The ARL 2030 Scenarios:

A User's Guide for Research Libraries

October 2010

Association of Research Libraries
Stratus, Inc.

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The scenarios and strategic implications presented in the user's guide were developed by representative leaders from ARL member institutions. The strategic focus and critical uncertainties highlighted in the scenarios were identified through a consultative process with the ARL membership during the spring of 2010. Input was provided through focus group participants, contributors to an online survey, and one-on-one interviews. Representative leaders from ARL member libraries identified the four scenarios and key elements and dynamics operating within them and provided valuable feedback on the scenarios during the editing process. Key strategic implications and related strategic questions for research library consideration were identified by representative leaders from ARL member libraries who met in September. They also played a role in helping to tune this resource to better serve the needs of research libraries.

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Chapter 1: Introduction

Strategic Direction: Transforming Research Libraries: Outcomes & Strategies
Strategy 1: Initiate visioning and scanning activities focused on emerging roles for research libraries in the processes of research, scholarship, and graduate education. Encourage and facilitate member engagement in adopting new roles in advancing research and scholarship.

ARL Strategic Plan 2010–2012

Confronting uncertainty in a rapidly changing environment is essential if research libraries are to continue to be valued and valuable contributors to the advancement of new research and the creation of new knowledge. The temptation to "wait and see" is appealing but exposes libraries to the risks of irrelevance and replacement. By delaying decision-making we may magnify the risks to our organization's future instead of reducing them. While research libraries think a lot about change and constantly change themselves, relatively little library planning actively engages with uncertainty.

When ARL's Transforming Research Libraries Steering Committee considered options for implementing the ARL Strategic Plan's call to initiate visioning and scanning activities to foster research libraries' adoption of new roles, the group was interested in seeking new approaches that the community could use to enrich and deepen its thinking about the future. A broad consensus emerged from ARL's strategic planning process that techniques are required that shift planning attention from incremental to transformational approaches.

Scenario planning is a tool that a few research libraries have used, but is largely new to the library community. Its ability to focus planning attention away from the false security of prediction to a balanced consideration of risk opens a range of largely unexplored avenues for thinking about the future and about strategic change. Scenario planning typically looks out over time horizons that are substantially longer than those used for strategic planning—20 to 50 years is not an uncommon span. This also enhances the technique's value in fostering transformational thinking.

Scenario planning is not a new technology; other sectors and industries have for decades been developing its methodologies for identifying and engaging with uncertainty and applying the results to organizational planning. In a variety of forms, it has been used by hundreds, if not thousands, of organizations. While it may be unfamiliar to many in research libraries, it is a mature planning tool that is used widely outside of higher education and occasionally within higher education. It is also a highly flexible activity—one that can be adapted and customized for a variety of needs and purposes. An institution can use a scenario set for a range of planning activities and can return to its scenario set again and again over time as its needs and circumstances change.

When ARL launched its scenario planning project, "Envisioning Research Library Futures: A Scenario Thinking Project," in the early spring of 2010, it set out to design a set of scenarios that could serve as a resource

for any member library to use to enhance its strategic planning process and to foster organizational alignment around change. Developing a scenario set is not enough, however. ARL also determined that the project needed to engage in a variety of activities to help members learn about scenario planning and determine how best to use the scenarios to meet their own organizational objectives. This user's guide, including the ARL 2030 Scenarios, is designed to be a key resource supporting members' application of scenario planning. In addition, the ARL scenario planning project will be developing additional resources and supporting activities.[1]

Who This Guide Is For

This user's guide was developed to advance local planning at ARL member libraries. It is written for library leaders writ large and for anyone leading or contributing to research library planning processes. You do not need advanced facilitation skills to benefit from this guide, but facilitators charged with supporting scenario planning will find the detailed designs particularly helpful. For leaders, planners, and facilitators alike, the user guide introduces the ARL 2030 scenarios and explains many of the ways you can strengthen your institution's planning using the ARL 2030 Scenarios.

Scenario planning is a methodology that requires substantial time and other resources to implement. ARL has supported the investments in the creation of this scenario set, and individuals and libraries can find great value even by committing a few hours to consideration of the scenarios and the strategic implications this guide includes. However, to more fully benefit from scenario planning, libraries will need to make more significant, longer-term investments to implement the advanced designs the user's guide offers. Many readers will not be prepared to implement the guide's most powerful tools themselves, as well-developed facilitation skills are required. However, leaders can use the descriptions of the tools to decide which might be used most effectively at their organization and to determine what resources are needed to initiate scenario planning or integrate it with their strategic planning program.

Users should bear in mind that the scenarios are designed for a particular community—North American research libraries. ARL defined the project's strategic focus further to concentrate on those functions of research libraries that advance the research process. Thus the scenarios have been developed to be useful to a broad audience but do not attempt to address all of the possible concerns of research libraries. While the scenarios touch on developments in related activities, for instance undergraduate education, a different scenario set would need to be developed to look deeply at uncertainties around a topic like the future of undergraduate education. However, there is sufficient depth within the scenarios to support conversation and planning around the changing relationship between teaching and research.

How to Use This Guide

After reviewing the introduction, it is important to take the time to read the full scenario set carefully. "Scenarios" is a term that is often used in a vernacular sense. The ARL 2030 Scenarios are rich descriptions of four possible futures. Each presents a particular exploration of many critical uncertainties in a way that considers the dynamics that might unfold over a twenty-year time frame, as well as synergies and interactions between uncertainties. As a set, the four scenarios are designed to tell widely divergent stories to explore a broad range of possible developments over time.

The goal in using scenarios is not to pick one as more likely or more desirable but to accept that the future will contain elements of all four scenarios. Each scenario in itself, however, offers a chance to engage deeply with particular outcomes that libraries could face. The first page of each scenario offers an overview and highlights

[1] Visit the project website at http://www.arl.org/rtl/plan/scenarios/ or sign up for the list: ARL-2030-Scenarios@arl.org for information about other project activities and resources.

important circumstances and dynamics. This is followed by a narrative story that paints a more detailed picture of the situation in 2030 and the circumstances that led to that particular future. To make it easier for users to work with the scenarios as a set and to look at how critical uncertainties vary across the four, the end state table provides a relatively compact guide and reference.

When you read the scenarios you will notice that there are four futures described, but libraries are not explicitly described in any of those futures. Scenarios created for use in scenario planning intentionally leave the organizations that are planning out of the picture. This allows the organization to better focus on the main forces that are shaping the environment around it. Thus, each scenario has a blank where the library can fill itself in through the planning process. It is assumed that in each future research libraries exist in some form.

This approach means that other kinds of organizations might also find blanks that they can explore through a scenario planning process. ARL can consider its future as an association using these scenarios, but other kinds of libraries, other actors in the research enterprise, or other participants in the scholarly communication system could find value in using this scenario set and the user's guide.

Once you are familiar with the ARL 2030 Scenarios, you are in a position to review the strategic implications that were identified through the ARL scenario project. These are intended as a starting point and model rather than a comprehensive identification of strategic implications implicit in the scenarios. With this understanding of the scenario material, you will be ready to browse through the information on mapping out an institutional process and read the descriptions of different strategies for applying the ARL 2030 Scenarios to planning in your organization. Each ARL member is unique. The guide is designed to provide a good range of ideas and resources from which member libraries can choose in deciding what best meets their individual needs.

For some member libraries, this guide may provide all the help they need in integrating the ARL 2030 Scenarios into their planning process. However, ARL is planning to continue its scenario project and develop workshops and other resources to support members' use of the scenarios. As further support is developed, information will be provided at the project's website at http://www.arl.org/rtl/plan/scenarios.

Chapter 2: The ARL 2030 Scenario Set

Scenario Set Introduction

Scenario planning is a strategy-related methodology many organizations can use to explore the uncertain landscape of the future external environment in which they may operate. The process is designed to make deeply held assumptions and beliefs explicit, and to test those beliefs and assumptions against the critical uncertainties facing the organization.

Critical uncertainties are those drivers of change that are the most uncertain and most critical to the organization's future success. The critical uncertainties are crafted into a set of plausible and relevant scenarios, which represent what the future might hold. Scenarios are not prescriptions, but rather carefully constructed tools that help individuals consider the implications of future possibilities on their organizations and missions.

No single scenario ever captures the future with accuracy. Instead, the set of scenarios as a whole contain the elements and conditions the organization will face in the future. This is why it is important to consider the full set of scenarios in planning, and not choose one or consider one more likely than another. By exploring the strategic implications of a scenario set, organizations are able to create a strategy that is robust across a broad range of challenges and opportunities.

The ARL 2030 Scenarios were developed for ARL members to use in advancing organizational planning for their local institutional setting. The scenarios were created by representatives from member institutions to ensure their usefulness to ARL members seeking to engage in a rich strategic conversation on the futures of research libraries.

The time horizon for ARL's scenario planning project looks out 20 years from today (out to 2030). This time horizon determines the end state described in the scenarios. The ARL 2030 Scenarios allow members the opportunity to suspend disbelief and stretch beyond conventional wisdom about our future. Although the scenarios are far into the future, member organizations can use them effectively for planning for the next 1 to 5 years.

The Scenario Development Process

Strategic Focus Development

The first step in this process was to define the strategic focus for the scenarios and strategic conversation to follow. Using a series of internal interviews, focus groups, and surveys of key constituents conducted by Stratus Inc. and ARL staff, the core strategic questions on the minds of key decision-makers were gathered.[2] Through the internal data-gathering processes mentioned above, the following strategic focus for the scenarios emerged:

[2] A report that summarizes the findings of that process can be found on the ARL 2030 Scenario Planning Project website at http://www.arl.org/bm~doc/scenarios-data-gathering-summary-082010.pdf.

How do we transform our organization(s) to create differential value for future users (individuals, institutions, and beyond), given the external dynamics redefining the research environment over the next 20 years?

The term, "we" refers to the ARL member research libraries. "Our organization(s)" was captured in both the singular and plural, as member libraries share an interest in both individual strategic planning as well as collaborative strategic planning.

"Transform" is a term that carries a legacy. In this context, the word refers to the opportunity to use the scenario set to help research libraries to redefine themselves to maintain and grow a differential value in the market. That being said, it is important to note that research libraries are all at different points in their individual evolution.

Everyone that shared insights with ARL brought up concerns about maintaining and/or building a relevancy that could be sustained and valued by users. Sustained value by definition must have some differentiating characteristic that ensures that value for users is maintained over time. As such, the terminology "differential value" seems to most accurately capture the strategic imperative most frequently focused on by member organizations.

Value is always for the customer, or in this case the user. Members discussed how the user group for research libraries was changing and expanding. As such, we chose to clarify the focus on "future users." Some members focused primarily on the parent institutions, others on individual users. The term "future users" includes these two critical stakeholders and is not limited to future possibilities that may take us beyond our current thinking.

"Research environment" is deliberately selected to constrain the scenarios to a manageable range of dynamics. The teaching and learning environment is thus not scoped within the strategic focus. However, it is important to note that although this scenario exercise did not concentrate on the full set of dynamics that are changing the learning environment, learning and its critical role in the research process are considered part of the "research environment."

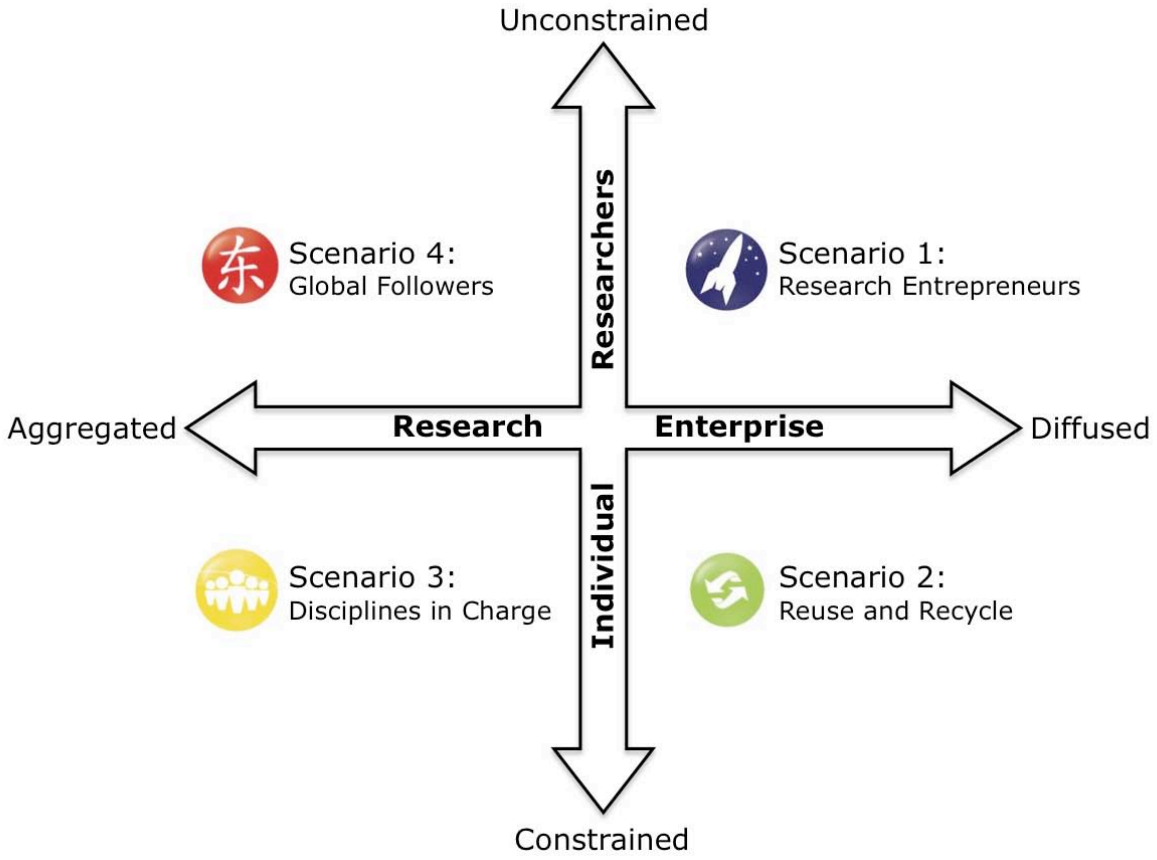
Scenario Development

A Scenario Development Workshop brought together a group of 30 representative of the North American membership, along with external provocateurs and ARL staff, to create the scenario set. Participants considered a wide variety of social, economic, technological, political, and environmental drivers of change relevant to research library futures and chose a set of scenarios most relevant to ARL members and their strategic focus. The ARL 2030 Scenarios are captured on a 2 x 2 matrix in which the two axes represent the framing of critical uncertainties:

- **Research Enterprise**: To what extent are the broad set of activities and stakeholders that encompass the full global span of research activities programmatic and intentional? Will research be highly diffused into loosely related initiatives and activities or will it be aggregated, organized, and mediated by powerful social structures?

- **Individual Researchers**: Will individual researchers become constrained by technology, resources, or other factors that overshadow their role in the research process and limit their ability to shape their research program, or will they be unconstrained in their work, managing and expanding their research methodologies and programs as they see fit in increasingly creative and innovative ways?

When these two critical uncertainties are combined, four highly divergent and rich scenarios emerge that are organized in the four quadrants of the 2 x 2 framework:



These two uncertainties help to organize and distinguish the four scenario narratives, but each story explores the dynamics of change associated with a richer set of critical uncertainties that include:

- Nature of Research
- Researchers
- The Research Community
- The Dynamics of Knowledge Sharing
- Economic Outlook and Funding
- Nature of Technological Surprises
- Digitization and Beyond
- Government Regulation and Intellectual Property
- Globalization
- State of Higher Education

Each scenario is presented first through a one-page overview that leads into a rich contextual story of how the future of research may play out in one of four highly divergent ways. This narrative strategy allows the reader to explore synergies and intersections among multiple uncertainties and surface opportunities and constraints that emerge as critical uncertainties play out over time.[3]

[3] The scenario narratives were written by Karla Strieb (ARL) with editorial assistance from M. Sue Baughman (ARL), Tricia Donovan (ARL), Lee Anne George (ARL), and Susan Stickley (Stratus, Inc.).

How to Approach the Scenario Set

In order to fully engage with this material, you must a) avoid the desire to choose a scenario as a more likely or desirable future; and b) suspend disbelief concerning the possibilities that stretch beyond your level of comfort.

Each scenario includes both a description of the end state in 2030, as well as an explanation of how that world came about. A useful reference for exploring the differences across the scenarios is the end state table, which can be found following the scenario narratives. You might find it easier to read the end state table first or to read just the overview of each scenario as you look at the four scenarios for the first time. Others may find that it is only when they read each scenario as a story that they can start to engage deeply with the possibilities each presents.

Scenario 1: Research Entrepreneurs

Overview

This is a future shaped by the rise of entrepreneurial research; individual researchers are the stars of the story. The path of technological developments has acted to empower researchers as creators of high-value new knowledge. Speed and innovation are rewarded by corporate sources of support. New conceptions of translating research to market have opened avenues for more entrepreneurially rooted models of business investment in research, including venture capital. Relative reductions in government funding have freed researchers to seek funding from new sources and have encouraged philanthropists to seek opportunities to influence knowledge creation by supporting researchers directly.

This has come about as leading researchers used the spotlight provided by the "accountability movement" to entrepreneurially leverage a range of funding sources. Researchers collaborated freely and frequently but organized their own alliances when they saw opportunities to enhance their research agendas, and they took individual credit for their contributions. Yet the burdens of institutional structures also motivated many researchers to leave institutional settings to go out on their own with funding from a range of sources. With big successes come visible failures, if researchers' claims prove to be wrong. While research projects attract large-scale investment, the money can go as quickly as it came when what funders find valuable shifts rapidly.

Disciplinary labels have lost much of their meaning in the face of the accomplishments and interests of individuals. For instance, humanistic sources of research content and modes of inquiry, along with deep knowledge of cultural context, are valued in many projects. In this world, creativity is highly valued and understood to be the defining characteristic of researchers rather than research modes. Research that changes or enriches society is valued, as well as research that provides commercial opportunities.

With the fading of discipline boundaries, the training of new researchers becomes closely aligned with opportunities to work with successful individuals rather than following institutionally defined programs. Research institutions, while they still contribute to the research enterprise, increasingly function to provide support services to researchers and the projects they attract. Much work is contractual, but it is the researchers who write the contracts to suit their own terms.

In this story, our protagonist, Hannah Chen, embodies the successful entrepreneurial researcher. She shapes her own career and research, flexibly pursuing opportunities as she chooses. Part of her edge comes from her personal willingness to follow new paths to her own development as a scholar, while she also demonstrates the benefits of canny partnerships with other researchers.

Scenario 1: Research Entrepreneurs

"Funny how strange it feels now to be going onto a university campus," Hannah Chen thinks as she waits for her turn to pass through campus security. Usually she works remotely when she has contracts with researchers still affiliated with higher education. She's feeling a little irritable; she had to skip her morning coffee as part the preparation for today's facilitated data analysis session. Twelve hours of fasting is mandatory before taking the heavily regulated drugs they'll be using during their time in the university's multi-sensory data analysis facility. Her apprentice, Tomas Perez, is in line right behind her, but without coffee she's in no mood for their usual banter.

Once through security, Hannah and Tomas head off to meet Robi Shaw, the faculty member she has subcontracted for her project with SmartGen, an implant design company. SmartGen is seeking their insights to help develop attention-enhancement products. Implants have become quite the craze in the last ten years, and the biotech sector has been pouring larger and larger amounts of money into a wide range of cognitive neuroscience research.

Hannah built her reputation around her insights into multi-sensory data processing in the brain, while Robi has used his training as a humanist to work with Hannah studying cultural imprints on brain processing patterns. SmartGen originally pitched this contract to Hannah, and she decided to draw in Robi, whom she's known since their graduate student days at the University of British Columbia. As a university-based researcher, he's a rather small player, but his access to university facilities saves her a lot of money. He also doesn't seem to mind that she calls the shots about licensing their work.

Today the three researchers will look at some data the implant company has collected and see how it fits with the data collection Hannah and Robi have been constructing for their next "book." Hannah and Robi have been preparing for this session for the past month—besides allocating Robi's semi-annual slot at his university's lab to the project—but it will be well worth it, given how much the company is paying and how interesting their data looks. Hannah feels confident they'll be able to map out at least three opportunities for SmartGen to pursue with further work.

Hannah also expects today's session will let her show Tomas an analytical technique that underpinned several breakthroughs that were part of her previous contract with a neuro-pharmaceutical giant. Tomas is her first apprentice, and sometimes she wonders if he slows her down more than he advances her work. He was eager to pay her fee and moved from Miami to Toronto to work with her, but his ambition can trip him up. He has responded well to the drugs they use and contributed quickly to their data analysis sessions, but he's not so diligent in writing up and promoting new findings. Right now, he's still got a lot to learn. Hopefully he'll do a decent job of preparing the final report that they will ultimately have to create for SmartGen. It will be proprietary, of course, but Tomas will also handle the data washing and deposit the data into the publicly accessible data store Robi's university manages—a key requirement she put in the SmartGen contract. While Tomas is taking care of those chores, Hannah will be working with Robi to put the final touches on their forthcoming publication—this one a comparison of cultural factors influencing the effectiveness of cognitive enhancement therapies. Hopefully it will be another bestseller for her.

The contrast in how Hannah and Robi's research careers have played out is striking. Looking back, it was the Great Recession that catalyzed many of the shifts that led Hannah to the path she followed to become a research star

with her pick of funded projects. Losses in public funding drove research universities into the arms of corporate funders, while an accountability movement cast a spotlight on the high value of a few leading researchers' activities. The stage was set for many faculty to begin experimenting with partnerships with venture capitalist firms. Small coalitions of researchers from different institutions started to be very successful in tapping into these new kinds of funding sources. Projects bringing together small, interdisciplinary teams that leveraged the latest generation of computational and analytic capacities proved especially attractive to private sector funding and venture capital. In this competitive, fast-paced research environment, researchers also began to experiment with "performance-enhancing drugs" to increase their intellectual functioning. Regulators intervened after several researchers died from side effects; now these drugs are only administered in medically controlled settings.

As a kind of "academic star" culture emerged, aided by strategic shifts in immigration laws among developed countries, some faculty started shopping themselves around among top universities worldwide. In 2019 alone, thirteen Nobel laureates left the US. In addition, many top faculty left their institutions and went out on their own—taking their venture capital with them and shedding what they perceived as onerous bureaucratic demands. By 2021, forty-seven of the "Fortune Top 100 Researchers in North America" were operating as "free agents." Their collective 10-year returns to the companies that hired them were reported by *Fortune* to be enormous.

Another element of the researcher exodus from higher education was the growing popularity of apprenticeships, with leading researchers as a substitute for traditional graduate work. With researchers jumping from institution to institution or leaving altogether, it became very difficult and less attractive for graduate students to meet traditional degree requirements. Working one-on-one with particular researchers was a faster track to gaining visibility with potential private sector funders.

The imminent death of the research university was widely predicted when, in 2026, the entrepreneurial wave was slowed by the "Cure Fantasy" debacle. Cancer Cured Now, Inc. had generated an investment frenzy a few years earlier, based on their claims to have a model that could lead to a huge range of new cancer therapies. At the time, there were only a few groups left that had the computational firepower to test the models Cancer Cured was licensing. When the consensus finally emerged that their claims were false, their erroneous data had contaminated three major knowledge bases, setting up a firestorm of government "transparency" regulation. More than fifty researcher/partners ended up losing their personal fortunes as investors brought liability lawsuits. Suddenly, working within an institutional framework had started to have some appeal again.

Now in 2030, the small group of research institutions left regularly engaged in bidding wars—stealing "stars" and trying to lure back the entrepreneurs with "research support packages." It turns out that the main assets universities can offer to researchers are their information analysis labs, complete with medical supervision for pharmaceutical enhancement. Their data stores are also lures for many. Still, faculty like Robi have largely shifted to writing short-term contracts with universities, abandoning the tenure system. With so much uncertainty about which organizations will prosper, no one wants to be tied down for too long. Besides, they can get better money and retain more freedom to license their findings through short-term contracts.

Despite the problems of the new entrepreneurial models, Hannah still believes that the smartest move she ever made was deciding to leave the university research scene in 2020 to go work with Abie Grossmann, five years after he left Berkeley to write a contract with the BP Insight Foundation. At the time, she'd had to plunk down her entire inheritance from her grandfather as an "apprenticeship fee" to Grossman, but it had paid off in spades in terms of the technology and pharmaceuticals she'd gotten access to, what she'd learned about career management, and the connections she'd made. As a grad student, Hannah had felt like a small cog in a big machine, but as

Grossman's apprentice she'd gotten his focused attention. That time with Grossman turned her into the successful researcher she was now, moving her to the front lines of research analysis.

As Hannah rides with Tomas back to their hotel after their experiential session, it occurs to her that Tomas has been acting a little odd today. He catches her eye as they are about to separate in the lobby and says casually, "I need to talk to you tomorrow, before we head home to Toronto." Hannah agrees before going back to her room to sleep off the medication.

The next morning they sit down with coffees at a small table in the hotel's café.

"What's up?" Hannah asks.

"Well, I have to tell you. I've decided to exercise the exit clause in my contract with you," Tomas blurts out. "I think I'm ready to go out on my own. With two partners I've gotten enough venture capital to launch a startup. I'd ask you to join us, but I know we can't pay you enough to make it worth your while, for now." He glances down at his cup of coffee.

Caught off guard, Hannah says, "I don't think you're ready." Recovering swiftly, she continues, "But it's your choice. Just remember, there are also clauses in our contract barring reuse of any of my data and preventing you from working on cognitive implants for ten years."

"Don't worry," Tomas says. "This gig is for diabetes research. We're looking at synching insulin release with brain activity." He looks back up at Hannah.

"Look, I don't want any hard feelings," he says, smiling. "Some day I hope we can write a contract together."

Scenario 2: Reuse and Recycle

Overview

This is a world where recycling and reuse predominate in research activities. Disinvestment in the research enterprise has cut across society. Ongoing scarcity of economic resources has led to an emphasis on reuse of basic research and repetitive applications of research findings to basic "business problems." Government's ability to fund research and research-intensive education has become limited to non-existent. As networked communication and other popular mass technologies evolve and spread knowledge widely, the perceived value of new information becomes reduced, accelerating the devaluation of the research enterprise and individual researchers.

In this future, research projects reuse not just common knowledge resources but also mass-market technology infrastructure to underpin research activity. Creativity within the research enterprise focuses on identifying needs and interests that can provide revenue to support low-level research activity. Much research is ad hoc—cobbled together in ephemeral and often small-scale projects.

As researchers confront dwindling research support, one avenue they find open is participatory research modes that leverage large-scale audiences willing to make small contributions of money, expertise, or other kinds of support to research projects. These research opportunities cut across disciplinary boundaries, as many research questions currently associated with humanistic inquiry have widespread appeal to segments of mass audiences, such as hobbyists or enthusiasts of various topics. These participatory research modes also attract creative researchers from the social sciences and the "hard sciences."

Although discipline labels mean increasingly little, researchers collaborate, often in creative combinations. But competition for scarce resources and the proprietary nature of most application-oriented research keeps trust low within the research community. Even researchers affiliated with networked citizen projects jealously guard their association, although the data the projects produce is shared openly. Consequently, individual researchers tend to rely on personal relationships in organizing research collaborations. Contracts are widely used, but the power brokers are those with funds to offer—whether these come from business activity, philanthropy, or the ability to organize citizen networks.

Research institutions have little to offer the research enterprise beyond loose organizing capacities, matching services, low-level overhead, and symbolic capital. A few institutions may have surplus revenue from endowments or education activities, but it is hard for most to justify subsidizing research activities.

In this story, Hannah Chen is one of the lucky few who has persisted in crafting a career as a researcher. Her ability to "follow the money" to clients who can support her rather mundane research projects, combined with her skill in fostering personal relationships with other researchers, has allowed her to craft a niche to support her research activities, although not to fully develop her research interests.

Scenario 2: Reuse and Recycle

As Hannah Chen wrapped up her presentation, she exchanged a virtual glance with her colleagues, Netta Hamurabi and Jay Patel. From her campus office, she was reporting on the team's latest research to their contractor, Smart Sell, a big consumer-marketing firm for the food industry. She checked the screen window that showed Tomas Perez, the organizer and executive director of Food for Thought (FFT), the not-for-profit that had hired Smart Sell to lead a North American campaign to reduce obesity among Hispanics. Fortunately, Tomas was smiling.

The Smart Sell team asked a few predictable questions. Hannah and her team had done a handful of studies for them over the past ten years, and both teams knew the drill pretty well for this kind of work. This was the first time Smart Sell had taken on a non-profit client, though, and there was a pregnant pause as they waited for Perez to weigh in.

He looked ridiculously young, even on camera. It was only five years ago that he had launched Food for Thought as an online not-for-profit initiative from his parents' basement in Miami. Originally he'd focused on engaging people around issues of obesity in the Hispanic community, but FFT's creative projects engaged a much broader audience of ordinary people seriously looking at their food choices. Perez was definitely some kind of genius at growing the organization into a major citizen science/advocacy juggernaut. Of course, he hadn't done it alone, but he was the brains behind it.

"I like what you've done making sense of the data from FFT's past studies, Hannah," Perez said.

He turned to the Smart Sell team lead and asked her, "So what are you proposing to do to turn it into a marketing campaign?"

Relieved, Hannah allowed her thoughts to turn to speculating about what future projects she might propose to Perez; she'd heard the marketing firm's action framework described many times before, and she hadn't kept her career going this long by resting on her laurels. Fortunately, the cognitive processing underlying consumer choice was fertile territory for finding regular corporate contracts. While she hadn't done basic research on brain function for years, there was ongoing demand for looking at how people's brains responded to different kinds of product stimuli. She just had to stay in touch with the sector's growth areas and keep her proposals cost-competitive.

It had taken some grit to get herself into this niche in the funding landscape. In her graduate student days, prospects had looked pretty grim. The Great Recession had completely reworked the landscape between when she started grad school at the University of British Columbia in 2009 and when she finished up six years later.

By 2015, three US states had completely ceased providing state support to their universities. Repeated economic shocks had forced national governments to redirect their resources to propping up a series of tottering industries, leaving little left for either higher education or basic research. State and provincial contributions to public institutions became non-existent, once those first few states paved the way. National support for higher education became nearly entirely directed to high-volume, "low touch," jobs-focused education. By 2020, already scarce government research funds had been shrunk to merely token levels in most areas. The number of people who could afford high-

tuition, "old-style" higher education was severely limited, and even they wanted professional training to move up the earnings ladder.

Many institutions had gone through multiple mergers or folded completely. Now, most "faculty" were eking out a living doing contract teaching for undergraduate and various job skills programs. Non-professional graduate education had become almost non-existent. Only a small cadre of research faculty persisted in higher education institutions, and most of them had "soft money" positions, where they responded to corporate RFPs and had to attract enough projects to cover their salaries and university overhead. Most of that "research" was really recycling and reapplying earlier work to create new business applications. Large corporations either ran their own applied research and tech transfer operations or parceled out piecework studies.

Although much research now relied on private sector funding, many researchers became quite creative in leveraging mass technologies to advance their research projects. Some cultural projects in the humanities became successful by organizing "fan bases" and amassing large sums of money from tens of thousands of small contributions. Netta Hamurabi, one of Hannah's regular collaborators on food choice projects, was a beneficiary of this trend. She was an independent historian who worked on the role of foods in cultural and historical contexts. Netta did a lot of work with the Canadian "Hong Kong Gateway Project" organization. The Project had done such a good job of connecting to the descendents of that immigrant community that it now supported a small-college's worth of scholars working on enhancing and preserving the cultural experiences of Canadians who had arrived via Hong Kong. Hannah first met Netta when Netta had recruited her to help with a project on how Asian immigrants changed their food choice behaviors, impacting food choices in the larger society.

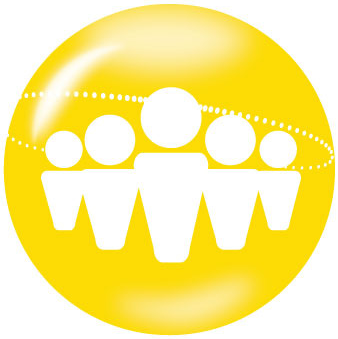
Hannah had been part of the last cohort to get real tenure-track jobs in North American universities. Her student research on the neurochemical mediators of multi-sensory decision-making had turned out to be one of the last hot tickets. Once she'd finished up her post-doc on the influence of aromas on decision-making in 2018, she moved back to the states. Fortunately, when her university placed a moratorium on granting tenure in 2023 while she was still an assistant professor, it had offered her a place in their program to transition faculty into private-sector contract research. Her office was now in a research park, and teaching was completely off her job description. She hadn't published a "basic research paper" herself in years, just piles of project reports for the companies she'd worked for, most of which never left their information systems. Still, the companies she worked with were usually okay with contributing data to public stores, albeit with a five- or ten-year embargo. As for the occasional work she'd done for interest groups like the Gateway Project, the reports were generally disseminated through an open server—either the university's or one managed by the funder.

In Hannah's experience, companies haggled over every dime in the contract, but at least they provided large amounts of clean data to work with, not like a lot of the junk that circulated on the public networks. The work brought in necessary funds to cover her salary and the overheard "tax" she paid to the university. It was disgusting what the institution took in return for providing her with a cubicle, a title, and an Internet connection. Still, she was the envy of almost all of her collaborators who, like Netta and Jay, were mostly "independent scholars." Netta was resigned to that path, since the Gateway project provided her with predictable support. But not poor Jay—he was brilliant at data modeling and had worked on more than fifty research contracts since he'd been in grad school with Hannah. Yet he'd been turned down twice for corporate research lab jobs in just the last year.

By the time Hannah finished her meeting with Perez and Smart Sell, and conducted a short debrief with Netta and Jay, it was time to eat her lunch—a sandwich from home again. While she munched, she popped into the Global Research Exchange to do a combination of searching and scanning through the latest listings of organizations

offering research contracts. She got customized listings automatically through the university, but about once a week she liked to go in and do a little poking around on her own. You couldn't afford to get too complacent, expecting the work to find you. If she stopped pulling in the research funds, she'd be out the door in a hurry.

Scenario 3: Disciplines in Charge



Overview

By 2030, research using computational approaches to data analysis dominates the research enterprise. The new research modalities prove to be powerful drivers for organizing the research enterprise to address grand research challenges and support technology evolution. As a result, scholars, whether humanists or scientists, have been forced to align themselves around data stores and computational capacity that address large-scale research questions within their research field.

Research fields, often operating at a sub-discipline level, have emerged as leading organizers of the research enterprise. By building and controlling access to key technologies that accelerate the creation and application of new knowledge, the organizations that align with the fields and disciplines are in a position to recruit funding and define the large-scale research questions. These organizations drive technology development and attract societal support from governments, the corporate sector, and philanthropy.

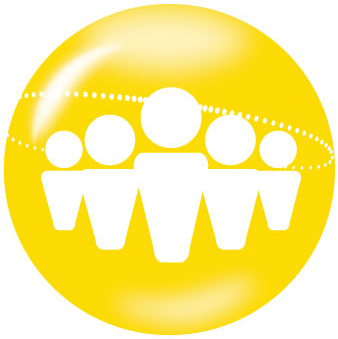
Individual research fields follow various paths toward organization—some create new "associations," some align closely with a particular research institution, and some assume a contractual relationship with research institutions. Within broad disciplines, the research fields that accelerate their research fronts by leveraging new research technologies blossom, making their case to a varied mix of funders. Humanistic research fields rely more heavily on philanthropy and government sources, whereas many science fields draw more predominately from corporate sector funding.

As the capacities of research technologies define success for the research enterprise, researchers themselves increasingly belong to two classes. A very small group of leaders control the disciplinary organizations and their research infrastructure. The majority of researchers are pushed to the background of the research enterprise, scrambling to pick up "piecework" that emerges in conjunction with research projects.

Research institutions are forced to specialize and align themselves with research fields, as the drive to focus research fields takes over. The connection between the research enterprise and undergraduate education and professional training weakens dramatically. Even the largest research institutions specialize, as they shift to play credentialing roles for researchers in a narrow set of research fields, providing a home for the leading researchers who control the disciplinary organizations. Service provision is a key concept in this future—researchers and research institutions provide services that feed the research enterprise.

In this world, Hannah Chen has found success by aligning herself with an emergent disciplinary research organization. She has leveraged her research skills, not in service of the discipline that trained her, but to play a leadership role in developing the research technologies that underpin another domain's research program.

Scenario 3: Disciplines in Charge



Hannah Chen allows herself a five-minute break to gulp down a jumbo cup of coffee—it has been a busy day already, and it's not even noon yet. Hannah is head of the Machine Learning Department of the Economics Co-op. Today she's spending a rare day at the home office in Texas. For the past five years Hannah has lived in a resort community in Mexico, doing most of her work from home and only occasionally crossing the border for office visits.

This afternoon she plans to sit in on the Co-op Board's monthly discussion of strategy, the first with the Co-op's new president. They will be updating the current roster of priority projects and developing strategies for identifying marketing targets. She could do this from her Mexico home, of course, but somehow there's nothing like being in the room to read the "vibe." Depending on how priorities shift, or if new priorities show up on the list, she'll need to figure out how to redeploy the Co-op's programmers, find money to acquire applications, or determine whether to leverage open-source solutions. She's successful in her job because she's good at projecting development costs and programming parameters when new research questions are identified.

No matter what, though, she has to be sure to hold an hour free at lunch to meet face-to-face for the first time with Tomas Perez. He's been working for her for about six months and has been very good at his job. Normally Hannah wouldn't take time to meet with staff while on a home office visit, but Tomas is a special case. He's a grad student at the university that now credentials 60% of all cognitive science researchers. He has permission to work on human subjects, something she hasn't had reason to pursue for several years. Hannah's hoping to find ways to apply what Tomas learns from his study to the next round of algorithmic improvements planned for the Co-op's most valuable data analysis protocol.

The Co-op has grown enormously since Hannah became employee number five—straight out of her graduate program at the University of British Columbia. She got that job on the strength of a side project from her dissertation research. She'd applied an artificial intelligence application to her data set on multi-sensory inputs to decision-making. Her expertise in human neural networks and decision-making had turned out to be good preparation for working on the development of artificial intelligence capabilities. Her early work for the Co-op had underpinned the core artificial-intelligence-based data processing capacity that became one of the key assets of the organization.

AI analysis and machine processing of data dominates most research activity now. The 'teens were a period where nearly all research fields, including humanities areas, succeeded in constructing knowledge bases scaled to the point where they effectively seeded the machine learning capabilities that were developed through the '20s.

Although data stores and computational analysis drive the research activity in nearly all research fields, how change has played out in different domains of scholarly inquiry has varied substantially between different research fields. The old Google book corpus provided the seed content for computer analytic capacity development now organizing several research fields. Similarly, early genomic and astronomic data collections enabled emerging machine learning capabilities for a variety of scientific fields. Nowadays, access to a field's information stores and algorithmic processing capacity is essential for anyone calling themselves a researcher.

Typically, the economists took their own route in organizing their discipline's questions and evolving its research capacity. They figured out early on that they needed a discipline-wide capability to negotiate funding for the development of new software, including new forms of machine learning. In 2015, the Co-op's Board was able to present a compelling case to a set of tech companies, energy companies, and the security community for funding the infrastructure and technology development that could then provide critical mass for supporting the next generation of economics research. That presentation led to early investment in a set of models and insights that effectively shifted public policy incentives to a course where most western nations were positioned to achieve energy self-sufficiency within the decade.

That money also positioned the Co-op as the entity that controlled access to the most valuable research capacity in the field of economics. By 2020, the Co-op's research infrastructure had attracted more than 200,000 members, and it was well on its way to becoming the global nexus of economics research activities. During the '20s, the Co-op became integral to the work of nearly every serious economics researcher around the world. Most industry-employed economists similarly sought membership. Even economists working as civil servants or educators began to see the benefits of Co-op affiliation.

The Co-op's early successes in arguing for research funding for the discipline and then delivering spectacularly on the investment led to even closer relationships between the Co-op and government and corporate sector funders. In the '20s, the Co-op really started calling the shots with the G-11 (formerly the G-8). It began setting baseline support levels expected from national governments to advance its compelling portfolio of "grand challenge research," which it showed was needed to support predictable economic growth and define the regulatory regimes nation states needed to enact to prevent "bubbles." Similarly, the Co-op had succeeded in shaking down the finance industry to support their program to identify key opportunities for new models—and create those models.

The Co-op's growing power naturally led to efforts to rein in its control of the assets of economics research. Because of the compelling interest of governments in its work, most Co-op research has to abide by a raft of government regulations that make its content openly available, although it can license use of the artificial intelligence and algorithmic capacities for five years before those too have to go into the public domain to feed corporate sector activities.

As it turned out, Hannah never even considered working for a university. She barely got her degree in time before the wave of consolidations and closures hit research universities in the 'teens, as they moved to specialize and align with the emerging research organizations. By 2030, the universities left generally serve one discipline or a cluster of research fields. They thrive by awarding research credentials for the fields they support. What used to be thought of as undergraduate education is now conducted by high-volume, common curriculum organizations—mostly for-profit outfits and a few remaining residential colleges for the elites. For specialist credentials, students typically apply to the few institutions that exist in a given field and then try and figure out how to pay for the best one they get into.

The lucky few researchers who are faculty at the specialist institutions mostly play leading roles in setting the agenda for developing research capacity, although those boards have a counterbalancing membership of experts from governments and leading private sector firms that are consuming the research. A few researchers have found salaried work in corporate sector R&D units, but most researchers nowadays do "piecework." The piecework crowd mainly cobbles together work from various projects circulated through the Co-op's "jobs" board. That work often fills in gaps in projects that algorithmic analysis can't fill.

Hannah is a rare person, a former researcher who got in on the ground floor in working with the new disciplinary infrastructure. She, and others like her, sacrificed a chance at a career in her field for an opportunity to devote her energy to building a new kind of research infrastructure. Ironically, she now has more influence over economics research than most economists, and as a Co-op Vice President she makes substantially more money than the researchers who use the Co-op's resources.

Reaching the bottom of her coffee cup, Hannah sighs. Today is hectic, but next week is going to be downright painful once the annual planning retreat starts. She's already dreading the annual round of tortured discussions on membership. They never seem to settle the questions of who can become an affiliate, what credentials are required to access various service levels, what the rules are for intellectual property assignment to the co-operative (particularly for research contracted by the private sector), who has to contribute what back to the data pool, etc. It's all part of her job, but Hannah still finds it hard to cope with the inevitable politicking that is a part of the process.

As Hannah talks with Tomas about his project over lunch, she feels a little sorry for him. He's so hopeful about his prospects as a researcher. She has to admit that in some ways the research playing field is more stable now than it was in her day. Now, research communities have gotten a pretty good grip on the control of the technology in their fields. Still, Hannah knows that at this point so much research is accomplished through machine processing of data that the people working on projects have become fairly interchangeable. On one hand, the value of funding research is well understood, so there is a lot of money targeted for research programs. But from where she sits, Hannah can see that it seems to be largely benefitting the research technology. Most of the people who try to present themselves as researchers seem to be standing in the shadows of the research process, chasing the latest technology advances, and filling in around the margins where artificial intelligence can't provide the full analysis. Even though there are only a few institutions training new researchers, each one still produces so many that there are always more of them than the market can really support. Tomas will likely have a long, hard slog to beat the odds and eventually snag a faculty position.

Scenario 4: Global Followers

Overview

In this future the research enterprise is relatively familiar, but the cultural context that frames the enterprise shifts profoundly. Key structures such as universities, faculty, and graduate students persist, but the locus of the funding that drives the enterprise migrates from North America and developed western nations to nations in the Middle East and Asia. These Middle Eastern and Asian cultures, which are able to build technical infrastructures that catalyze breakthrough research and attract top talent, can organize the activity into projects of relevance to their societies. Existing organizations and individuals act to realign themselves with the new sources of support.

In addition, cultural norms from the new lead investors are increasingly powerful in shaping practices. Over time, the cultures that control the research funding increasingly shape beliefs about what research is important to society and what research and communication practices are acceptable or rewarded. For instance, eastern norms regarding issues like conceptions of intellectual property, research on human subjects, individual privacy, etc., assume a larger sphere of influence in the research enterprise. Researchers bend to the prevailing wind rather than imposing western norms on the cultures that increasingly lead the enterprise.

The relative values placed on current disciplinary constructs are also reworked. What disciplines can contribute to answering particular categories of questions is rethought. There is increasing reconsideration of what the important questions are to ask. For instance, what westerners conceive of as "humanistic" approaches can be integrated in different ways into a research enterprise organized by different conceptions of research modes. In addition, as newly dominant non-western cultures take increasing pride in their traditions and historical concerns, topics that reflect historically western preoccupations languish.

Mobility and connectivity are crucial to the adaptability of the research enterprise to new centers of gravity. While researchers and institutions from the newly leading cultures are increasingly dominant in research projects, researchers and institutions from western nations that are flexible enough to adapt to the new realities are free to pursue opportunities to leverage the new engines of the research enterprise.

In this world, Hannah Chen's career has unfolded along somewhat traditional lines, while also tracking the shifting directions of the North American research enterprise. Throughout her development as a researcher, she has successfully aligned her research interests with the shifting grand research challenges identified by large-scale funding and leveraged emerging sources of research data. As a consequence, by 2030 her institutional allegiances have migrated beyond the borders of the US and Canada, although advances in technology and shifting cultural norms allow her to continue to live in North America.

Scenario 4: Global Followers

"Funny to end up where I began," Hannah Chen thought as she unpacked boxes in her new condo in San Francisco. When she'd started out as a graduate student at the University of British Columbia, she'd been straight from undergraduate work at UC Berkeley. It had been a big adventure going to Canada after growing up in the Bay Area, and she'd been hopeful that she'd find better opportunities in the Canadian system of higher education than she'd thought were likely in the US. Who would have guessed then that today she'd be a tenured professor at Fudan, the leading Chinese University in her field? Now she was in the Bay area again to have easy access to Fudan's cutting edge research visualization facility in Oakland.

Musing, Hannah resolved again to pay more attention to current events. She chided herself, "I really have been caught off-guard too often by how quickly the environment for North American researchers has changed." The Great Recession definitely had some unexpected effects. Being in California from the outset, she hadn't been so surprised to see the rapid pull out of states from funding higher education. Still, as a young grad student she had expected federal funding to hold up better. At first it looked like "grand challenge science" would be the organizing paradigm that would pull in, focus, and synthesize research in a variety of fields and keep the taps to public funding open. But while research activity did organize around key challenges, the sources of funding turned out to be different from those she had foreseen. Throughout the 'teens, western governments' resources became overwhelmed by the need to prop up sequentially collapsing industries and provide basic services. Real money for research became pretty scarce.

Amid all the economic woe, Hannah, like most North Americans, had only slowly grasped that the dynamics of the research enterprise were shifting. China and other "eastern" nations were rewriting the rules of the game. Perhaps it was the intense pragmatism of their approach that misled western observers at first. In 2015 China announced that, with several Middle Eastern leaders, it would jointly fund an initiative to create a broad research program around issues of air pollution, but no one in western policy circles paid much attention. Everyone she knew at the time had been much more interested in the World Health Organization's new initiative on climate change and human health. In hindsight, the amount of money the US and the EU threw into that enterprise had been laughably inadequate to create the scale of research infrastructures needed to produce breakthrough advances. What money was allotted to the US/EU initiative was parceled out in hundreds of loosely coordinated grants, while the award process took five long years.

By then, global research communities were buzzing about China's six new data analysis centers, constructed to support the knowledge bases expanding from the air pollution project. Still, what was happening with the "Eastern Coalition" research wasn't widely recognized as a power shift, despite announcements that similar ventures around water resources, food security, and new energy sources were being launched—and that other nations, including Singapore and India, were on board. Yet, within academic circles the amounts of money the Coalition was investing were eye-popping enough to get many western researchers networking actively with anyone they had a connection to in China.

At the time, North American academic institutions were also worried by the drying up of applications from potential graduate students from China, India, and the Middle East, and the aggressive recruiting of top North American faculty members by eastern universities. Hannah's younger sister was part of the first big wave of US students who

decided to go to graduate school in the vibrant new schools in Asia and the Middle East. Hannah was in Canada at that point, struggling as a soft-money affiliate at a mid-tier Ontario research university. She was teaching an overload of online undergraduate courses and trying to get a position as part of the joint US/Canada project to fight obesity. Hannah shuddered to think where she might be now if that hadn't come through. Fortunately she had been successful with her proposal to look at the multi-sensory aspects of choice in food consumption behaviors. Her strategy to mine multiple sources of data to create a new synthesis relating genetic data, food characteristics, and multi-sensory responses to food stimuli had been clever, no doubt. She'd been in at the start of the creation of the knowledge bank on multi-sensory neurologic processing.

It just shows how bad the research system in North America had become by then, that even that accomplishment only let her move up to a top-tier Canadian institution's soft-money, "earn as you go" position. At least that job jump ensured she had access to the best Canadian analytic technologies (for as long as the grant money held up)—and that she no longer needed to teach. That was when she'd started to do work drawing on open data stores coming out of the Eastern Coalition projects. Since human subjects were much less tightly regulated in their studies, Hannah had moved her research program ahead by leaps and bounds using data that just could not be collected from citizens in the west.

In 2023, western funders finally woke up to the dire situation of their research enterprise when a team led by researchers at the University of Science and Technology for China announced they had unlocked the immunological bases of asthma and had developed both successful treatment and prevention regimens. With this new powerhouse technology to accurately model immune function, a whole host of diseases became curable, from HIV to the flu, and it was mostly teams led by Chinese researchers, albeit with many western collaborators, who led the research programs. Within two years, another Chinese-led team announced that it had developed technology that could design vaccines for SARS and the current year's avian flu variant. The technology had the capacity to tune a vaccine to samples of the evolving flu strain within a few hours of submission of a virus sample. Several of the key elements of the technology were developed by researchers based in North America, but with research appointments to institutions in Singapore and China.

Finally awake to the loss of US leadership in both basic and applied research, in 2024 US, Canadian, Mexican, and EU government and business leaders convened at a summit at Camp David to discuss developing a competitive research capacity based in the West. The existing Alternative Energy Public/Private Partnership program in the US was designated as the core and model that should be replicated. Hannah had been thrilled at the time, expecting that all kinds of new money for research would be raining down in the US and Canada. As it turned out, summit partners found it hard to produce public funding for even one new research enterprise. Big government was still so far out of favor after its perceived bungling of the Great Recession more than a decade earlier that public support for funding a research competition with the emerging east just didn't exist. "We can't afford another space race, let alone three" was the rhetoric that killed the plan. In the end, the EU put in more money for the alternative energy project than the US.

It probably hadn't helped the situation that the corporate sector in the west was lukewarm about increasing government spending on research capacity. The Chinese attitudes about intellectual property meant that western companies felt that they had easy access to any eastern-funded research they wanted to use. They tended to be a step behind because they weren't directly involved in the research, but that wasn't seen as enough of a handicap to justify funding a competing research capacity.

Hannah became worried about her own prospects when she saw signs that to support the new initiatives around alternative energy, the US and Canadian governments were going to be reallocating time at existing data analysis

facilities away from all other "lower priority" projects—like her obesity research. Fortunately, Hannah had several former collaborators who were doing work with the emerging eastern universities, two living in India and one in China. Also, her sister was now happily working at the University of Singapore where she'd done her graduate studies. Working her eastern network, Hannah turned up an opportunity to join a project on enhancing learning of aging adults that Fudan University was leading. Her approach to studying multi-sensory information inputs in a context of learning and decision-enhancement appealed to a team there. That had led to a mind-boggling visit to China. She had surprised herself by leaving the country with a full tenure job at Fudan University. Even better, she had worked out a deal to be based in the Bay area near her aging parents, as well as Fudan's nearby visualization center.

As Hannah opened up a box of framed diplomas, she realized that one aspect of the job still made her nervous—supervising graduate students. During her time working in Canada very few students got support for graduate study, and contract researchers never supervised them. Now, her first grad student, Tomas Perez, would be working with her next week at the San Francisco visualization center. From their virtual chats, he seemed delighted with his first three years as a student at Fudan. He was originally from Miami, and after three years in China would be stopping in San Francisco en route to Florida, where he'd live while finishing his research project. It had been a little embarrassing in their first conversation when he assumed she'd prefer to converse in Chinese. He hadn't realized that she was a US citizen and had lived all her life in North America. After his initial training with her next week, Tomas would be working mostly at the Atlanta visualization lab operated by another Chinese university, although there was talk of Fudan opening a lab in southern Florida in a year. He would probably be done with his data analysis by then, though, and looking for a faculty opening with a university in China or India—after all, that was where the jobs were these days.

Year 2030 End State Table

The end state table highlights how key critical uncertainties vary across the four scenarios. It is a compact guide to these variations and useful reference while exploring the outcomes in more depth. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table.

Year 2030 End State Table

	Scenario 1: Research Entrepreneurs	Scenario 2: Reuse and Recycle
Research	• Researchers define entrepreneurial projects and produce insights that dazzle readers, leaders, and markets.	• Corporate, applied research dominates and funders control and define the research, often with RFP-like practices. • Relatively small projects focus on incremental improvements.
Sciences vs. Humanities	• Projects blend science, social science, and humanities. • Highly creative research processes empower researchers from all disciplines and attract funding.	• Primarily applied research finds funding, but scholars also mix and match humanities and social science content as they contribute to projects. • Citizen science and "popular humanities" evolve to join philanthropy as alternatives to commercial-sector funding.
Researchers	• Entrepreneurial, innovative researchers drive their own research careers, mobilely and multi-laterally. • "All star teams." • Affiliations are temporary, often contractually defined.	• Affiliations depend on revenue generating ability (earn your keep). • Creativity focuses on finding support and not the research itself.
Research Community	• Complex and dynamic, as individuals work in a variety of settings and choose to affiliate and collaborate. • Apprenticeships are the most effective model for getting start in research.	• Research community is a weak construct as competition for limited support heats up. • Researchers follow projects and work as teams, do not identify with larger research community.
Dynamics of knowledge sharing	• Abundance of public information, but private "secrets" common, too. • The long argument flourishes, as researchers promote their ideas and demonstrate their creativity. • Many information stores exist, often controlled by individuals.	• "Crowd/cloud" information is ubiquitous but low value. • Information is constantly repackaged, repurposed, and reused. • Sparse, high-value information may never be shared—or it is scarce and expensive.

	Scenario 3: Disciplines in Charge	Scenario 4: Global Followers
	• Organizing structures operating at the level of research fields define the research questions, manage funding, and decide who can contribute. • As research field's organize, gaps can form between diverging research fronts.	• Resource-rich cultures define and control a global research capacity. • Large, well-defined research (basic and applied) dominates.
	• Science and humanities shift to more focused, analytically intensive research topics and strategies. • Philanthropy supports much humanities but also other fields, seeding and influencing research agendas.	• In both humanities and sciences the "hot" topics are reshuffled as newly dominant cultures redefine what questions are important. • Big Science and Big Humanities strongly influenced by eastern mindset.
	• Discipline affiliation defines researchers. • Access to research system is controlled via academic credentials. • Strong gate-keeping within disciplines. • Researchers support the technology.	• Large, global collaborations form around large-scale project areas. • Best people are organized for research requirement.
	• Strongly organized by disciplines and focused areas of research. • Most researchers provide small-scale piecework to projects, while a few elites in the discipline control research priorities and technology development agendas.	• Global community employs traditional strategies for organizing. • Institutional affiliations remain important, but who the leading institutions are is reallocated. • International collaborations are common.
	• Information becomes the property of the discipline. • Centralized stores of data are very important to the success of technologies that advance research. • Access is critical but mediated by the discipline through access to technologies that create new knowledge.	• Centers of information-generation shift to Asia. • Information stores and research capacity are viewed as engines of economic success. • Open, Asian-style attitudes increasingly predominate.

Year 2030 End State Table

	Scenario 1: Research Entrepreneurs	Scenario 2: Reuse and Recycle
Resource Outlook	• Fluid, but large-scale funding with big risks and big payouts, bursts of money and other resources centered on innovative researchers. • Research capacity is powerful but expensive. • Humanities resources shift to museums, archives, and cultural centers.	• Scarce economic resources, private sector dominates. Researchers operate under contract—pursuing applied topics. • Funders own IP, not the contracted scientists. • Aggregating small funding sources a strategy for supporting larger research activities.
Nature of Technology Surprises *(Digital and beyond)*	• New technologies allow researchers to achieve highest potential. • Race to apply new technologies (winners and losers defined quickly).	• Mass technologies dominate with slow innovation rates. • Virtual spaces and infrastructure common. • New forms of repositories are created as accelerants of data reuse.
Government Regulation	• Regulation focuses on ensuring transparent information outputs and regulating researchers. • Authentication of information growing concern.	• Regulation focuses on mass technologies and unanticipated outcomes of research. • Regulation seeks to enhance data reuse while protecting IP.
Globalization	• Worldwide playing field—scour the world for the best minds.	• Many small groups of scientists working globally, but you work with who you know.
Higher Education	• Your work defines you, not your institution. • Broad, liberal arts education valued. • Apprenticeships outcompete higher education credentialing. • Higher education becomes a service provider and competes with other sectors to support researchers.	• Nearly complete public sector defunding. • Teaching loosely coupled to research. • Academic rewards tied to funding success not knowledge production. • Research consumers not accountable to higher education.

	Scenario 3: Disciplines in Charge	Scenario 4: Global Followers
	• Resources are adequate but allocated to disciplines. • Research that can attract large-scale government grants or private dollars dominates. • Funding supports technology innovations and data management with philanthropic influence on research agendas.	• Abundant resources for projects that uncover truth and improve quality of life—as seen by global leaders. • Eastern contributions to research enterprise heavily outweigh western nations. • Resources drive results. • Synergies from transnational collaboration pay off big.
	• Technology is the star and valued more than researchers in the research process. • Disciplines specify technology development. • Machine learning, artificial intelligence common.	• Highly effective collaboration and communication-enhancing platforms. • Technology investment understood to drive research advances by empowering researchers.
	• Discipline controls trump much government regulation. • IP practices set by discipline. • Preserving the value of the products of scholarship is a priority for disciplines.	• Looser regulatory regimes predominate in eastern projects and can provide competitive advantage. • Funders set IP expectations and distribution. • Asian influence on IP law.
	• Disciplinary organizations span national boundaries and articulate cases for international funding and research.	• Leaders from the east support global-scale cooperative research projects.
	• Strong credentialing role for graduate higher education. • Graduate de-coupled from undergraduate. • Few research-intensive organizations. • Many researchers are not affiliated.	• Teaching and research remain linked. • Leading higher education institutions found in Asia and Middle East. • Students follow the leading institutions across national boundaries.

Chapter 3: Strategic Implications for Research Libraries

The following is a summary of strategic implications for research libraries that emerged during an initial exploration of the ARL 2030 Scenarios by a representative set of ARL library directors. This content should be approached as a useful reference and guide to some of the more interesting and provocative conversations that can be elicited at your research library. Each organization will have its own interpretation of the scenarios and based on the organization's current circumstance will create its own unique set of strategies associated with the ARL 2030 Scenarios.

That being said, the initial exploration of the ARL 2030 Scenarios uncovered common themes and strategic questions that will benefit the reader by broadening his or her thinking on the strategic implications of the many critical uncertainties that are reshaping the research arena. You can use the strategic implications in other ways as well. They can inform your selection of an approach or focus for a workshop. You can also use them as a provocative pre-reading for participants as they prepare for the workshop (The scenario-specific implications are built into the materials for several of the workshop designs that appear later in the guide).

Common Themes Across the Scenarios

In exploring the strategic implications of each scenario, the ARL library directors uncovered common themes that emerged in more than one scenario and in many cases in all of the scenarios. This list is by no means exhaustive, but provides a sampling of some of the provocative areas that might elicit conversations within your organizations from which insights on robust strategies emerge.

- ### Developing Diverse and Novel Sources of Revenue and/or Funding

  Many of the scenarios suggested continuing challenges associated with sources of funding and, hence, in sustaining and growing the research library. Research libraries cannot assume that traditional sources of support and accountability will be stable over the next 20 years. A key uncertainty is how research activity will be aligned or not with research universities. Research libraries should begin to explore new relationships and opportunities from which to generate revenue and/or funding. The conversations around the scenarios suggest potential opportunities to obtain revenue from the private sector as well as contracting opportunities with independent researchers or research enterprises.

- ### Balancing Mission and Values with Sustaining the Enterprise

  The term "values" means many things to different individuals in our organizations. How we define and understand library values has major implications for how we respond to the uncertainties represented in the scenarios. As research libraries move into the future, they will need to consider what level of support they are willing and able to apply to services and content collections. This is especially true for those collections and services not adequately funded, those that do not generate revenue, and those that cannot be shifted to new network environments as open content.

- ### Engaging Fully in Research Activities as Service Provider and Steward of Content

  Across the highly divergent future research environments shared through the scenarios, research libraries will have the opportunity to provide a broad set of services to researchers throughout the research process. Those services require the library professional of the future to be a fully engaged member of the research team with responsibility to create, describe, curate, control access, and authenticate information.

  In addition to this expanded role during the research process, at the end of the research process there will be valuable content produced by researchers that research libraries can steward. Some of that information will be open and some will be proprietary, offering the potential for research libraries to manage closed as well as open content.

- ### Developing Focused, Specialized Capabilities and Scope

  The scenarios highlight uncertainties that significantly challenge research libraries' impulse to be all things to all people. Each scenario highlights in a different way the powerful advantages that will accrue to research libraries that effectively focus and specialize in areas of content and/or services that build off of their existing distinctive competencies.

- ### Creating Research Library Cooperative Capacities

  All of the scenarios evoke an interesting strategic conversation on what opportunities exist to effectively collaborate and network with other research libraries. Collaborative capacities serving groups of research libraries or the full community of research libraries allows for increasing opportunities to develop a strategy for maintaining and sharing open and rich general collections. Opportunities for cross-pollinating research activities and the potential for shared endeavors are also viable strategies.

Strategic Implications of Each Scenario

These scenario-specific implications complement the themes. They provide a starting point for surfacing and exploring potential elements of strategic agendas suggested by each scenario's circumstances.

Scenario 1: Research Entrepreneurs

This scenario highlights the challenges associated with supporting the growing pool of entrepreneurial researchers who are often funded through private or venture capital. Research is increasingly a creative blend of science, social science, and the humanities. To succeed in this world, research libraries need to consider how to re-invent themselves to be indispensable partners in the research team. In this scenario, stewardship of information is still valued and involves maintaining both open and proprietary information. Research libraries need to understand what information to maintain as open and how to most effectively share and leverage that information, but they could engage with proprietary information as well. Research content collections and service provision could be delivered via independent entities offering highly specialized subject knowledge and services to a wide range of researchers, as well as through capacities embedded within private companies.

The following are three strategic questions that research library leadership should address in the next 1 to 5 years to be well positioned to succeed in this potential future:

- What non-traditional sources of funds or revenue should we be nurturing today to supplement our traditional sources of funding?

- How do we begin now to develop the library professional of this future—a highly capable and credible service provider who can work directly with researchers with data preparation and curation capabilities? What skills are we currently developing in our library professionals that may not be valued in the future?
- How do we successfully position our organization for this potential future given our traditional library values and culture?

Scenario 2: Reuse and Recycle

This scenario brings into focus the dramatic impact that a decades-long economic downturn combined with the cultural devaluation of new knowledge can have on research and the role of the research library. This is the world of the researcher as rainmaker, who skillfully creates opportunities to perform research valued in a world surfeited with knowledge. The ongoing economic downturn has turned most business focus toward efficiency and cost reduction, leading to reuse, reapplication, and repurposing of data and earlier research content, and hence, the commoditization of research. With dwindling public resources, information as a public good is receiving less funding. To flourish in this scenario, research libraries will need to determine the proper balance between public mission and business endeavor. Under resource constraints, research libraries become increasingly competitive, experiencing closings and consolidation. Informatics professionals with discipline knowledge and the ability to mine data collections to answer targeted questions are valued. In a world awash in ubiquitous, low-value information, skills in creating, curating, and authenticating high value information to which access is limited retain some value.

The following are three strategic questions that research library leadership should address in the next 1 to 5 years to be well positioned to succeed in this potential future:

- How do we develop new, competitive, and diverse revenue generating models?
- How do we understand our mission in a world with abundant, but low-value information and only scarce high-value information? Strategically, what levels of support are we willing and able to apply to (redundant) general collections and services if they are not adequately funded or able to generate revenue?
- How do we develop the library professional of this future—an informatics professional with discipline knowledge and project management skills? What skills are we currently developing in our library professionals that may not be valued in the future?

Scenario 3: Disciplines in Charge

This scenario highlights the need for research libraries to think about new organizing structures for themselves and the community that align with new organizing structures emerging in the research enterprise. To function well in this world, research libraries need to transform themselves into more specialized research service providers based on a content discipline or area of service. A critical success factor will be the creation of a new extra-organizational capacity or federated service that serves the community of specialized research libraries and research enterprises. Programmatic research agendas will dominate and seek alignment with deep, rich research support capacity. Research fields are highly focused, and sub-disciplinary in scope. Research libraries become uniquely positioned to bridge the research field boundaries, disseminating content across fields to seed and re-invigorate research. In order to succeed, research libraries need to build new relationships with other research libraries, research service centers, and research fields—relationships that might or might not be mediated by research institutions.

The following are three strategic questions that research library leadership should address in the next 1 to 5 years to be well positioned to succeed in this potential future:

- How do our organizations identify areas where we are uniquely positioned to focus resources to further build expertise and distinctive competency?
- What relationships do we need to build with the research community?
- What relationships do we build with other research libraries? How do we best support the development of the network of research libraries?

Scenario 4: Global Followers

This scenario highlights the rise of eastern influence and leadership in higher education and research. In this scenario, universities still exist much as they do today. However, institutions in the West are no longer the global leaders, they are the followers. Followership requires new abilities and new roles in the research arena. Strong relationships with eastern peers and collaboration lead to access to information and to remaining an active contributor to the research enterprise. Success requires integrating library knowledge management expertise into institutional multi-national agendas and projects. Content is revalued relative to research agendas set within non-western cultural contexts. The greatest challenge for research libraries is to overcome their western mindset, freeing themselves up to reinvent intellectual property, and leverage the richness of a multi-cultural framing of the research process and content.

The following are three strategic questions that research library leadership should address in the next 1 to 5 years to be well positioned to succeed in this potential future:

- How do we position ourselves to flourish in the role of follower to leading eastern institutions and research agendas?
- How do we effectively build cross-cultural and multi-cultural participation and expertise?
- What is required to develop common cause and cooperation around intellectual property issues?

Chapter 4: Applying the Scenarios to Create Strategy

The Basics of Developing and Implementing a Strategic Agenda

Although the environment in which organizations operate is constantly changing, organizations over time develop a set of understandings and beliefs about that environment that are not dynamic. Those assumptions and beliefs become the conventional wisdom of the organization. Organizations act on what they know or what they believe they know to be certain. Many of those certainties are in actuality uncertainties. Those false certainties become the basis for an organization's strategic decision-making. The more mature the business, the more embedded those false certainties become and the more significant the perceived risk associated with change or acting against those certainties. Incumbent, mature organizations find it extremely difficult to challenge false certainties and to imagine new possibilities. The result is organizations that seem incapable of changing or adapting over time.

> *"There is this totally absurd notion that knowledge proceeds in neat steps from known facts through logical deduction."*
>
> Edward de Bono

Scenario planning has organizations focus on what they do not know and cannot control; those forces that are external to the organization, but that over time define the environment in which the organization must operate. These unknown and uncontrolled forces that shape the external environment are termed critical uncertainties, the platform on which scenarios are created. Scenario planning is a strategy-related methodology that is designed to challenge deeply held assumptions and beliefs and thereby liberate thinking from current constructs and structures. Scenario planning helps organizations develop the capability to see multiple possible futures and to identify and make sense of indicators of change that emerge in the external environment. The result is an organization that is more anticipatory and proactive in its operational arena.

Scenario planning is not an analytic process. It is not about assigning probabilities to future events or choosing a desired future. Scenario planning is based on the belief that the future is inherently uncertain and that an organization cannot choose the future environment in which it will operate. However, an organization can take a disciplined approach to understanding the critical uncertainties that it faces and develop a robust strategy that will work across a wide range of possible futures.

What are Scenarios?

Scenarios are stories about the future. They are devices for ordering perceptions about multiple future environments in which decisions might be played out. The platform for ordering our perceptions is built on a set of relevant uncertainties. Their power comes from a clear and relevant strategic focus. As a result, scenarios must be created to context. The ARL member community was engaged broadly to identify a strategic focus that would be valuable to our diverse community of libraries. The ARL 2030 Scenario Set **strategic focus** can be found in Chapter 2 on **page 12**.

What is a Strategic Agenda?

A strategic agenda is a set of coherent and aligned strategies that an organization identifies through exploring a set of scenarios. The strategic agenda is an organization's platform for its strategic plan. Although the ARL 2030 Scenarios are 20 years in the future, the strategic agenda a library develops from the scenarios will guide implementation in the next few years. The strategic agenda is then translated into the organization's strategic plan. This guide will focus on the process of moving from scenarios to a strategic agenda. Figure 1 is an example of a strategic agenda for an organization.

Figure 1: XYZ Organization's Strategic Agenda for a Biotech R&D Incubator

Strategy: **Transition to a Virtual Platform**
- Strategic Option: Develop a multi-disciplinary network of biotech thought leaders
- Strategic Option: Invest in a multi-media social networking platform
- Strategic Option: Experiment with virtual laboratory capability

Strategy: **Develop Bridge Function with Other Knowledge Centers**
- Strategic Option: Determine strategic partners
- Strategic Option: Formulate win-win relationships

Strategy: **Expand Pool of Participating Scientists**
- Strategic Option: Create innovative commons or shared IP model
- Strategic Option: Empower participating scientists to network and grow pool

Strategy: **Growth focused on virtual rather than physical expansion**
- Strategic Option: Maintain but not expand existing R&D laboratory
- Strategic Option: Identify strategic partners
- Strategic Option: Invest in virtual or partnered laboratory assets

A powerful strategic agenda has the following characteristics:

- **Robust**—works across a divergent and challenging set of scenarios
- **Distinctive and Advantaged**—leverages the distinctive competencies of the organization toward achieving an advantaged position in the external research environment
- **Inspiring**—delights the end use customer and inspires the staff
- **Focused**—requires strategic choices of things to do and things not to do, assessed against a realistic understanding of capabilities and resources

Developing Your Organization's Strategic Agenda

Scenario planning provides an effective platform for organizations to prepare for an uncertain future by creating a coherent set of strategies that work across a wide span of future possibilities—the strategic agenda. Whereas the strategic plan of an organization can take on many different forms, the strategic agenda of an organization is the consistent and common underpinning of any strategic plan. It can also function independently in the absence of a strategic plan.

Creating One Strategic Agenda from Multiple Futures

At first glance, it would appear quite complex to try to develop one set of strategies from multiple futures. However, that is exactly what an organization does with a set of scenarios. The process steps for developing a strategic agenda are provided in **Chapter 7: Designs for Strategic Implications Workshops** (page 57).

The process begins with participants exploring the strategic implications and potential strategic options associated with each scenario. They then identify those strategic options that are robust strategies. Robust strategies are ones that make sense across a wide range of scenarios. Robust strategies do not have a significant downside or risk if acted on. Those robust strategies are foundation for the strategic agenda. Not all robust strategies need to be acted on. Organizations should consider their unique market position, current strategic activities, and distinctive competencies in determining which of the robust strategies to pursue.

Many strategic options are not robust. They remain connected to a specific scenario. These options are called contingent strategies because their application is contingent upon that scenario playing out in the external environment. Those strategies are a resource for the organization to draw on at some point in the future. The use of contingent strategies is directly connected with ongoing monitoring of the external environment to know when and if they should be added to the strategic agenda.

Using Scenarios to Create vs. Test Strategy

When applying scenario planning, an organization may have an existing strategy that it wants to test and strengthen, or it may wish to create a new strategy in response to the strategic focus. Although the process applied in both cases is similar, there are subtle and important differences.

An organization with an existing strategy should rehearse implementing that strategy in each scenario to determine how well it works. This process is referred to as wind tunneling, a term that comes from the aviation industry. In aviation, new aircraft designs are tested in a wind tunnel to determine how well they fly. Wind tunneling allows critical refinements to be made to the aircraft design to insure safe and successful flight. Wind tunneling of the strategy follows the same principles and process. In aviation, the wind tunnel applies various challenging wind scenarios to the aircraft. In scenario planning, the scenarios apply several different challenging scenario conditions to the strategy. Through the process strengths and weaknesses of the existing strategy can be identified and refinements can be made to increase the robustness of the strategy across the full range of scenarios. This process allows both the identification of strategic activities to begin or adjust and the identification of activities to remove from the organization's "To Do" list. Good strategy always implies choice.

Often, scenario planning is undertaken to address a new and unfamiliar area of inquiry or to release an organization from stagnation. In these cases, an organization is not looking to test a strategy, but to create a new strategy. To create a new strategy, an organization enters the process with an understanding of its "organizational self." The organizational self includes understanding distinctive capabilities, assets, values and the organization's purpose.

With this understanding, an organization can literally start with a blank slate to identify a powerful and robust strategic agenda. That strategic agenda will lead to the identification of strategic activities to begin or enhance and the identification of activities to remove from the organization's "To Do" list. Once again, good strategy implies choice.

In either case, the core premise behind scenario planning is for the organization to determine how to succeed in an uncertain and often challenging set of future possibilities. As such, scenario planning is an inherently optimistic and empowering process. Organizations do not undertake scenario planning to learn how to fail, but to learn how to succeed.

Scenario Planning, an Interactive Engagement Process

Scenario planning can be used by individuals as a personal broadening exercise. However, the power of the methodology is how it engages groups of people to collectively create a new and powerful understanding of future possibilities. The more diverse and varied the group, the richer the outcome. Scenario planning embraces diversity and builds from the creative leveraging of conflicting and differing views. It is a collective and social process. Engaging and gaining buy-in within the organization beyond the leadership team is critical to successful implementation of the strategic agenda. Thoughtful planning early on in the scenario planning process pays off as you move into implementing the strategic insights that emerge from the process.

Adding Scenario Planning to a Strategic Planning Process

Scenario planning does not have to be done in conjunction with strategic planning, but most organizations have a strategic planning process in place that is undertaken either every year or every few years to refresh the strategic plan of the organization. The form of the strategic plan product and the process itself varies from organization to organization. Each organization needs to take stock of their existing strategic planning process when determining how best to leverage scenario planning within that existing institutionalized process. That being said, there are a few general comments that can be made that will help organizations determine how to most effectively build scenario planning into their organization's strategic planning process.

Scenario planning is an excellent tool to challenge conventional thinking on what the future holds by allowing the uncertainties facing the organization to be fully explored. As such, scenario planning is usually undertaken at the start of the strategic planning process, before strategies are identified. That way, the scenario planning process becomes a key element in identifying and testing strategic options toward developing a robust and effective strategic agenda for the organization. The existing strategic planning process can then be used to further flesh-out strategies and related implementation plans.

Scenario Shelf Life

Scenarios are relevant and useful for a period of time. The rule-of-thumb is that most scenarios have a shelf life of 3 to 5 years. The ARL 2030 Scenarios, likewise, will have a shelf life of usefulness. During that period, the strategic planning process does not recreate the scenarios themselves, but rather uses the existing scenarios to identify and to refresh the strategic agenda. During the first cycle of use, the organization conducts a strategic implications workshop and process as described in **Chapter 7:** Designs for Strategic Implications Workshops (page 57). In later years, the organization can choose to follow one or some of the approaches suggested in **Chapter 8**: Designs for Engaging the Organization (page 77), and **Chapter 9**: Designs for Keeping the Strategic Conversation Alive (page 83).

Creating an Ongoing Strategic Conversation

Most strategic planning tools are designed for a single application with a clear starting point and ending point. Scenario planning also has a starting point, which begins with the defining of a strategic focus for the effort. However, scenario planning does not have an ending point. It cannot be captured and neatly stored in a binder on a shelf. Scenario planning is a way of thinking that fosters a living strategic conversation that continues well beyond the identification of strategic implications and strategic options. Organizations can, of course, end the scenario planning process once strategic implications and options are identified. However, in doing so, organizations lose the opportunity to build up their organization's antennae to external dynamics of change and the potential to develop a more adaptive and anticipatory stance in their operating environment.

Early Indicators and Ongoing Monitoring

Early indicators are events or dynamics currently underway external to the organization that validate the dynamics or characteristics portrayed in a specific scenario. Early indicators can be weak signals or much more pronounced dynamics of change.

Because there is a time element embedded in the ARL 2030 Scenarios, in that each story begins today and takes us out to 2030, there are early indicators in all four scenarios currently playing out in the research environment. Becoming aware of early indicators and engaging your organization in the process of identifying, sharing, and making sense of indicators that it identifies in the research arena allows your organization to build awareness and understanding of dynamics changing the external environment.

Figure 2: Examples of Early Indicators for Each of the ARL 2030 Scenarios

Scenario 1: Research Entrepreneurs

Industry Supports Research Funding
Academic research spending from all sources increased by 5.8% (to $54.94 billion) in the 2009 fiscal year as indicated by a National Science Foundation report. Spending by industries rose by 11.6% (to $3.20 billion) and by universities by 7.6% (to $11.20 billion). Academic scientists and public policy scholars express concerns that scientists will skew findings to suit commercial interests.
Source: Brainard, Jeffrey. "The Top 100 Universities in Research Spending Had More Industry Help in 2009." *Chronicle of Higher Education*. September 28, 2010.

Start Up Funds Revolutionize Research
High-powered researchers come together to forge new models for cancer therapies. The model considers the disease as it affects a whole organism.
Source: Buchen, Lizzie. "Cancer Crunch." *New Scientist*. 207: 2768. July 10, 2010.

Scenario 2: Reuse and Recycle

Ban on Data Sharing
BP PLC offers lucrative contracts to university scientists with confidentiality clauses. Data collected over the next few years cannot be published. Ethical questions raised about the use of publicly owned laboratories to conduct confidential work on behalf of BP, a private company.
Source: Raines, Ben. "BP Buys Up Gulf Scientists For Legal Defense, Roiling Academic Community." *Press-Register* (Alabama) July 16, 2010.

Citizen Science Expanding Knowledge and Literacy
Citizen science, around for decades, engages the public in gathering data on a vast array of interests and projects. In turn, the citizen scientists build their knowledge and literacy about topics of interest and value to them.
Source: Cooper, Caren B.; et al. *Bioscience* 59, Issue 11 (December 2009): 977–84.

Scenario 3: Disciplines in Charge

Google Awards Grants for Digital Humanities
Google announces grants totaling $479,000 to start a new digital humanities research program. Program supports humanities text-mining research projects.
Source: Parry, Marc. "Google Awards First Grants for New Digital Humanities Research Program." *Chronicle of Higher Education*. July 14, 2010.

Social Science Agenda Identifies Top Issues
The National Science Foundation hopes to create a social science research agenda that will identify questions that deserve more study and those areas in most need of NSF support. There us a commitment to support interdisciplinary projects, especially those that link social sciences with other sciences.
Source: Scott Jaschik. 2010. News: New NSF Social Science Agenda. *Inside Higher Ed*, August 16.

Scenario 4: Global Followers

Nine Out of Top 50 Universities Are Asian
Asian universities are providing students with a quality education and cultural experiences. Government funding in China has aided its rise in standings.
Source: http://www.topuniversities.com/university-rankings/world-university-rankings/2010/results

China Incubates Scholarly Spin-offs
"China's 15-year plan for science and technology, issued in 2007, calls for reducing alliance on foreign technology." Issues surface about protection of intellectual property rights.
Source: Young, Jeffrey R. 2010. Chinese Research Park Incubates Hope for Scholarly Spinoffs. *The Chronicle of Higher Education*, September 14, sec. Technology.

Chapter 5: Mapping Out Your Scenario Planning Process

This user's guide focuses on the formal implementation of scenario planning within your research library. While the ARL 2030 Scenarios can be read and reflected upon to enhance your own personal understanding of the changing environment facing your research library, their value is increased when they are applied in a more formal planning process.

It is safe to say that those who explore the ARL 2030 Scenarios will increase their appreciation for the uncertainties facing the future of research and the research library and will build their ability to apply multiple future possibilities to strategic thinking. This ability shifts leaders from an "either or" to a "both and" approach to planning for the future. However, organizations that invest more deeply in the engagement of a wider group of staff will obtain greater benefits and achieve deeper organizational alignment. Applying the ARL 2030 Scenarios more formally to your organization's strategic planning leads an organization to develop a robust strategic agenda and to be well positioned to proactively, rather than reactively, adapt and change over time.

This guide provides a full set of resources you can use to create a scenario planning process for your research library. It provides a scenario set, identifies some of the scenarios' strategic implications, and offers a range of specific activities that you could use. However, each research library is unique, and each will benefit from a unique planning process. For your organization to get the most out of the ARL 2030 Scenarios, it is necessary to spend some time mapping out your customized scenario planning process. This could be done by an individual or by a small group. It is valuable to include an individual with facilitation expertise in the planning group, if possible. While a few sample process maps are included in this chapter, the best way to approach process map development is to review all of the designs and content in the guide before tackling the mapping activity.

Ideally, scenario planning can be mapped to strategic planning activities already occurring at your library, or more broadly within the institution. Because strategic planning is so widespread in research libraries, the user's guide devotes considerable attention to process maps and workshop designs that integrate scenario planning into strategic planning. However, scenario planning can be conducted as an activity independent of strategic planning.

The following are the seven designs included in this user's guide:

Design A: Developing a Strategic Agenda
This is a good design to use at the outset of the strategic planning process if the organization is creating a new strategic agenda. The participants should include the key leadership of the library with responsibility for strategy and a few key members of the organization with implementation responsibility. (2 days)

Design B: Testing an Existing Strategic Plan or Agenda
This is a good design to use if the organization has a strategic plan that is currently in use. This design allows the existing strategic plan or agenda to be tested and refined. The participants should include the key leadership of the library with responsibility for strategy and a few key members of the organization with implementation responsibility. (2 days)

Design C: Partnering Libraries Developing a Joint Strategic Agenda
This is a good design to use by a set of organizations that are currently partnering or want to explore new partnership opportunities. The participants should evenly represent all of the organizations and should include key leadership of each library with responsibility for strategic decision-making. (2 days)

Design D: Scenario Planning and ARL 2030 Scenarios Introduction
This is a good design to use to introduce staff or members of the broader research library organization to scenario planning and the ARL 2030 Scenarios. It is ideal for a brown bag lunch discussion. Currently, the design is written to introduce one scenario to the participants. This design can be expanded to include more than one scenario. Another option is to use this design as-is and offer four sessions, one session focused on each scenario. (1 hour)

Design E: Rollout of the Strategic Agenda
This is a good design to use when introducing staff or members of the organization to the strategic agenda and to allow participants to align their activities with the strategic agenda and the implementation process. (2 hours)

Design F: Ongoing Monitoring of Early Indicators
This is a good design to use to review early indicators for the ARL 2030 Scenarios on a regular basis. As an ongoing activity this session should be scheduled 3 to 4 times per year and can be scheduled to occur prior to leadership team sessions. For this activity, consider identifying an ongoing monitoring team to create continuity in your process. The members of a monitoring team can each take responsibility for watching for early indicators between sessions. (3 hours)

Design G: Refreshing the Strategic Agenda
The strategic agenda should be refined and adjusted over time to take advantage of the changing external research environment. This process can be embedded in an organization's annual strategic planning process or incorporated in other scheduled group meetings to engage the broader organization in the ongoing strategic conversation. (3 hours)

Designs A, B, and C are three variations on a 2-day strategic implications workshop; Design D is a 1-hour introductory session. Designs E, F, and G are 2- to 3-hour sessions for reviewing or refreshing the library's strategic agenda.

Libraries that want to be more exploratory in their approach can also start with Design D as a mechanism for learning about scenario planning. Based on an initial positive experience with that design, the library can then revisit the designs to determine how to create a fuller process map.

Mapping Scenario Planning to Your Existing Strategic Planning Process

In choosing how to assemble the building blocks of the designs in Chapters 7, 8, and 9 within an organization's strategic planning process, several key questions will drive the decision process. What is your organization currently doing? If a strategic planning process is in place, how formal is the process? How often is the strategic plan revisited? Where is your organization currently within the strategic planning cycle? Is a strategic plan already in place or being developed?

Does your strategic planning process already include environmental scanning of the external research environment that you serve? Some organizations have mechanisms in place to watch for changing needs in the external environment. If such a process exists in your organization, scenario planning can be woven in to further enhance the analysis portion of the process.

How tied is your strategic planning to your parent institution's strategic planning process? If you are tied to your parent institution's process, what control do you have over the context in which you engage in your strategic planning? Are you given the institution's strategic plan and asked to implement it, or are you given the parent institution's strategic plan and asked to create a strategic plan for the research library that supports the institution's strategic plan?

All of these questions will help you determine how to most effectively shape your scenario planning process. Begin by scanning through these questions and determine which apply to your situation. Depending on your answers thoughtfully position the scenario planning activities to enhance your organization's strategic conversation.

Sample Process Maps

The following are two sample process maps that might be helpful to you as you work to create your own unique scenario planning process. Process Map A could apply to organizations whose planning process is independent of its parent institution. It can serve organizations creating, testing, or collaborating to create a strategic agenda. Process Map B could apply to a process where strategic planning is part of the parent institution's process, for either creating or testing a strategic agenda.

Figure 3: Process Map A—Library Planning Is Independent from Parent Institution

Step 1: **Scenario Planning and the ARL 2030 Scenarios Introduction Sessions**
(Design D; series of kick-off sessions)

Step 2: **Strategic Implications Workshop**
(Design A, B, or C)

Step 3: **Fleshing out Strategic Agenda**
(After workshop, a small team needs to spend time cleaning up the language and creating a communication package for sharing the strategic agenda.)

Step 4: **Rollout of Strategic Agenda**
(Design E; series of roll out sessions)

Step 5: **Strategic Agenda Translated into Strategic Plan**
(A strategic plan document captures and describes the implementation of the strategic agenda.)

Step 6: **Ongoing Monitoring of Early Indicators**
(Design F; quarterly sessions)

Step 7: **Refreshing Strategic Agenda**
(Design G; annual strategy session)

Figure 4: Process Map B—Library Strategic Planning Is Part of Parent Institution's Strategic Planning Process

Step 1: **Scenario Planning and the ARL 2030 Scenarios Introduction Sessions**
(Design D; series of kick-off sessions. One of the sessions could include leadership from the parent institution. Think carefully how you would introduce the leadership to the scenario planning process and engage them in discussions.)

Step 2: **Strategic Implications Workshop**
(Design A or B; pre-work will include familiarizing the participants with the parent institution's strategic plan or directive. In this case the designs would be tweaked to allow the strategic options to be developed in response to the parent institution's strategic plan or directive.)

Step 3: **Fleshing Out Strategic Agenda**
(After workshop, a small team needs to spend time cleaning up the language and creating a communication package for sharing the strategic agenda.)

Step 4: **Rollout of Strategic Agenda**
(Design E; series of roll out sessions)

Step 5: **Strategic Agenda Translated Into Strategic Plan**
(A strategic plan document captures and describes the implementation of the strategic agenda.)

Step 6: **Ongoing Monitoring of Early Indicators**
(Design F; quarterly sessions)

Step 7: **Refreshing Strategic Agenda**
(Design G; annual strategy session)

Chapter 6: Workshop Planning

The workshop designs provided in Chapter 7 are building blocks you can work with as you plan and structure the process to create your library's strategic agenda. No one design will in itself provide a full strategic agenda development process. A full agenda development process will require the creation of a **process map***, as described in the previous chapter. Please note that the designs may not appear in the order in which they will be applied within a library's process. In fact, many organizations may choose to start with an exploratory session based on* **Design D** *(page 78) prior to conducting a strategic implications workshop.*

Each design is laid out in somewhat generic terms to be shaped and refined to fit in with your organization's culture and approach to strategy. An experienced facilitator can work with library leadership or a planning group to select the appropriate design and make modifications to reflect the library's goals, organizational structure, and resources.

Why a Workshop?

These designs are labeled "workshop" deliberately to denote a very different type of environment and process from a "meeting." Meetings tend to be a more passive and formal interaction with structured presentations and Q&A. These workshop designs promote a creative environment that encourages participants to think in new ways, to collectively problem-solve, to roll up their sleeves, and to create something that did not exist when they entered the room.

High-quality strategy has to be collectively developed to insure it is collectively owned within the organization. Good strategy development creatively engages a wide range of thinkers to work through complex issues to generate a strategic plan for success. The workshop environment is the ideal environment for a scenario-based strategic conversation.

Workshops are also generally longer than meetings and require a greater up-front investment in planning, as well as more active facilitation to promote the necessary environment for transformational thinking. Most of the workshop designs are for two-day events. This allows the necessary time for a group to engage deeply with the process, expand their thinking, and create and test new ideas. There are no substitutes for sustained engagement to achieve deep insights, although use of the short workshop laid out in **Design D** can allow a group to explore the potential of scenario planning and take some first steps toward broadening their thinking.

Planning a Workshop

Since planning a workshop is significantly more complex than planning a meeting, start your workshop planning by reviewing the following suggestions.

Workshop Space

The space for a workshop is critical to the success of the process. Ideally, the workshop should be conducted in a large and open space. Do not follow conference center specifications for the size of your group, as these are based

on schoolroom- or conference-style set-ups. A room of approximately 1000 to 1400 sq ft works well. In addition, a room with natural lights and windows is highly conducive to creating a high energy, creative environment.

The question of where to hold the workshop often comes up. To minimize distractions and participants stepping out for conversations and meetings, an offsite location is best.

Facilitating a Workshop

This user's guide provides a comprehensive overview of scenario planning along with actual workshop designs to use with members of your organization. Workshops do not just happen by handing an agenda to a group of people. They are highly interactive processes that need someone or a team of individuals to lead and guide the process. Although you may have the ability to facilitate the workshop, be clear as to whether you also want to participate in the workshop. It is extremely difficult to facilitate and participate in a workshop. As such, you may want to consider bringing in a neutral party to help facilitate the session so you can fully participate in the strategic conversation. If your research library has a department responsible for organizational development, you may have facilitators on staff. If not, a facilitator can be contracted to help with your workshop. He or she should be given the design documentation for planning and preparation. Ideally, the facilitator should have some experience in facilitating strategy sessions.

Who to Invite

Even more critical then the space is whom you choose to invite to the workshop. You need to consider both your longer-term interest in engaging critical players in the development of the strategy and your need to invite unique, creative, and strategic thinkers. The ideal number for a strategic implications workshop is 12 to 20 people. Beyond this range, the facilitation of the session can become rather complex. Below this range risks a lack of energy and individuals to properly engage in scenario breakout conversations. Thoughtful time should be spent identifying the ideal set of participants and the date set with plenty of notice to insure this critical workshop is on people's calendars. The strategic implications workshop is best approached as a consecutive two-day session.

Gaining Buy-in Is Essential

Those ARL member directors who participated in the development of the ARL 2030 Scenarios would find it difficult to communicate to you all the thought and dialogue that led to the scenarios themselves. The process was highly iterative and complex, and the result is a set of rich and provocative futures. Indeed, if you don't create the scenarios yourself, you will find it difficult to buy-in to the scenario content, which means allowing yourself to suspend disbelief and fully engage in a serious discussion of the implications of each scenario.

Nothing can fully take the place of being a part of the scenario creation itself. However, to say, "You had to be there!" cannot suffice. Overtime, scenarists have learned that it is critical to purposely engage new participants entering the process after the scenarios are created. That engagement ideally includes both the thoughtful reading of the scenario content and interacting with the content by identifying current early indicators present in the external environment that validate the plausibility and importance of each scenario. This process is a critical part of the process and is incorporated in the designs as a pre-work assignment in preparation for a strategic implications workshop. Do not overlook the importance of this critical step in the process.

The Pre-work Assignment

The pre-work assignment familiarizes the participants with the logic of each scenario and allows them to find validating evidence of the value of considering the full range of scenarios. Suggested language to use in sharing the pre-work assignment with the participants is provided as appropriate in each design. Plan to send the assignment with the ARL 2030 Scenarios out to participants at least one week ahead of the workshop to insure they have time to complete the assignment.

Chapter 7: Designs for Strategic Implications Workshops

The following workshop designs are suggestions to help you plan and structure an effective strategic implications workshop. As such, they are laid out in rather generic terms to be shaped and refined to fit in with your organization's culture and approach to strategy.

Three sample designs have been included for the strategic implications workshop. Each design is for a different situation and includes information on when to use the design and who should participate.

Design A: Developing a Strategic Agenda

This is a good design to use at the outset of the strategic planning process if the organization is creating a new strategic agenda. The participants should include the key leadership of the library with responsibility for strategy and a few key members of the organization with implementation responsibility.

Process Design

Workshop Length: 2 days
Number of Participants: 12 to 20

Pre-work Assignment:

Distribute 1 week before the workshop.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- 6 to 10 full pads of 3"x5" Post-it Notes, ideally lined and in various colors
- 12 to 20 Sharpie Permanent Markers (or equivalent felt tip marker) for writing on post-its
- 12 Pack of flip chart markers, chisel tip
- 5 rolls of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Note paper and pens—1 for each participant

Room Set-up:

Large room with 4 round tables with 3 to 5 seats each, seats facing the "front" of the room. Each table given 1 flip chart easel with paper, flip chart markers, post-its, masking tape, and Sharpie markers. A screen and LCD can be set up at the "front" of the room, if desired. One additional flip chart easel with paper, markers, and tape for session leader.

Process Description

Day 1:

15 min **Welcome and Opening Remarks**

Share expectations, desired outcome, and group norms for strategic dialogue.

Expectations: These should be developed specifically for your audience. The following are some ideas to consider:

- Everyone will fully participate.
- We will suspend disbelief and seriously engage in discussing all the scenarios.
- We will work together collectively to uncover critical strategic insights for our organization.

Desired Outcome: A robust strategic agenda for our organization to use in our strategic planning.

Group Norms for Effective Strategic Dialogue (captured on flip chart in the room)

- Be open to new ideas
  - challenge *your* assumptions
  - ask clarifying questions of each other
- Suspend disbelief
- Balance inquiry and advocacy
- Stay in the strategic space, future-oriented
- Fully participate
  - listen actively
  - contribute
  - leave "space" in the conversation for others
  - stay together (gadgets off, no multi-tasking, be on time)

15 min **Introduction to Scenario Planning with the ARL 2030 Scenarios**

Key Points:

- Scenarios allow organizations to look at the critical uncertainties that are changing the environment in which they operate.
- Avoid the desire to choose a future scenario. The future will not be any one of the ARL 2030 Scenarios; the future will be made up of components of all four scenarios.
- The scenarios are 20 years in the future. They are used to plan for the next 1 to 3, or 1 to 5, years.

60 min **ARL 2030 Scenarios and Early Indicators**

Take time to remind the participants of each scenario, and discuss early indicators of each scenario that participants identified in their pre-work and any new indicators identified during discussion. (approx. 10 minutes per scenario)

At the end of reviewing the early indicators of all four scenarios, ask participants to step back from the full set of early indicators and share what they see or observe in the indicator data. End by making the observation that there are early indicators of all four scenarios, meaning all four are currently playing out in the external environment.

15 min **Break**

60 min	**Scenario Deep Dive** *Breakout Activity* Participants should be separated into four breakout groups. To optimize breakout group dynamics, you may want to pre-assign individuals to the groups. Each group is asked to focus on one scenario. See the following Breakout Template for the details of this activity. Participants continue this conversation into the morning of Day 2. Breaks for lunch and refreshments and the overnight pause help the groups sustain their energy and balance different thinking styles as they work through the Deep Dive activities.
60 min	**Lunch**
90 min	**Scenario Deep Dive, cont.** *Breakout Activity*
15 min	**Break**
60 min	**Scenario Deep Dive, cont.** *Breakout Activity*
30 min	**Breakout Groups Share Insights from Conversations** *Plenary*
	Close

Day 2:

15 min	**Morning Reflections** *Plenary* Participants share new reflections and insights arising from their time away from the conversation.
60 min	**Scenario Deep Dive, cont.** *Breakout Activity*
15 min	**Break**
45 min	**Presentations** *Plenary* Each breakout group presents its key strategic insights ▪ Strategic Options ▪ Highlight from discussion of Strategic Questions
45 min	**Key Learnings and Takeaways** *Plenary* Discussion of key learnings and takeaways from the Deep Dive activity
60 min	**Lunch**

90 min **Building the Strategic Agenda**
Plenary

60 min Identifying Robust Strategic Options
Have participants work in small groups and walk around the room to uncover which of the "strategic options" work across the scenarios. A strategic option may be applicable to all four scenarios, but may have only been identified by one or two groups during the breakout activity. "Robust strategies" will work in at least three of the four scenarios and if it works in only three, it will have no detrimental impact if acted on in the remaining scenario. The small groups should keep notes on the strategic options they believe are robust. The notes should include full description of the strategic option and what scenarios it applies to. (15 min)

Once groups have identified the robust strategies, have groups share them in plenary. Someone should capture and compile the full list on a flip chart entitled, "Strategic Agenda." If each strategic option is captured on a separate post-it note, the participants will be able to move them around and even remove them in the process of organizing and fine tuning the strategic agenda. (45 min)

30 min Clustering Strategic Options into Robust Strategies
With the strategic options on Post-its, work with the participants to organize the material into robust strategies, see **Figure 1**: XYZ Organization's Strategic Agenda for a Biotech R&D Incubator (page 42).

15 min **Break**

90 min **Refining Strategic Agenda**

45 min Prioritizing Robust Strategies
Not all robust strategies need to be acted on. Your organization needs to consider who it is and what its distinctive capabilities are to determine which robust strategies to focus on. The strategic agenda should not be looked at as a list of strategies, but an agenda of strategic activity that systemically works as a whole. An organization should capitalize on the ability to focus strategic efforts. It is much better that your organization is positioned to implement three to six robust strategies than attempt 12 that cannot be properly implemented.

45 min Adding Additional Strategies to the Strategic Agenda
In exploring the four scenarios in breakout groups, an organization may identify a strategy that is not robust but that offers powerful advantages given the organization's current positioning in the research arena. Before leaving the scenario, did such a strategy emerge during the breakouts? Should that strategy be added to the strategic agenda?

Before leaving this activity, participants should test the refined strategic agenda against the **key characteristics** of a powerful strategic agenda (page 42).

30 min **Next Steps and Closing Remarks**

Adjourn

Design A: Breakout Template

Scenario: _____
Breakout Members:

Capture your discussion on flip chart sheets. Be sure to capture full ideas and concepts and note what question you are answering on the flip chart.

1) Who will be the end-user of our research library in 2030? What will be their needs? What forces drive their needs? (60 min)

2) Brainstorm Opportunities and Threats for our research library in this scenario. (30 min)

   Brainstorm Rules
   - Capture all ideas.
   - Redundancy is OK.
   - Do not critique and analyze.
   - At the end, note top ideas.

3) Identify our Strengths and Weaknesses in this scenario. (30 min)

4) What are the strategic implications of this scenario in 2030 for our research library? (30 min)

5) Identify strategies we might employ that mitigate threats and leverage opportunities, given our strengths and weaknesses. Each strategy is a strategic option. Capture each on a separate post-it note so you can organize and cluster your strategic options. (60 min)

6) Discuss the strategic questions for your scenario. What new strategic options emerge from your discussion? Add these strategic options to your work in exercise 5 above. (60 min)

Strategic Questions

Developed by ARL Members for Research Library Consideration

Scenario 1: Research Entrepreneurs

- What non-traditional sources of funds or revenue should we be nurturing today to supplement our traditional sources of funding?
- How do we begin now to develop the library professional of this future—a highly capable and credible service provider who can work directly with researchers with data preparation and curation capabilities? What skills are we currently developing in our library professionals that may not be valued in the future?
- How do we successfully position our organization for this potential future given our traditional library values and culture?

Scenario 2: Reuse and Recycle

- How do we develop new, competitive, and diverse revenue-generating models?
- How do we understand our mission in a world with abundant, but low-value information and only scarce, high-value information? Strategically, what levels of support are we willing and able to apply to (redundant) general collections and services if they are not adequately funded or able to generate revenue?
- How do we develop the library professional of this future—an informatics professional with discipline knowledge and project management skills? What skills are we currently developing in our library professionals that may not be valued in the future?

Scenario 3: Disciplines in Charge

- How do our organizations identify areas where we are uniquely positioned to focus resources to further build expertise and distinctive competency?
- What relationships do we need to build with the research community?
- What relationships do we build with other research libraries? How do we best support the development of the network of research libraries?

Scenario 4: Global Followers

- How do we position ourselves to flourish in the role of follower to leading eastern institutions and research agendas?
- How do we effectively build cross-cultural and multi-cultural participation and expertise?
- What is required to develop common cause and cooperation around intellectual property issues?

Design B: Testing an Existing Strategic Plan or Agenda

This is a good design to use if the organization has a strategic plan that is currently in use. This design allows the existing strategic plan or agenda to be tested and refined. The participants should include the key leadership of the library with responsibility for strategy and a few key members of the organization with implementation responsibility.

Process Design

Workshop Length: 2 days
Number of Participants: 12 to 20

Pre-work Assignment:

Distribute 1 week before the workshop. In addition to the scenario-related pre-work, documentation of the current strategic plan or agenda should be distributed. Participants should be asked to refresh themselves on the content.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- 6 to 10 full pads of 3"x5" Post-it Notes, ideally lined and in various colors
- 12 to 20 Sharpie Permanent Markers (or equivalent felt tip marker) for writing on post-its
- 12 pack of flip chart markers, chisel tip
- 5 rolls of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Note paper and pens—1 for each participant

Room Set-up:

Large room with 4 round tables with 3 to 5 seats each, seats facing the "front" of the room. Each table given 1 flip chart easel with paper, flip chart markers, post-its, masking tape, and Sharpie markers. A screen and LCD can be set up at the "front" of the room, if desired. One additional flip chart easel with paper, markers, and tape for session leader.

Process Description

Day 1:

15 min **Welcome and Opening Remarks**

Share expectations, desired outcome, and group norms for strategic dialogue.

Expectations: These should be developed specifically for your audience. The following are some ideas to consider:

- Everyone will fully participate.
- We will suspend disbelief and seriously engage in discussing all the scenarios.
- We will work together collectively to test our existing strategic plan or agenda.

Desired Outcome: Refinements and changes to the existing strategic plan or strategic agenda to make it more robust.

Group Norms for Effective Strategic Dialogue (captured on flip chart in the room)

- Be open to new ideas
  - challenge *your* assumptions
  - ask clarifying questions of each other
- Suspend disbelief
- Balance inquiry and advocacy
- Stay in the strategic space, future-oriented
- Fully participate
  - listen actively
  - contribute
  - leave "space" in the conversation for others
  - stay together (gadgets off, no multi-tasking, be on time)

30 min **Current Strategic Plan or Agenda**

This should be a brief overview and refresher on the key strategic content.

15 min **Introduction to Scenario Planning with the ARL 2030 Scenarios**

Key Points:

- Scenarios allow organizations to look at the critical uncertainties that are changing the environment in which they operate.
- Avoid the desire to choose a future scenario. The future will not be any one of the ARL 2030 Scenarios; the future will be made up of components of all four scenarios.
- The scenarios are 20 years in the future. They are used to plan for the next 1 to 3, or 1 to 5, years.

60 min **ARL 2030 Scenarios and Early Indicators**

Take time to remind the participants of each scenario and discuss early indicators of each scenario that participants identified in their pre-work and any new indicators identified during discussion. (approx. 10 minutes per scenario)

At the end of reviewing the early indicators of all four scenarios, ask participants to step back from the full set of early indicators and share what they see or observe in the indicator data.

End by making the observation that there are early indicators of all four scenarios, meaning all four are currently playing out in the external environment.

15 min **Break**

60 min **Scenario Deep Dive**
Breakout Activity
Participants should be separated into four breakout groups. To optimize breakout group dynamics, you may want to pre-assign individuals to the groups. Each group is asked to focus on one scenario. See the following Breakout Template for the details of this activity. Participants continue this conversation into the morning of Day 2. Breaks for lunch and refreshments and the overnight pause help the groups sustain their energy and balance different thinking styles as they work through the Deep Dive activities.

60 min **Lunch**

90 min **Scenario Deep Dive, cont.**
Breakout Activity

15 min **Break**

60 min **Scenario Deep Dive, cont.**
Breakout Activity

30 min **Breakout Groups Share Insights from Conversations**
Plenary

Close

Day 2:

15 min **Morning Reflections**
Plenary
Participants share new reflections and insights arising from their time away from the conversation.

60 min **Scenario Deep Dive, cont.**
Breakout Activity

15 min **Break**

45 min **Presentations**
Plenary
Each breakout group presents its key strategic insights
- Strategic Options
- Highlight from discussion of Strategic Questions

45 min **Key Learnings and Takeaways**
Plenary
Discussion of key learnings and takeaways from the Deep Dive activity.

60 min **Lunch**

60 min **Compiling and Organizing Recommendations**
Plenary
Whether you enter the workshop with a strategic plan or a strategic agenda, it will be helpful at this point to frame the strategic content of the current strategy in the form of a strategic agenda. See **Figure 1**: XYZ Organization's Strategic Agenda for a Biotech R&D Incubator (page 42).

Participants work together to compile the recommendations on how to refine the current strategic agenda.

Some conflicting recommendations may emerge that will need to be talked through. The goal here is to maximize the robustness of the strategic agenda.

The recommendations may need to be organized to understand their cumulative impact on the current strategic agenda.

90 min **Refining Strategic Agenda**

45 min **Testing Recommendations**
Not all recommendations need to be acted on. Some may have been dismissed during the compiling process. At this point it is worth applying the full set of recommendations to the strategic agenda to see if any issues still need to be addressed.

15 min **Break**

45 min **Adding Additional Strategies to the Strategic Agenda**
In exploring the four scenarios in breakout groups, an organization may identify a strategy that is not robust but that offers powerful advantages given the organization's current positioning in the research arena. Did such a strategy emerge during the breakouts? Should that strategy be added to the strategic agenda?

Before leaving this activity, participants should test the refined strategic agenda against the **key characteristics** of a powerful strategic agenda (page 42).

30 min **Next Steps and Closing Remarks**

Adjourn

Design B: Breakout Template

Scenario: _____
Breakout Members:

Capture your discussion on flip chart sheets. Be sure to capture full ideas and concepts and note what question you are answering on the flip chart.

1) Who will be the end-user of our research library in 2030? What will be their needs? What forces drive their needs? (45 min)

2) Brainstorm Opportunities and Threats for our research library in this scenario. (30 min)

   Brainstorm Rules
   - Capture all ideas.
   - Redundancy is OK.
   - Do not critique and analyze.
   - At the end, note top ideas.

3) What are the strategic implications of this scenario in 2030 for our research library? (30 min)

4) Identify the Strengths and Weaknesses of our current strategic plan or agenda in this scenario. (30 min)

5) What changes or refinements to the current strategic plan or agenda would be necessary for it to be robust in this scenario? Compile a list of recommendations. (60 min)

6) Discuss the strategic questions for your scenario. What new strategic insights emerge from your discussion? Capture any additional recommendations related to the strategic questions. (60 min)

Strategic Questions

Developed by ARL Members for Research Library Consideration

Scenario 1: Research Entrepreneurs

- What non-traditional sources of funds or revenue should we be nurturing today to supplement our traditional sources of funding?
- How do we begin now to develop the library professional of this future—a highly capable and credible service provider who can work directly with researchers with data preparation and curation capabilities? What skills are we currently developing in our library professionals that may not be valued in the future?
- How do we successfully position our organization for this potential future given our traditional library values and culture?

Scenario 2: Reuse and Recycle

- How do we develop new, competitive, and diverse revenue-generating models?
- How do we understand our mission in a world with abundant, but low-value information and only scarce, high-value information? Strategically, what levels of support are we willing and able to apply to (redundant) general collections and services if they are not adequately funded or able to generate revenue?
- How do we develop the library professional of this future—an informatics professional with discipline knowledge and project management skills? What skills are we currently developing in our library professionals that may not be valued in the future?

Scenario 3: Disciplines in Charge

- How do our organizations identify areas where we are uniquely positioned to focus resources to further build expertise and distinctive competency?
- What relationships do we need to build with the research community?
- What relationships do we build with other research libraries? How do we best support the development of the network of research libraries?

Scenario 4: Global Followers

- How do we position ourselves to flourish in the role of follower to leading eastern institutions and research agendas?
- How do we effectively build cross-cultural and multi-cultural participation and expertise?
- What is required to develop common cause and cooperation around intellectual property issues?

Design C: Partnering Libraries Developing a Joint Strategic Agenda.

This is a good design to use by a set of organizations that are currently partnering or want to explore new partnership opportunities. The participants should evenly represent all of the organizations and should include key leadership of each library with responsibility for strategic decision-making.

Process Design

Workshop Length: 2 days
Number of Participants: 16 to 24

Pre-work Assignment:

Distribute 1 to 2 weeks before the workshop.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- 10 to 12 full pads of 3"x5" Post-it Notes, ideally lined and in various colors
- 16 to 24 Sharpie Permanent Markers (or equivalent felt tip marker) for writing on post-its
- 12 pack of flip chart markers, chisel tip
- 5 rolls of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Note paper and pens—1 for each participant

Room Set-up:

Large room with 4 round tables with 4 to 6 seats each, seats facing the "front" of the room. Each table given 1 flip chart easel with paper, flip chart markers, post-its, masking tape, and Sharpie markers. A screen and LCD can be set up at the "front" of the room, if desired. One additional flip chart easel with paper, markers, and tape for session leader.

Process Description

Day 1:

30 min **Welcome, Introductions, and Opening Remarks**

Share expectations, desired outcome, and group norms for strategic dialogue.

Expectations: These should be developed specifically for your audience. The following are some ideas to consider:

- Everyone will fully participate.
- We will suspend disbelief and seriously engage in discussing all the scenarios.
- We will work together collectively to uncover critical strategic insights for our organization.

Desired Outcome: A robust strategic agenda for our organization to use in our strategic planning.

Group Norms for Effective Strategic Dialogue (captured on flip chart in the room)

- Be open to new ideas
  - challenge *your* assumptions
  - ask clarifying questions of each other
- Suspend disbelief
- Balance inquiry and advocacy
- Stay in the strategic space, future-oriented
- Fully participate
  - listen actively
  - contribute
  - leave "space" in the conversation for others
  - stay together (gadgets off, no multi-tasking, be on time)

15 min **Introduction to Scenario Planning with the ARL 2030 Scenarios**

Key Points:

- Scenarios allow organizations to look at the critical uncertainties that are changing the environment in which they operate.
- Avoid the desire to choose a future scenario. The future will not be any one of the ARL 2030 Scenarios; the future will be made up of components of all four scenarios.
- The scenarios are 20 years in the future. They are used to plan for the next 1 to 3, or 1 to 5, years.

60 min **ARL 2030 Scenarios and Early Indicators**

Take time to remind the participants of each scenario and discuss early indicators of each scenario that participants identified in their pre-work and any new indicators identified during discussion. (approx. 10 minutes per scenario)

At the end of reviewing the early indicators of all four scenarios, ask participants to step back from the full set of early indicators and share what they see or observe in the indicator data. End by making the observation that there are early indicators of all four scenarios, meaning all four are currently playing out in the external environment.

15 min **Break**

60 min **Scenario Deep Dive**
Breakout Activity
Participants should be separated into four breakout groups. Pre-assign participants to optimize breakout group dynamics and insure each library is represented adequately in all four groups. Each group is asked to focus on one scenario. See the following Breakout Template for the details of this activity. Participants continue this conversation into the morning of Day 2. Breaks for lunch and refreshments and the overnight pause help the groups sustain their energy and balance different thinking styles as they work through the Deep Dive activities.

60 min **Lunch**

90 min **Scenario Deep Dive, cont.**
Breakout Activity

15 min **Break**

60 min **Scenario Deep Dive, cont.**
Breakout Activity

30 min **Breakout Groups Share Insights from Conversations**
Plenary
What can we learn through this exercise about each of our libraries and our partnership?

Close

Day 2:

15 min **Morning Reflections**
Plenary
Participants share new reflections and insights arising from their time away from the conversation.

60 min **Scenario Deep Dive, cont.**
Breakout Activity

15 min **Break**

45 min **Presentations**
Plenary
Each breakout group presents its key strategic insights.
- Strategic Options
- Highlight from discussion of Strategic Questions

45 min **Key Learnings and Takeaways**
Plenary
Discussion of key learnings and takeaways for our partnership from the Deep Dive activity.

60 min **Lunch**

90 min **Building a Shared Strategic Agenda**
Plenary

60 min Identifying Robust Strategic Options
Have participants work in small groups and walk around the room to uncover which of the "strategic options" work across the scenarios. The small groups of three to four should be a mix of the partnering libraries. A strategic option may be applicable to all four scenarios, but may have only been identified by one or two groups during the breakout activity. "Robust strategies" will work in at least three of the four scenarios and if it works in only three, it will have no detrimental impact if acted on in the remaining scenario. The small groups should keep notes on the strategic options they believe are robust. The notes should include a full description of the strategic option and what scenarios it applies to. (15 min)

Once groups have identified the robust strategies, have groups share them in plenary. Someone should capture and compile the full list on a flip chart entitled, "Our Strategic Agenda." If each strategic option is captured on a separate post-it note, the participants will be able to move them around and even remove them in the process of organizing and fine tuning the strategic agenda. (45 min)

30 min Clustering Strategic Options into Robust Strategies
With the strategic pptions on Post-its, work with the participants to organize the material into robust strategies, see **Figure 1**: XYZ Organization's Strategic Agenda for a Biotech R&D Incubator (page 42).

15 min **Break**

90 min **Refining Strategic Agenda**

45 min Prioritizing Robust Strategies
Not all robust strategies need to be acted on. Your partnering organizations need to consider how together you are uniquely positioned to determine which robust strategies to focus on. The strategic agenda should not be looked at as a list of strategies, but an agenda of strategic activity that systemically works as a whole. Capitalize on your ability to focus strategic efforts. Identifying three to six robust strategies that your partnership is positioned to implement is much better than 12 that cannot be properly implemented.

45 min Adding Additional Strategies to the Strategic Agenda
In exploring the four scenarios in breakout groups, the participants may identify a strategy that is not robust but that offers powerful advantages given the unique positioning of the partnering organizations in the research arena. Did such a strategy emerge during the breakouts? Should that strategy be added to the strategic agenda?

Before leaving this activity, participants should test the refined strategic agenda against the **key characteristics** of a powerful strategic agenda (page 42).

30 min **Next Steps and Closing Remarks**
Adjourn

Design C: Breakout Template

Scenario: _____
Breakout Members:

Capture your discussion on flip chart sheets. Be sure to capture full ideas and concepts and note what question you are answering on the flip chart.

1) Who will be the end-user of our research library partnership in 2030? What will be their needs? What forces drive their needs? (60 min)

2) Brainstorm Opportunities and Threats for our research library partnership in this scenario. (30 min)

   Brainstorm Rules
   - Capture all ideas.
   - Redundancy is OK.
   - Do not critique and analyze.
   - At the end, note top ideas.

3) Identify our relevant Strengths and Weaknesses in this scenario. (30 min)

4) What are the strategic implications of this scenario in 2030 for our research library partnership? (30 min)

5) Identify strategies we might employ that mitigate threats and leverage opportunities, given our strengths and weaknesses. Each strategy is a strategic option. Capture each on a separate post-it note so you can organize and cluster your strategic options. (75 min)

6) Discuss the strategic questions for your scenario. Frame them from the perspective of your partnership. What new strategic options emerge from your discussion? Add these strategic options to your work in exercise 5 above. (75 min)

Strategic Questions

Developed by ARL Members for Research Library Consideration

Scenario 1: Research Entrepreneurs

- What non-traditional sources of funds or revenue should we be nurturing today to supplement our traditional sources of funding?
- How do we begin now to develop the library professional of this future—a highly capable and credible service provider who can work directly with researchers with data preparation and curation capabilities? What skills are we currently developing in our library professionals that may not be valued in the future?
- How do we successfully position our organization for this potential future given our traditional library values and culture?

Scenario 2: Reuse and Recycle

- How do we develop new, competitive, and diverse revenue-generating models?
- How do we understand our mission in a world with abundant, but low-value information and only scarce, high-value information? Strategically, what levels of support are we willing and able to apply to (redundant) general collections and services if they are not adequately funded or able to generate revenue?
- How do we develop the library professional of this future—an informatics professional with discipline knowledge and project management skills? What skills are we currently developing in our library professionals that may not be valued in the future?

Scenario 3: Disciplines in Charge

- How do our organizations identify areas where we are uniquely positioned to focus resources to further build expertise and distinctive competency?
- What relationships do we need to build with the research community?
- What relationships do we build with other research libraries? How do we best support the development of the network of research libraries?

Scenario 4: Global Followers

- How do we position ourselves to flourish in the role of follower to leading eastern institutions and research agendas?
- How do we effectively build cross-cultural and multi-cultural participation and expertise?
- What is required to develop common cause and cooperation around intellectual property issues?

Chapter 8: Designs for Engaging the Organization

Scenario planning is an excellent foundation for developing an organization that is aligned around a strategic agenda. Engagement can be achieved at many levels and can cascade as deeply as desired into an organization. The members of the organization can engage with the scenarios themselves, building awareness of the dynamic nature of the research environment. They can also engage in understanding and playing an active role in implementing the strategic agenda developed from the scenario planning activity. The following are a few examples of ways to initiate engagement with a leadership or planning group, or engage the broader organization beyond the leadership team that participated in the strategic implications workshop. Each of these activities takes 1 to 2 hours of time. The designs can be combined to create a more comprehensive experience or used at planned intervals to keep the strategic conversation alive.

Creative Engagement of the Organization

A strategic agenda is normally created and maintained over time by the leadership of an organization. The subsequent implementation of that strategic agenda involves the engagement of the broader organization and requires the cascading of the scenarios and resultant strategic agenda throughout the organization. Some organizations choose to fully involve all levels of the organization in the process of engagement. Others choose to engage selective departments and levels within the organization that they feel are critical to the successful implementation of the strategic agenda. The decision on who to engage is an individual decision for each organization that is influenced by many things including the organization's structure and culture.

Engagement requires individuals in the organization to:

1) Understand the scenario planning process.
2) Be familiar with and experience the ARL 2030 Scenarios.
3) Understand how the strategic agenda was informed by the ARL 2030 Scenarios.
4) Explore how each individual can align their work with successful implementation of the strategic agenda.

The two designs described here are essential to almost any organizational process map. They are important components when scenario planning is being used to enrich a strategic planning process. They also can be used independently when an organization does not rely on strategic planning. Design D can work on its own as an exploratory activity to help a group or organization engage with the scenarios or as an exercise to build alignment among partner organizations.

The background information explaining general workshop planning (described in **Chapter 6**) is relevant to the designs in this chapter, and should be reviewed as part of the planning process.

Design D: Scenario Planning and ARL 2030 Scenarios Introduction

This is a good design to use to introduce staff or members of the broader research library organization to scenario planning and the ARL 2030 Scenarios. It is ideal for a brown bag lunch discussion. Currently, the design is written to introduce one scenario to the participants. This design can be expanded to include more than one scenario. Another option is to use this design as-is and offer four sessions, one session focused on each scenario.

Process Design

Workshop Length: 1 hour
Number of Participants: 6 to 24

Pre-work Assignment:

Distribute the scenario(s) you will focus on 1 week ahead of the session.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- Flip chart easel with paper, markers (varied colors, chisel tip)
- 1 roll of 1" masking tape (if flip charts are not 3M Post-it Pads)

Room Set-up:

Flexible. Can be in classroom set-up, boardroom, or other. Screen and LCD projector, if you are planning to share slides.

Process Description

5 min **Welcome and Opening Remarks**

Desired Outcome: Familiarize the attendees with scenario planning and engage in a strategic conversation of one or more of the scenarios.

10 min **Introduction to Scenario Planning with the ARL 2030 Scenarios**

Key Points:

- Scenarios allow organizations to look at the critical uncertainties that are changing the environment in which they operate.
- Avoid the desire to choose a future scenario. The future will not be any one of the ARL 2030 Scenarios; the future will be made up of components of all four scenarios.
- The scenarios are 20 years in the future. They are used to plan for the next 1 to 3, or 1 to 5, years.

15 min **ARL 2030 Scenario and Early Indicators**

Take time to remind the participants of the scenario you wish to focus on. Ask them to share some early indicators of that scenario already present in the external research environment. Capture the early indicators on a flip chart. End the discussion by noting that current early indicators validate the plausibility of that scenario playing out over time. They speak to the fact that dynamics are already at play that support this future state coming to pass. Always note that scenario planning is never done through consideration of just one scenario. The future is very uncertain, so it is important to consider a wide range of potential futures.

You have the option of expanding this segment to include additional scenarios.

25 min **Strategic Implications for Our Organization**

Ask attendees to discuss the implications of this scenario on the research library. How might we prepare for such a future? How might such a future change what you do at the library and how you do it?

5 min **Closing Remarks**

This is an opportunity to share how scenario planning is being applied at your research library and how you would like the attendees to play a role in the successful roll out of the process in the library.

Design E: Rollout of the Strategic Agenda

This is a good design to use to introduce staff or members of the organization to the strategic agenda and to allow participants to align their activities with the strategic agenda and the implementation process.

Process Design

Workshop Length: 2 hours
Number of Participants: 6 to 24

Pre-work Assignment:

> No pre-work assignment is suggested. The strategic agenda is best shared in person with participants. Although one might be tempted to send out the strategic agenda ahead of the session to speed up the process, the result often is just the opposite, as each individual will come to the session with preconceived notions on the meaning of the various strategies. To avoid the process of redirecting and reforming the groups understanding, and to insure the strategic agenda is accurately understood, present the strategic agenda in the session with a clear explanation and context.

Workshop Materials:

- Flip chart easel with paper, markers (varied colors, chisel tip)
- 1 roll of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Additional flip charts with markers and paper, if you plan to break the group into smaller groups.

Room Set-up:

> Flexible. Can be in classroom set-up, boardroom, or other. Screen and LCD projector, if you are planning to share slides.

Process Description

5 min **Welcome and Opening Remarks**

Desired Outcome: Attendees have the opportunity to learn about the scenario planning process at the research library and begin to understand how they can align themselves and their activities with the strategic agenda developed through this process.

45 min **Scenario Planning Process and the Resultant Strategic Agenda**

Key Points:

- Scenarios allow organizations to look at the critical uncertainties that are changing the environment in which they operate.
- Avoid the desire to choose a future scenario. The future will not be any one of the ARL 2030 Scenarios; the future will be made up of components of all four scenarios.
- The scenarios are 20 years in the future. They are used to plan for the next 1 to 3, or 1 to 5, years.
- Share a summary of the strategic implications of the scenarios for your research library and the resultant strategic plan.

Introducing the attendees to the ARL 2030 Scenarios is an optional activity that could be included. An introduction to the scenarios would include a brief description of each scenario and a discussion of early indicators.

50 min **Aligning to the Strategic Agenda**

Depending on the group size, this activity can either be done in plenary or by forming trios that each talk about one key strategy in the strategic agenda. If you use trios, allow them to speak for 20 minutes and use the remaining 25 minutes for trios to share with the whole group the highlights of their conversation. Whether done in plenary or with small groups, be sure to capture the key highlights at the front of the room on flip chart paper.

Each key scenario within the strategic agenda is discussed for a few minutes. Clarifying questions on what the key strategy means should be answered. Attendees should then be asked how the strategy affects them and what they do? How might their work change with this strategy? What role can they play in successfully implementing this strategy?

20 min **Next Steps and Close**

An opportunity to share how the strategic agenda is being rolled out at your research library and how you would like the attendees to play a role in the implementation of the strategic agenda.

Chapter 9: Designs for Keeping the Strategic Conversation Alive

As described in **Chapter 4***, organizational planning through scenarios creates an ongoing strategic conversation focused on developing a robust and effective strategic agenda and then adapting that strategic agenda over time as the external research environment changes and evolves. The process is a living one and leads to an organization developing adaptive foresight capability. The two critical components of keeping the strategic conversation alive are developing a mechanism to monitor indicators in the external research environment and to know when and how to refresh and adapt the strategic agenda over time.*

Monitoring the external environment can easily balloon into a complex and resource-draining proposition. Organizations succeed in sustaining monitoring processes when the approach is kept simple and becomes part of the existing meeting and process structure already in place in the organization. This means finding ways to leverage existing quarterly or semi-annual leadership sessions to share insights on the external research environment and leveraging user-friendly approaches to gather early indicator data over time.

When should a strategic agenda be refreshed or adapted? Each year the organization should test the strategic agenda against its understanding of the dynamics playing out in the external research arena. When new threats or opportunities are identified, the organization should look back at the contingent strategies developed at the strategic implications workshop to determine how best to adapt to the new situation. If no contingent strategy applies to the new threat or opportunity, the organization will need to determine what refinement is needed to the strategic agenda to leverage the opportunity or mitigate the threat.

The two designs presented here provide options for the later portion of your organizational **process map** (page 50). With a modest investment of time, they allow a library to draw ongoing advantage from its original investment in developing a strategic agenda.

The background information explaining general workshop planning (described in **Chapter 6**) is relevant to the designs in this chapter, and should be reviewed as part of the planning process.

Design F: Ongoing Monitoring of Early Indicators

This is a good design to use to review early indicators for the ARL 2030 Scenarios on a regular basis. As an ongoing activity this session should be scheduled 3 to 4 times per year and can be scheduled to occur prior to leadership team sessions. For this activity, consider identifying an ongoing monitoring team to create continuity in your process. The members of a monitoring team can each take responsibility for watching for early indicators between sessions.

Process Design

Workshop Length: 2 hours, 45 minutes
Number of Participants: 6 to 10

Pre-work Assignment:

This design can be employed in an organization that has an ongoing process of gathering and reviewing early indicators or that does not. In the case where there is an ongoing process, the pre-work assignment would be based on reviewing the latest early indicator data prior to the session. If the organization does not have an ongoing process of gathering and reviewing early indicators, the pre-work assignment would be based off of the traditional pre-work and participants would be asked to bring early indicators to the workshop. See suggested pre-work assignment language below. In the latter case, organizations should plan to conduct a monitoring workshop several times a year to stay connected to the dynamics of change in the external research environment.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- 2 flip chart easels with paper
- 6 to 10 full pads of 3"x5" Post-it Notes, ideally lined and in various colors
- 6 to 16 Sharpie Permanent Markers (or equivalent felt tip marker) for writing on post-its
- 1 pack of flip chart markers, various colors, chisel tip
- 1 roll of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Note paper and pens—1 for each participant (optional)

Room Set-up:

Flexible. Can be in classroom set-up, boardroom, or other. Screen and LCD projector, if you are planning to share slides.

Process Description

5 min **Welcome and Opening Remarks**

Desired Outcome: Early Indicator data shared and interpreted to determine if there are any new strategic insights to test against the strategic Agenda. Findings will be shared with the leadership team in a monitoring summary report.

Group Norms for Effective Strategic Dialogue (captured on flip chart in the room)

- Be open to new ideas
  - challenge *your* assumptions
  - ask clarifying questions of each other
- Suspend disbelief
- Balance inquiry and advocacy
- Stay in the strategic space, future-oriented
- Fully participate
  - listen actively
  - contribute
  - leave "space" in the conversation for others
  - stay together (gadgets off, no multi-tasking, be on time)

80 min **ARL 2030 Scenarios and Early Indicators**

Take time to remind the participants of each scenario before you discuss early indicators of that scenario. Whether your organization conducts ongoing monitoring and has a recent report on early indicator data or not, always start by asking participants to share some early indicators they have come across. Capture the early indicators on a flip chart.

If you have early indicator data that was shared in pre-work, weave this into the discussion of each scenario. Spend approximately 20 minutes per scenario.

15 min **Break**

50 min **Strategic Implications of the Early Indicators**

Participants will want to consider the early indicator data within each scenario and across the full scenario set. Are there any particularly strong dynamics that they feel have strategic implications for the research library? If so, which dynamics and what strategic question need to be addressed?

This conversation can be expanded to have the participants review the strategic agenda to uncover potential implications associated with the strategic agenda. Either way, this conversation should end with the development of a summary of insights to share with the leadership team from this review of early indicators.

5 min **Next Steps and Closing**

Share with the participants how their findings will move forward. The results of this session can be captured in a monitoring summary report that can become a pre-read for the following Refreshing the Strategic Agenda workshop.

Design G: Refreshing the Strategic Agenda

The strategic agenda is not a stagnant list of strategies, but rather a guiding set of strategies that can be refined and adjusted over time to take advantage of the changing external research environment. This process can be embedded in an organization's annual strategic planning process or incorporated in other scheduled group meetings to engage the broader organization in the ongoing strategic conversation.

Refreshing the strategic agenda is generally undertaken by the leadership team of an organization. The process normally includes checking the status of the various strategies included in the strategic agenda. Once the current status is understood, a discussion of what has been tracked and learned through the monitoring of early indicators takes place. That discussion is generally framed by the following questions:

- How do the various indicators we have been tracking inform us as to what is taking place in our operating environment?
- Based on that understanding, how well-positioned are we with the current strategic agenda? What might we refine or adjust in lieu of what we have learned?

Refinements can include the addition of contingent strategies to the strategic agenda or the removal or focusing of strategies already included in the strategic agenda. The goal of this process is not to constantly add to the strategic agenda, but to more effectively focus and position the agenda over time.

This activity is best undertaken by the leadership team who has decision responsibility for the development, implementation, and refinement of the strategic agenda.

Process Design

Workshop Length: 3 hours
Number of Participants: 6 to 16

Pre-work Assignment:

Pre-work includes the review of the summary documentation from the monitoring session (see Design F) as well as the more traditional pre-work, which will remind the participants of the scenarios and engage them in the process of identifying early indicators.

1) Thoughtfully read the full scenario set. Some people like to look at the end state table first and then read the scenarios; some like to read the narratives first and then review the end state table. It is important that you take time to read the scenarios and review the table carefully before the workshop, as they will be our starting point for the ensuing conversation.

2) Come prepared to share at least one early indicator for each of the four scenarios on the first day of the workshop. An indicator is something in the external environment that suggests a shift in one of the critical uncertainties the scenarios address. Early indicators can be weak signals of change or events that suggest the logic of one of the scenarios beginning to play out at the present time. Participants can bring an actual article with them to share or notes on the specific piece.

Workshop Materials:

- Flip chart easel with paper
- Additional flip charts with markers and paper, if you plan to break the group into smaller groups (optional)
- 6 to 10 full pads of 3"x5" Post-it Notes, ideally lined and in various colors
- 6 to 16 Sharpie Permanent Markers (or equivalent felt tip marker) for writing on post-its
- 1 pack of flip chart markers, various colors, chisel tip
- 1 roll of 1" masking tape (if flip charts are not 3M Post-it Pads)
- Note paper and pens—1 for each participant (optional)

Room Set-up:

Boardroom style or variation. Screen and LCD projector, if you are planning to share slides.

Process Description

10 min **Welcome and Opening Remarks**

Desired Outcome: Identification of any refinements or changes to the strategic agenda based on the interpretation of early indicators.

Group Norms for Effective Strategic Dialogue (captured on flip chart in the room)

- Be open to new ideas
  - challenge *your* assumptions
  - ask clarifying questions of each other
- Suspend disbelief
- Balance inquiry and advocacy
- Stay in the strategic space, future-oriented
- Fully participate
  - listen actively
  - contribute
  - leave "space" in the conversation for others
  - stay together (gadgets off, no multi-tasking, be on time)

75 min **Our Interpretation of Early Indicators**

Participants first need to share early indicators they have brought which are different from those captured in the monitoring summary report. Take time to remind the participants of each scenario before you discuss early indicators of that scenario. Spend approximately 15 minutes on each scenario.

15 min **Break**

75 min **Strategic Implications toward Refinements of the Strategic Agenda**

Participants will want to consider the early indicator data within each scenario and across the full scenario set. The discussion should not focus on individual indicators, but sets of indicators that signal a pattern of change. What are the strategic implications of the emerging dynamics these strengthing indicators point to? How well-positioned is our strategic agenda for these dynamics?

At the end of the discussion of each relevant and impactful set of early indicators, the participants need to determine what if anything needs to be changed or adjusted in the Strategic Agenda.

5 min **Next Steps and Closing**

Share with the participants next steps in the process.

Supplemental Resources

Recommended

Fulton, Katherine, and Diana Scearce. *What If? The Art of Scenario Thinking for Nonprofits.* www.gbn.com/articles/pdfs/GBN_What If.pdf

Guide to scenario planning for nonprofits with case studies.

Schwartz, Peter. *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company.* 2nd edition, New York: Doubleday Currency, 1996.

Most read introduction to the subject.

Van der Heijden, Kees. *Scenarios: The Art of Strategic Conversation*. 2nd edition, Chichester, England: John Wiley & Sons, 2005.

General and conceptual overview.

Wack, Pierre. "Scenarios: the Gentle Art of Re-perceiving." (Working Paper) Cambridge, MA: Harvard Business School, 1984.

Classic article introducing scenario planning to the business community.

Additional Readings

De Geus, Arie. "Planning as Learning." *Harvard Business Review* 66, no. 2 (1988): 70–74.

Organizational learning as a way to interpret what planners (including scenario planners) do.

_____. *The Living Company*. Boston, MA: Harvard Business School Press, 1997.

Leveraging scenario planning to achieve organizational learning.

Fahey, Liam, and Robert M, Randall (eds.), *Learning from the Future*, New York: John Wiley & Sons, 1997.

Great resource offering various perspectives on scenario planning.

Ogilvy, Jay. *Creating Better Futures: Scenario Planning as a Tool for a Better Tomorrow*. New York: Oxford University Press, 2002.

Scenario planning to achieve a desired future scenario.

Schwartz, Peter. *Inevitable Surprises*. New York: Gotham Books, 2003.

A set of scenarios that are changing the world and business.

Van der Heijden, Kees. *The Sixth Sense: Accelerating Organizational Learning with Scenarios*. Chichester & New York: John Wiley & Sons, 2002.

Leveraging scenario planning to achieve a learning culture.

Wack, Pierre. "Scenarios: Uncharted Waters Ahead." *Harvard Business Review* 63, no. 5 (1985): 72–79.

_____. "Scenarios: Shooting the Rapids." *Harvard Business Review* 63, no. 6 (1985): 139–50.

Classic articles on the Royal Dutch Shell story.

Wilkinson, Lawrence. "How to Build Scenarios." *Wired* (Scenarios: 1.01 Special Edition) September 1995: 74–81.

How to explanation of one scenario planning methodology.

Glossary of Terms

Contingent Strategies - Strategies that are connected to a specific scenario. Strategies whose application is contingent upon a particular scenario playing out in the external environment.

Critical Uncertainties - Dynamics of change that are critical or highly relevant to the strategic focus and highly uncertain.

Early Indicators - Events or dynamics currently underway—external to the organization—that validates the dynamics or characteristics portrayed in a specific scenario. Early indicators can be weak signals or much more pronounced dynamics of change.

Matrix - The framework made up of two critical uncertainties that allow the scenarios to be understood as a set. Often denoted as a 2x2 matrix. The critical uncertainties that make up the two axes of the framework are not the only critical uncertainties or the most important uncertainties captured in the scenarios. The scenarios capture a much more complex and larger set of critical uncertainties.

Monitoring - The process of identifying and tracking indicators for signs of change or development that inform our understanding of how the world is evolving in reference to the scenario set. The monitoring process is directly linked to scenarios and strategic actions in a way that scanning is not.

Robust Strategies - Strategies that make sense across a wide range of scenarios. Robust strategies do not have a significant downside or risk if acted on.

Scenarios - Stories about the future. They are devices for ordering perceptions about multiple future environments in which decisions might be played out.

Strategic Agenda - Set of coherent and aligned strategies that an organization identifies through exploring a set of scenarios.

Strategic Focus - A statement of why the scenario exercise is being undertaken. Often worded as a strategic question with a defined time horizon.

Strategic Implications - The interpretation of each scenario playing out in the future in the external environment and what it implies for the organization.

Strategic Options - A list of strategies that an organization can realistically act on associated with a particular scenario. Not all strategic options are part of the same strategic stance. The organization invariably must make choices on what options to include in its strategic agenda.

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