Striking a Balance Between Physical and Digital Resources

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In various configurations—be they academic, archival, county, juvenile, monastic, national, personal, public, reference, or research, the library has been a fixture in human affairs for a long time.[1] "Digital"—meaning, content or communication that is delivered through the internet, is 20 years old (but younger in parts). Basically, both approaches to organizing serve to structure information for access. However, digital is multiplying very fast and libraries all-round contemplate an existential crisis; the more hopeful librarians fret about physical and digital space.

Yet, the crux of the matter is not about physical vs. digital: without doubt, the digital space of content or communication transmogrifies all walks of life and cannot be wished away; but, the physical space of libraries is time-tested, extremely valuable, and can surely offer more than currently meets the eye. Except for entirely virtual libraries, the symbiotic relationship between the physical and the digital is innately powerful: for superior outcomes, it must be recognized, nurtured, and leveraged; striking a balance between physical and digital resources can be accomplished. This paper examines the subject of "delivering digital" from macro, meso, and micro perspectives: it looks into complexity theory, digital strategy, and digitization.

I. A MACRO PERSPECTIVE: COMPLEXITY THINKING FOR LIBRARIES

With varying intent and success, libraries aim to select, classify, and describe information so they may provide that to "users" in response to priority needs.[2] But, here is the rub: Google Inc.'s mission statement, articulated in 1999, is to organize the world's information and make it universally accessible and useful.[3] The difference between the two—aside from the sheer audacity of Goggle's scope—lies in the characteristics of the milieus in which they operate.

Four contexts, defined by the nature of relationship between cause and effect, condition the issues the physical and the digital face and what responses may be entailed. (Kurtz and Snowden 2003) (Disorder—the fifth context—reigns when none of the other four dominates.) In simple (or obvious) contexts, cause-and-effect relationships are repeatable, perceivable, and predictable; the approach is to Sense–Categorize–Respond so we might apply best practice. In complicated contexts, cause-and-effect relationships are separated over time and space; the approach is to Sense–Analyze–Respond so we might apply good practice. In complex contexts, cause-and-effect relationships are only coherent in retrospect and do not repeat; the approach is to Probe–Sense–Respond so we might sense emergent practice. In chaotic contexts, no cause-and-effect relationships are perceivable; the approach is to Act–Sense–Respond so we might figure out novel practice. In brief, simple and complicated domains are those of order while complex and chaotic domains are those of un-order. (Snowden and Boone 2007)

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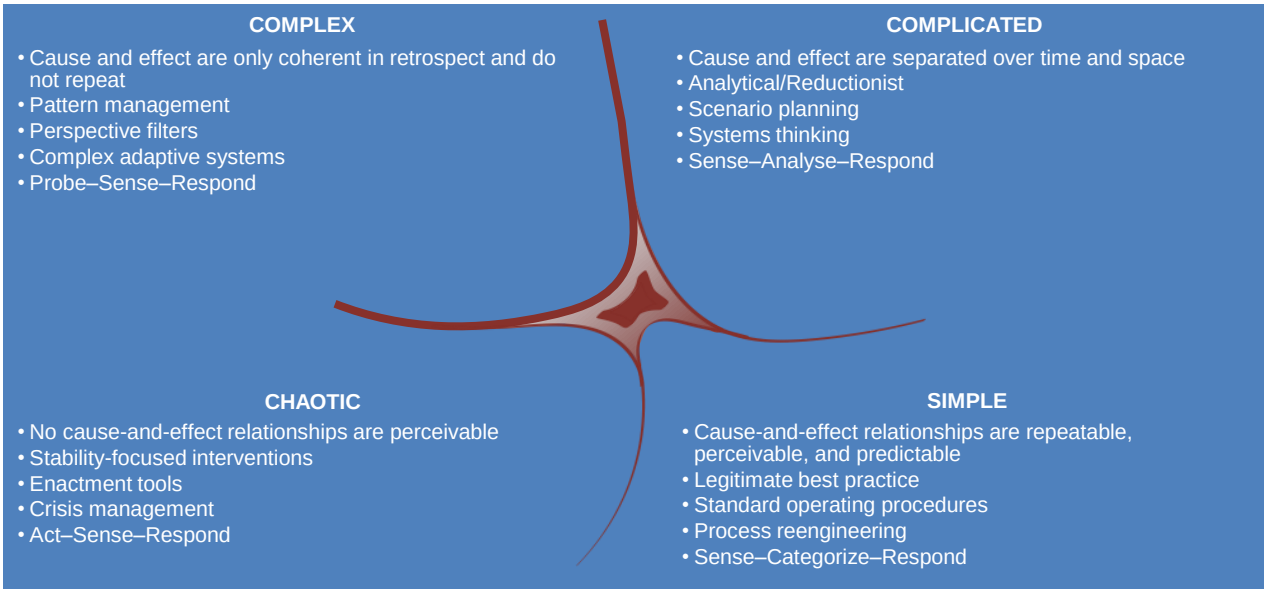
[1] The clay tablets of the ancient city-state of Ebla in northwestern Syria date from 2,500–2,250 BC. Unearthed *in situ* in the order in which they were shelved, the Ebla tablets number about 17,000—of which 1,800 complete documents, 4,700 fragments, and thousands of chips. The main subjects—recorded in cuneiform script—are commercial, e.g., exports, imports, receipts, tariffs; there are also historical, judicial, literary, and religious texts.

[2] Not so long ago, most libraries referred to their users as patrons, aka benefactors, not customers and even less clients. (Some still do.) Terminology—the nomenclature of terms belonging or peculiar to an art, business, science, or specialized subject—both reflects and colors one's worldview.

[3] In 1996, Google co-founders Sergey Brin and Larry Page were graduate students working on Stanford University's Stanford Digital Library Project. The goal of the project was to design and implement the infrastructure and services needed for collaboratively creating, disseminating, sharing, and managing information in a digital library context. They foresaw that in a future world, in which infinite collections of books are digitized, people would need a "web crawler" to index content and analyze the connections between books, thus determining a particular book's relevance and usefulness by tracking the number and quality of citations of it in other books.

Figure 1: Sense-Making in Context



Source: Adapted from Kurtz, Cynthia, and David Snowden. 2003. The New Dynamics of Strategy: Sense-Making in a Complex and Complicated World. *IBM Systems Journal*. 42 (3), pp. 462–483.

By making out the governing context, watching out for danger signals, and taking appropriate actions when preferred management styles might instead lead to mistakes, organizations can cope effectively in many situations. Traditional libraries may be deemed to operate in simple, at most complicated, contexts—the domains of legitimate "best" or good practice and experts addressing "known knowns" and "known unknowns".[4] (A history of libraries is a history of control.) But, the digital exists in complicated or complex, sometimes chaotic, contexts—the domains of experts in "known unknowns" but more often of emergence and rapid response to "unknown unknowns" and "unknowables".[5]

[4] In no specific order, the terms of reference for an academic librarian, for example, would normally include (i) selecting, developing, cataloging, and classifying library resources; (ii) answering readers' enquiries; (iii) managing library systems and specialist computer applications; (iv) leading library staff, assuming responsibility recruitment, training, and/or supervisory duties; (v) liaising with departmental academic staff, external organizations, and suppliers; (vi) ensuring that library services meet the needs of particular groups of users, e.g., departmental academic staff, postgraduate students, disabled students, etc.; (vii) managing budgets and resources; (viii) supporting independent research and learning; (ix) developing information technology facilities; (x) assisting readers in the use of computer equipment, the conduct of literature searches, etc.; and (xi) promoting the library's resources to users.

[5] On 9 April 2014, for instance, the Washington Post ran an article titled *Heartbleed Bug Puts the Chaotic Nature of the Internet under the Magnifying Glass*. The piece showcased "a major flaw in widely used encryption software [to highlight] one of the enduring—and terrifying—realities of the internet: it is inherently chaotic, built by multitudes and continuously tweaked, with nobody in charge of it all." (Washington Post 2014) The extent of the damage caused by Heartbleed may never be known, but the possibilities for data theft were enormous. The bug allowed hackers to access encrypted data online—including user names, passwords, credit card numbers, and social security numbers, and had companies and government agencies scrambling to update software.

Table: Decisions in Multiple Contexts: A Leader's Guide

	The Context's Characteristics	The Leader's Job	Danger Signals	Response to Danger Signals
Simple	• Repeating patterns and consistent events • Clear cause-and-effect relationships evident to everyone; right answer exists • "Known knowns" • Fact-based management	• Sense–Categorize–Respond • Ensure that proper processes are in place • Delegate • Use good practices • Communicate in clear, direct ways • Understand that extensive interactive communication may not be necessary	• Complacency and comfort • Desire to make complex problems simple • Entrained thinking • No challenge of received wisdom • Over-reliance on good practice if context shifts	• Create communication channels to challenge orthodoxy • Stay connected without micromanaging • Do not assume things are simple • Recognize both the value and the limitations of good practice
Complicated	• Expert diagnosis required • Cause-and-effect relationships discoverable but not immediately apparent to everyone; more than one right answer possible • "Known unknowns" • Fact-based management	• Sense–Analyze–Respond • Create panels of experts • Listen to conflicting advice	• Experts overconfident in their own solutions or in the efficacy of past solutions • Analysis paralysis • Expert panels • Viewpoints of non-experts excluded	• Encourage external and internal stakeholders to challenge expert opinions to combat entrained thinking • Use experiments and games to force people to think outside the familiar
Complex	• Flux and unpredictability • No right answers; emergent instructive patterns • "Unknown unknowns" • Many competing ideas • A need for creative and innovative approaches • Pattern-based leadership	• Probe–Sense–Respond • Create environments and experiments that allow patterns to emerge • Increase levels of interaction and communication • Use methods that can help generate ideas: open up discussion (through large group methods); set barriers; stimulate attractors; encourage dissent and diversity; and manage starting conditions and monitor for emergence	• Temptation to fall back into habitual, command-and-control mode • Temptation to look for facts rather than allow patterns to emerge • Desire for accelerated resolution of problems or exploitation of opportunities	• Be patient and allow time for reflection • Use approaches that encourage interaction so patterns can emerge
Chaotic	• High turbulence • No clear cause-and-effect relationships, so no point in looking for right answers • "Unknowables" • Many decisions to make and no time to think • High tension • Pattern-based leadership	• Act–Sense–Respond • Look for what works instead of seeking right answers • Take immediate action to reestablish order (command and control) • Provide clear, direct communication	• Applying a command-and-control approach longer than needed • "Cult of the leader" • Missed opportunity for innovation • Chaos unabated	• Set up mechanisms (such as parallel teams) to take advantage of opportunities afforded by a chaotic environment • Encourage advisers to challenge your point of view once the crisis has abated • Work to shift the context from chaotic to complex

Source: Snowden, David and Mary Boone. 2007. A Leader's Framework for Decision Making. *Harvard Business Review*. November, pp. 69–76.

New digital services spring to life every day: they remove human interaction to deliver innovative ways of interacting and engaging wherever and whenever, in just a few seconds. (Mobile applications, for

instance, are remodeling everything from, say, banking and shopping to leisure and self-education.)[6] Gradually more, they permeate our professional and personal lives, turning them into one and the same. Like everyone else, but also precisely because their users are going digital, libraries must move from simple (Sense–Categorize–Respond) to complex (Probe–Sense–Respond) modes of sense-making in the newly prevailing operative context. They must assimilate key concepts of complexity science.

Complexity thinking sees organizations as ecosystems—or markets—rather than machines whose parts have been fabricated for efficiency. Usefully, to help address the challenges of development and humanitarian aid but with unquestionable potential for application in other realms of human endeavor, the Overseas Development Institute has circumscribed what crucial concepts of complexity pertain to systems, change, and agency. (Ramalingam, Jones, Reba, and Young 2008). The following excerpts the related text:

- **Complexity and Systems.** The first three concepts relate to the features of systems that can be described as complex:
  1. Systems characterized by *interconnected and interdependent elements and dimensions* are a key starting point for understanding complexity science.
  2. *Feedback processes* crucially shape how change happens within a complex system.
  3. *Emergence* describes how the behavior of systems emerges—often unpredictably—from the interaction of the parts, such that the whole is different to the sum of the parts.
- **Complexity and Change.** The next four concepts relate to phenomena through which complexity manifests itself:
  1. Within complex systems, relationships between dimensions are frequently *nonlinear*, i.e., when change happens, it is frequently disproportionate and unpredictable.
  2. *Sensitivity to initial conditions* highlights how small differences in the initial state of a system can lead to massive differences later; butterfly effects and bifurcations are two ways in which complex systems can change drastically over time.
  3. *Phase space* helps build a picture of the dimensions of a system, and how they change over time. This enables understanding of how systems move and evolve over time.
  4. *Chaos and edge of chaos* describe the order underlying the seemingly random behaviors exhibited by certain complex systems.
- **Complexity and Agency.** The last three concepts relate to the notion of adaptive agents, and how their behaviors are manifested in complex systems:
  1. *Adaptive agents* react to the system and to each other, leading to a number of phenomena.
  2. *Self-organization* characterizes a particular form of emergent property that can occur in systems of adaptive agents.
  3. *Co-evolution* describes how, within a system of adaptive agents, co-evolution occurs, such that the overall system and the agents within it evolve together, or co-evolve, over time.

Next, to move from the simple to the complex, libraries may find inspiration in the world of project-based organizations. Projects are framed by two parameters: how well-defined the goal is, and how-well defined the methods to achieve that are. This leads to four sets of attributes: (i) well-defined goal and methods, e.g., engineering and construction projects; (ii) well-defined goal, poorly defined methods, e.g., product development projects; (iii) poorly defined goal, well-defined methods, e.g., systems development projects; and (iv) poorly defined goal and methods, e.g., research and organizational change projects. (Asian Development Bank 2012) The situation a library faces where digital is the new default fits in the fourth category. Here, a complex (sometimes chaotic) context owes to unclear directional sources. So, as a general rule, it is best to look for patterns, be patient, and encourage solutions to emerge. (In other words, one should not try to control the situation and demand a plan of action.) Specifically, it helps (pell-mell) to augment discussion; encourage dissent; harness top talent; be flexible about the engagement of different

[6] Mobile applications are computer programs designed to run on smartphones, tablet computers, PDAs (personal digital assistants), and other mobile devices. They are usually made available through application distribution platforms, which appeared in 2008 and are typically operated by the owner of the mobile operating system. The largest platforms are Google Play, App Store, Amazon Apps, Windows Phone Store, and BlackBerry World, with the first two enjoying more than 90% of worldwide "app" revenues. As of June 2015, the number of applications available for download from Google Play was about 1.5 million; that from App Store was about 1.4 million. Popular categories are games, business, education, and lifestyle, which together comprise almost 50% of active applications, followed by entertainment, utilities, travel, books, music, etc. (Statista, 2015)

personality types; stimulate creative thinking; network with peers outside the organization; task a diverse group of people to come up with innovative, creative solutions (within set boundaries); tap internal knowledge markets; conduct business experiments; accept failure as part of the learning process; monitor for emergence; and manage change. Throughout, it is vital to interact and communicate.[7]

II. A MESO PERSPECTIVE: PLANNING AND DRIVING A DIGITAL STRATEGY[8]

There is now overwhelming evidence—with more accumulating every day—that information and communications technology is a critical determinant of an organization's success. Digital is no longer optional: on the verge of the Internet of Things, organizations must quickly embrace the digital world if they are to survive and, preferably, thrive. To boost efficiency and productivity, reduce transaction costs, and (above all) transform service delivery, organizations must be digital by default. Irrespective of the "arena" an organization finds itself in, digitization enables fundamentally different ways in which to think about clients, audiences, and partners and, vitally, engage them. Digitization—simple, clear, and fast—helps address and answer questions such as:

- What are the expressed and latent needs of clients, audiences, and partners (not forgetting relationships and behaviors)?
- How does one build products and services to better meet these needs?
- How does one integrate these products and services into a digital strategy? (Conversely, how might a digital strategy conduce new, value-adding products and services?)
- What are the organizational, directional, process-based, and information technology-related changes required to make the transition happen?

In consideration of an organization's mission—inasmuch as one has been specified, vision, and goal as well as analyses of strengths, weaknesses, opportunities, and threats, a digital strategy aims to identify, articulate, and execute what digital initiatives across the organization will create value (and in so doing deliver competitive advantage, even in the public or not-for-profit sectors).[9] The span of digital initiatives can range from a focus on the organization *per se* to sharper attention to clients, audiences, and partners.[10] The ambit of digital strategies encompasses:

- **Rethinking.** Organizations can no longer make the needs of clients, audiences, and partners fit existing arrangements with outdated one-size-fits-all approaches. Instead, they should characterize demand and build products and services around requirements. In the digital world, value-added springs from conceptualizing ecosystems and business models that redefine and upgrade organizational performance to meet demand. The key is to identify what value means to clients, audiences, and partners, and to deliver it.
- **Designing.** Organizations that deploy successful digital strategies do not just address the needs of clients, audiences, and partners; with design thinking, they make out unarticulated wants and deliberately imagine, envision, and spawn futures; with digital engagement, they also harness clients, audiences, and partners and, at the peak of an increasing continuum of involvement, e.g., reached, interested, involved, and activated, get them to perform work—meaning, co-create—for bottom-up change that adds value on the organization's behalf.
- **Implementing.** The internet, together with the social media and mobile applications that leverage it and boost it, has changed the way we search, connect, and collect. (Mobile applications—which surfaced in 2008—are becoming increasingly prevalent across smartphone users.) Information and communications technology has also dramatically transformed the way organizations build brands.

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[7] The Asian Development Bank's *Knowledge Solutions* series aims to build competencies in the areas of strategy development, management techniques, collaboration mechanisms, knowledge sharing and learning, and knowledge capture and storage. Many of the tools, methods, and approaches the series offers are relevant to the four project typologies presented, including the last. (Serrat 2008–)

[8] This section excerpts an unpublished précis. (Serrat 2015)

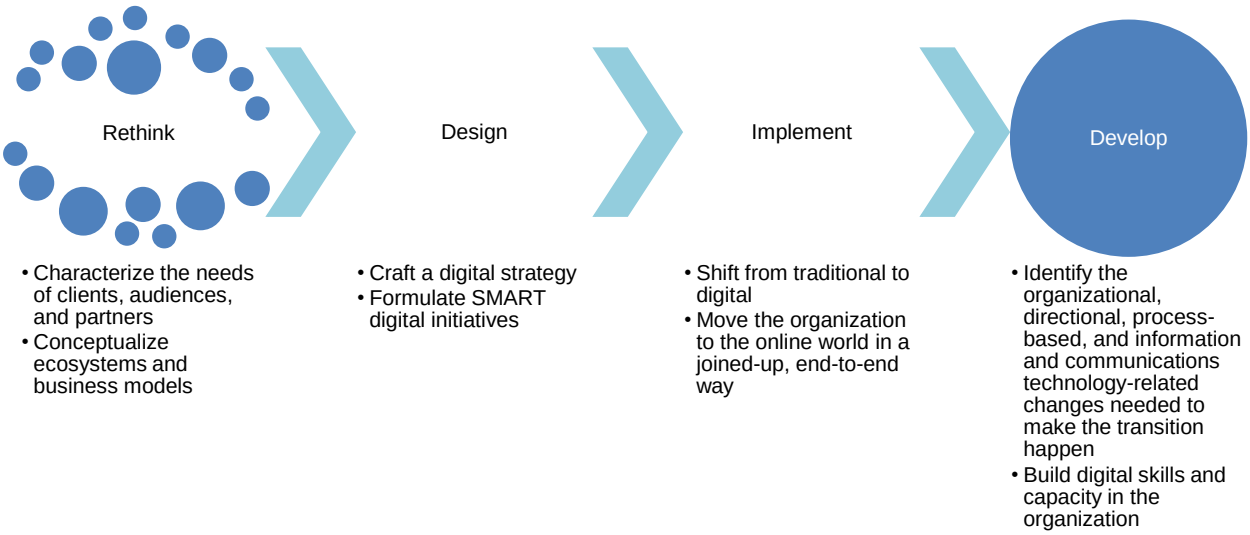
[9] Many see digital strategy as a process: this point of view lays emphasis on progression—from a starting point to targets to destinations unknown.

[10] Enterprise-centric digital initiatives might have to do with collaboration; customer intelligence; governance; innovation; market, product, and service exploration; sales and service performance; technology architecture and processes; etc. Sharper attention to clients, audiences, and partners might relate to advertising, e-commerce, mobile applications, search engine optimization, social media, web sites, etc.

But, developing a digital strategy often requires that offline and online operations be integrated end-to-end; personnel must also be migrated to the online world.

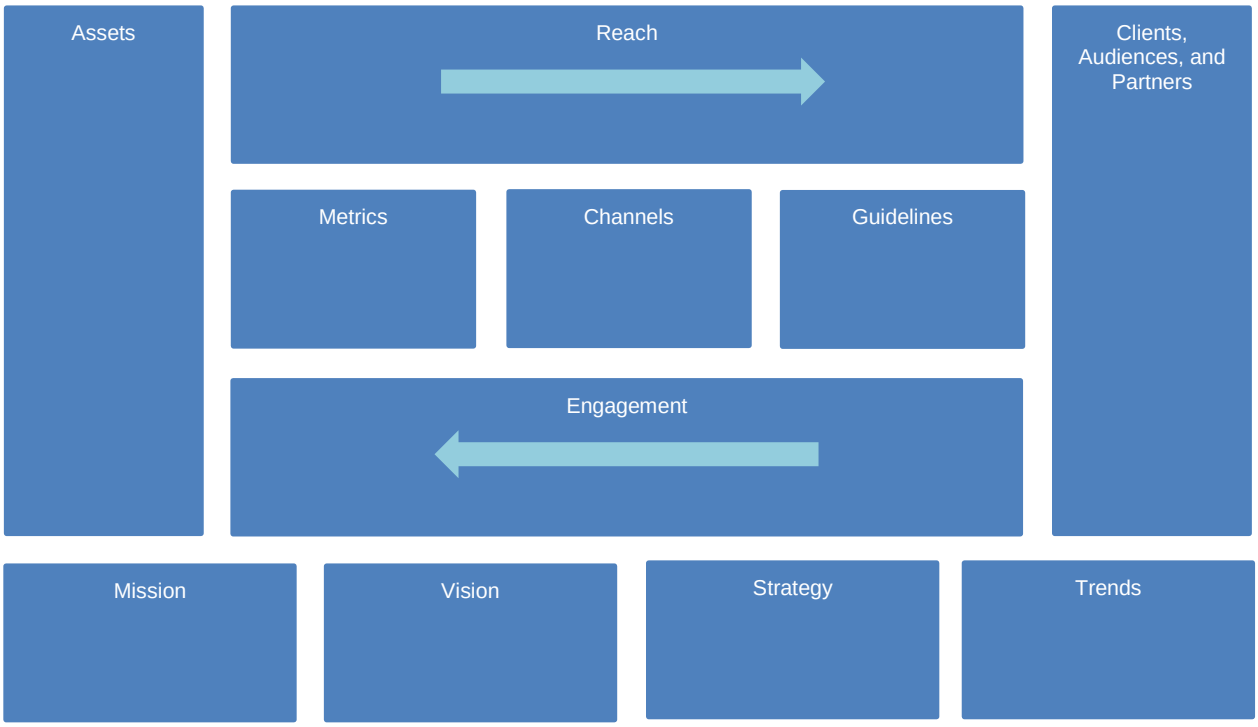
- **Developing.** In organizations, new digital skills and capacity are needed to successfully make the transition to the digital world. Organizational, directional, process-based, and information and communications technology-related changes must be effected to make the transition happen.

Figure 2: Planning and Driving a Digital Strategy



Source: Author.

Figure 3: Elements of a Digital Engagement Construct

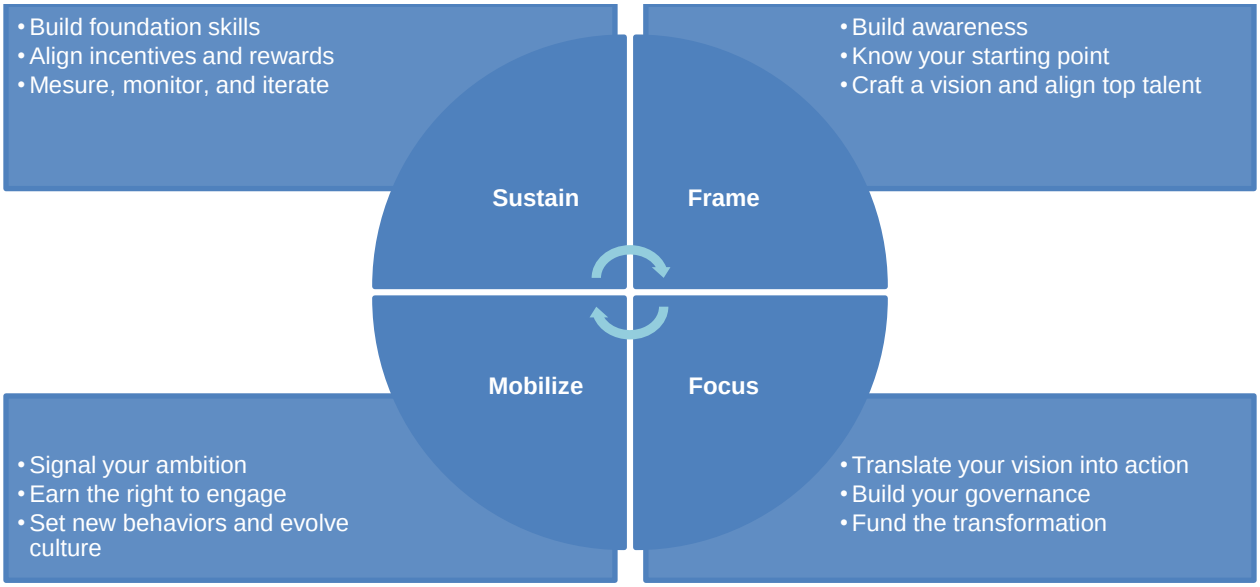


Source: Adapted from *Digital Engagement Framework*. 2014. digitalengagementframework.com/.

The journey toward digital transformation is best begun—and continually assessed—by surveying the environment; Westerman, Bonnet, and McAfee, in *Leading Digital*, share a blueprint. (Westerman, Bonnet, and McAfee 2014) Helpfully, they also itemize related questions (and subset queries) to gauge perceptions about the state of affairs. The questions pertain to:

- **Framing.** How well has the organization framed the digital challenge?
- **Focusing.** How well has the organization focused its investment?
- **Mobilizing.** How well has the organization been mobilized?
- **Sustaining.** How well is the organization sustaining digital transformation?

Figure 4: The Digital Transformation Compass



Source: Westerman, George, Didier Bonnet, and Andrew McAfee. 2014. *Leading Digital: Turning Technology into Business Transformation*. Harvard Business Review Press.

III. A MICRO PERSPECTIVE: SELECTING MATERIALS FOR DIGITIZATION

When books (and their antecedents) were either unavailable or unaffordable libraries stood as the only centers of excellence for organizing information:[11,12] today, content is easily accessible via the internet. What is more, the Digital Revolution is changing the nature of what is organized as well as the means of its organization. So, digital is the new default but balance is the key: certain forms of library service should not suffer at digital's expense, no matter how good digital may be.[13] Libraries should not be seen

[11] Johannes Gutenberg's invention of the printing press around 1440 enabled the mass production of books but this does not mean they became available and affordable everywhere. And yet, even in low-income countries, limited access is being overcome by mobile technology. Worldreader Mobile, launched in 2012, makes e-books available via a wide range of mobile phones including inexpensive feature phones. The genres it publicizes include action and adventure, education, health, religion, and romance.

[12] Beginning December 2014, the New York Public Library has shared every Monday at instagram.com/explore/tags/letmelibrarianthatforyou/ questions that its "patrons" posed to staff in the pre-internet 1940s–1980s. The (sometimes hilarious) queries support the tongue-in-cheek claim that libraries were once looked up to as the font of all knowledge.

[13] Some libraries house unique materials, often paper-based. Grounded in considerations of historical, cultural, social, or spiritually significance as well as comparative value, e.g., rarity, completeness, and integrity relative to others of their kind, conserving and preserving special collections can (i) recount the past, communicate the present, and profile the future; (ii) guarantee the safekeeping and continuation of cultural and scientific heritage; (iii) increase the comprehensiveness, depth, uniqueness, authenticity, and reputation of a library; and (iv) obviate the fact that digitization does not preserve the artifact value of original items.

as buildings (or special collections)[14] but, rather, as business-minded cultural institutions:[15] this standpoint opens vistas for a participatory, receptive, imaginative, and plastic regeneration of their physical forms. (Design thinking has much to offer here: after all, access is a means, not an end.) (Donner-Reichle and Dueñas 2012) This said, because they are quintessentially about information, libraries must in the 21st century marry their physical space to the digital world. Digital augments physical: it multiplies a library's ability to explore and meet user needs, even when they are not expressed, distant though these users may be; it raises a library's profile as users worldwide enjoy its materials remotely; within the premises of a library, it also offers convenient online access to content and, by releasing physical space, to possibly much else if this helps move them from collecting to enabling connection and creation.[16]

This is not to say transition is not underway. In many libraries, touchscreen technology delights visitors (especially, their children); tables come equipped with computers or laptop plug-ins; and card catalogs—replaced by online public access catalogs—have been consigned to basements. Likewise, digitization of architectural drawings, books, graphics, magazines, manuscripts, maps, moving images, musical scores, photographs, posters, recordings, texts, etc.—whether mass or large-scale—is not new: for many years, thousands of libraries of all sizes have done just that, either to safeguard materials for future generations or—a case in point—for reaching much wider audience than they ever could otherwise.

Libraries that have much physical space should maintain physical items and even enlarge and renew collections, especially with items that are rare. However, they should give growing priority to digital formats in new acquisitions and to developing digital content where no one else will.[17] So, what good practice might they follow? Relatively early, in 2004,[18] Cornell University Library established a task force to articulate and recommend a policy for selecting traditional (defined as ink-on-paper) materials for digitization.[19] The following excerpts from the questions and understandings that guided work: (Cornell University Library 2005)

- *What is content*? Content is information in context: it includes all of what is intrinsic in a document, viz., its ideas, organization, and physical presentation.

[14] Individual libraries determine for themselves what their special collections are. Notwithstanding, the attributes of special collections include artifactual or monetary value, uniqueness or rarity, and/or an institutional commitment to long-term preservation and access. Special collections tend to be housed in a separate unit, with specialized security and user services.

[15] Every business is now a digital business: the question is not whether organizations should do something about digital; it is, rather, what should they do to remain efficient, sustainable, and resilient? Certain industries—most immediately those that intermediate—stand first in the line of fire as digital destroys, merges, and creates ecosystems, changing value chains and enticing (when not forcing) players into new roles; because of the size of their industries, electronics, media, retail, and telecommunications are being subjected to wholesale change. However distasteful reality may be, libraries too must accept that they are in business: their challenges are not unique; every day, others face similar travails e.g., confronting uncertainty, facing increased competition, finding the right staff, husbanding resources, managing risk, narrowing the technology gap, retaining customer loyalty, solving problems, valuing products and services, etc. At the very least, business-mindedness would rally round their parent organizations to the opinion that libraries are not incorrigible cost centers but centers of value.

[16] The possible uses for physical space include art studios; band practice rooms; blogger stations; cybercafés; daycare facilities; drama studios; exercise bicycles and treadmills; gamer stations; imagination rooms; mini-theaters; podcast studios; recording studios; video studios; and virtual world stations. (Serrat 2014) Some of these uses are efforts to reinvent the library as a "third place"—neither work nor home—focused on learning, with "makerspaces" for creativity and innovation projects.

[17] In Egypt, the Bibliotheca Alexandrina that was established in 2002 archives all the webpages of every website on the internet since 1996. Initiated in San Francisco, the original Internet Archive, available at archive.org/, agreed that the Bibliotheca Alexandrina would provide backup as well as two mirror sites. The archive is available at archive.bibalex.org via the Wayback Machine; it is the first of its kind outside the United States.

[18] That same year Google Inc. announced a partnership—now Google Books—with five research libraries to digitize the full text of millions of books (and magazines) using optical character recognition; the original participants—sixteen others have joined the partnership since—were the University of Michigan, Harvard (Harvard University Library), Stanford (Green Library), Oxford (Bodleian Library), and the New York Public Library. In 2010, Google reckoned there were about 130 million distinct titles in the world and expected to scan all of them by the end of the decade; as of 2013, the number of book titles it had scanned was over 30 million.

[19] See also International Federation of Library Associations and Institutions. 2002. *Guidelines for Digitization Projects for Collections and Holdings in the Public Domain*. www.ifla.org/publications/guidelines-for-digitization-projects-for-collections-and-holdings-in-the-public-domain.

- *Why digitize*? Digitization is a tool for increasing access to information.[20]
- *Why select*? In addition to the inevitably finite nature of resources, which demands that priorities be set, some print materials may be unsuitable for digitization because of format, condition, or other characteristics.
- *Why preserve originals*? Library digitization must not sacrifice historically significant materials nor deny researchers the ability to study ways in which information was originally presented.
- *What technologies should be used to digitize*? Digitization should be accomplished with the use of multiple scanning and photographic technologies. These evolving technologies would minimize, but not necessarily eliminate, destruction of originals.
- *Why exclude copyright?* The focus of the task force would be digitization based upon content. Legal (and technical) issues would be considered as a second step in the selection process.

The task force articulated selection criteria for both project-based and systematic digitization: the first set would help determine the priority of collections or intellectual groupings of materials for targeted digitization, applied by library staff in consultation with subject experts; the second would govern systematic digitization without selector intervention as well as digitization upon request by a faculty member or researcher.

The following list excerpts the task force's recommended criteria and associated parameters for prioritization of *project-based digitization*:[21]

- **Value**
  1. Collections of unique materials or subjects of supreme strength at Cornell University Library
  2. Materials that provide exceptionally broad or deep coverage of a subject or theme
  3. Materials that are not well represented in other digital collections or projects
  4. Collections that provide potential for generating revenue for Cornell University Library
  5. Collections that offer potential to attract development opportunities
- **Utility**
  1. Demonstrated or potential demand
  2. Responsive to Cornell University's research and teaching needs
  3. Responsive to regional, national, or global research and teaching needs
- **Access**
  1. Provides value-added enhancements such as search capabilities, text manipulation, interpretive commentary, or bibliographic apparatus
  2. Offers synthesized virtual collection, linking geographically dispersed originals
  3. Provides surrogate access to fragile originals for preservation purposes
- **Innovation**
  1. Provides opportunity for building innovative relationships among institutions
  2. Provides opportunity to forge new delivery models, metadata standards, technological advantages, entrepreneurial models, or modes of scholarly communication
- **Continuity**
  1. Considers the inventory of Cornell University Library's current digital holdings and projects in preparation and builds on them, where possible

The following list excerpts the task force's recommended criteria for *systematic digitization*:[22]

- Assumes digitization of non-unique or non-rare stack materials only
- Assumes no destruction of originals without special collections review

[20] This is pithy enough; others strain the rationale for digitization of resources into three: (i) to enhance access; (ii) to facilitate new forms of access and use; and (iii) to preserve damaged or endangered materials.

[21] Interestingly, the task force deemed that the selection criteria for project-based digitization could be informed by many of those that drive conventional collection development decisions, e.g., value, utility, demand, condition, collection relevance, opportunities for distinctive aggregation, etc.

[22] Helpfully, the task force also looked into circumstances that might warrant the withdrawal of paper originals after digitization. The criteria it identified related to duplicate copies, e.g., more than one original held by Cornell University Library; imminent loss of content, e.g., brittle paper; and items that survive in large numbers and carry no demonstrable aesthetic, associative, evidential, or other physical value.

- Requires professional staff to outline negative criteria in advance, e.g., item incomplete, illegible, too fragile, copyright restricted
- Production must include a training program in the safe handling and preservation of materials

In the "reselection" process for digital conversion libraries can surely learn from Cornell University Library's questions, understandings, and selection criteria—to which the findings, conclusions, and recommendations of numerous symposia since 2004 add depth.[23] Light on digitization of resources can be shone quite effectively by such particularized concerns as value, utility, access, innovation, and continuity: it follows there is no unmitigable danger that resources might be preserved digitally without any consideration of their actual worth just because they can be. (Besides, once a copy has been digitized it is "free" to additional users and not uncommonly ends up elsewhere on the internet. This means it no longer matters who owns the "file"; and so, libraries do not need to keep a copy of everything.)

Post-planning, digitization projects traverse (i) processes occurring prior to digitization, (ii) digital conversion, and (iii) post-digitization work;[24] they can be complicated and their success rests on effective project management, the requirements of which should never be an afterthought. (Parenthetically, obtaining copyright permission is not always possible: this can derail a digitization project that may otherwise seem straightforward. Past that hurdle, semantic differences and different vocabularies may constrain—or block—interoperability across databases.[25] At some point, what with the progress of information and communications technology, issues of digital obsolescence may also crop up. Then again, perhaps, lack of funds or diminishing institutional commitment may—one way or another—limit the sustainability of digital resources.) One underrepresented area that clamors for attention is that of "authentication". Is the digital product tamperproof? Can it be relied upon as completely correct as to version and edition in time and place? One can tamper with paper but this only at some (perhaps considerable) cost; yet, digital tampering may be much easier. (Authentication would appear to be particularly important for documentation that has legal ramifications.) Throughout history, libraries were the trustees of official and authentic versions of documents: these were relied upon by the body politic, counting scholars. (Germain 2012) Without digital authentication, one of the most valued attributes of libraries—trustworthiness, might be lost. Can any "techie" [*sic*] now rewrite "history"?

The views expressed in this article are those of the author and do not necessarily reflect the views and policies of the Asian Development Bank, or its Board of Governors or the governments they represent.

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[23] In 2006, for instance, the University of Michigan University Library and the National Commission on Libraries and Information Science in the Government of the Unites States, renamed Institute of Museum and Library Services in 2008, convened a symposium on *Scholarship and Libraries in Transition: A Dialogue about the Impacts of Mass Digitization Projects*. Deliberations on information policy clustered in four areas: (i) How should important aspects of copyright—fair use, orphan works, opt-in vs. opt-out models—be handled in digitization projects? (ii) When is the quality of optical character recognition good enough? What about quality of content and authentication? (iii) What are the roles of publishers and booksellers in the digital age? (iv) What business models are needed in the era of mass digitization? How will the open access movement affect the economics of digitization? Reflections on the role of libraries in the digital age concentrated in three areas: (i) What are the roles and priorities for libraries in the digital age? (ii) Who will assume long-term ownership of books and journals and other media? Who will take responsibility for long-term preservation of books and journals and other media and for preserving the public record? (iii) How can the silos of digital initiatives communicate with each other to promote standardization and interoperability? (Bellardo Hahn 2006)

[24] More exactly, but even then at the risk of oversimplification, workflows administer such sundries as selection, assessment, and prioritization of materials; preparation of originals for digitization, metadata collection or creation, digitization, quality management, and data collection and management; and submission of digital resources to delivery systems leading to repository environments, followed by assessment or evaluation of the digitization effort.

[25] Here, interoperability is the ability to search across different sets of metadata records in such ways that deliver meaningful results.

Timeline, available at reflections.adb.org: this is an anthology of videos that catalogs major sector and thematic landmarks in ADB's operations since 1966. Olivier can be reached at oserrat@adb.org.

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