Leading Scenario Planning Efforts in Knowledge Organizations

By PJ Neal

Written for and Delivered at the Annual Meeting
of the Special Libraries Association, June 2011, Philadelphia, PA

Planning for The Future

Animals, people, and organizations that understand the passing of time find a way to plan for the future. Squirrels, bears, frogs and many other animals eat large quantities of food in the fall, and hibernate through the winter, when hunting and foraging would be difficult if not impossible. People learn to take an umbrella when it might rain, do their laundry before they run out of clean clothes, and set aside money each paycheck so that they can retire decades later.

Commercial, government, and non-profit organizations all plan for the future, too, and do so in an effort to successfully deal with uncertainty, and with what may occur at a later time. More succinctly, organizations plan for the future in an attempt to minimize risk and maximize opportunities. They must plan to ensure the future is taken into account.[1]

Risk can take many forms. For companies, external risks can come from competitors who introduce innovative new products, enter new markets where there is no market leader, lower their prices below their competitors, or undertake any course of action that disrupts the normal way of business. Risk can come from the Government, too, with the introduction of new taxes, employment and minimum wage laws, or trade policies that make it harder to compete with foreign competitors. Risk can evolve from internal sources, as well: fraud in the CFO's office, the inability to hire or keep qualified staff, or a disgruntled employee who decides to contaminate a product in an effort to hurt the company's reputation, or even kill a random customer.

Likewise, opportunity can strike from multiple directions. The Government can provide incentives that help an organization be competitive or lower operating costs. Employees can generate brilliant but unanticipated ideas, which create new lines of business or bring in unplanned revenue. Opportunities can also arise from technological advancement or innovation, like the rise of the desktop computer in the latter half of the 19th century.

Organizations realize that to be successful, and especially to be successful against competitors in the market, they need to find ways to minimize those risks to the extent possible, and take whatever action is necessary to foster and support innovations and opportunities from internal and external sources. Doing so is not easy. Many individuals, when planning for the mid- and long-term, have trouble thinking outside their comfort zone ("outside the box") and often end up simply determining where they are today, and projecting forward.[2] Unfortunately, this is not enough for success today. In a world that is changing as rapidly as ours is, no one can afford to maintain comfortable views, or protect their "sacred cows." [3]

This need to plan can be addressed with internal or external resources, and is done though a variety of means, including:

1. Alternative Futures	2. Horizon Mission Methodology
3. Business Simulations	4. Plausible Scenarios
5. Canonical Scenarios	6. Poison Mushrooms
7. Cross-Impact Analysis	8. Relevance or Decision Trees
9. Delphi / BOGSAT	10. Scenario Planning
11. Econometric Analysis	12. Statistical Modeling
13. Environmental Scanning	14. Structural Analysis
15. Futures Wheel	16. Systems Dynamics
17. Game Theory	18. Technical Sequence Analysis
19. Gaming and Simulation	20. Time-Series Forecasts

21. Genius Forecasting	22. Trend-Impact Analysis
23. Happenstance	24. "Usual Suspects"
25. Morphological Analysis	26. War Games

Amazingly, this list is not exhaustive. For many people, it is not even completely understandable! Some of the methods listed above require deep technical knowledge and experience. Some are specific to certain markets, companies, or situations. Others require facilitated sessions that can last days if not weeks. One, however, is an inclusive process that welcomes divergent views and opinions, seeks the involvement of many people, and would benefit tremendously from the participation or direction of modern information professionals: Scenario planning.

What is Scenario Planning?

Done properly, scenario planning is an inclusive process, welcoming multiple perspectives and ideas and avoiding the disagreements often associated with consensus-demanding planning activities. The scenario planner (or facilitator, if done in a group setting) should encourage and even seek out the involvement of different perspectives on an issue or question. Unlike forecasting, scenarios do not demand consensus, rather they respect and accommodate differences, seeking only to define them clearly.

The specific, detailed process for creating a set of scenarios is discussed later in this paper, but their basic nature has been simply defined by Kees van der Heijden as the following: [4]

- *There will be a need to articulate and characterize the strategic situation, where the [scenario] needs to provide new illumination.*
- *A set of scenarios will describe the multiple possible futures of the external business environment around this.*
- *Scenarios become productive in their juxtaposition with our understanding of the organizational "self," through which a new perspective on the business needs emerges.*
- *Scenarios are the test bed through which an area of policy is considered and judged.*

Engelbrecht, et. al., agree, writing that "alternative futures created should adequately stress the systems of interest, [...] contain sufficient detail and richness to be useful for planning, [...] and the vision of the future should be broad enough to ensure an entire range of challenges are adequately captured; in other words, ensure the customer is not surprised by the future." [5]

Scenarios are often presented in the form of stories, telling what the future might look like, if a given set of situations occur simultaneously. The story form of scenarios enables both qualitative and quantitative aspects to be incorporated, so ideas are not excluded on the basis that they cannot be measured, as often happens in other forms of strategic planning. And, by building sets of scenarios, we assemble several different versions of the future at the same time.

Why is this last part important? It trains professionals to keep thinking of the future as full of possibilities - which it is! - instead of guaranteed to play out in a certain way. "There is a tendency in our planning to confuse the unfamiliar with the improbable," wrote Thomas Schelling. "The contingency we have not considered seriously looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously." [6]

No one knows what the future holds, but to discard some possibilities because they are too unfamiliar or deemed too implausible opens an organization up to tremendous surprise. The attacks on Pearl Harbor in 1941 and on

New York and Washington on September 11, 2001, are two prominent examples of this. Clearly, both were possible, but not anticipated or considered to the extent necessary.

Many organizations, weighed down by tradition, fail to innovate or grasp on to new ideas, products, and services. Entrepreneurs, who must do so to survive, often lead the charge on adopting new technology, innovating ways of using data, and coming up with new ways to serve clients. [7] Schelling later wrote, regarding thinking about and planning for the future, "The danger is not that we shall read the signals and indicators with too little skill; the danger is in a poverty of expectations - a routine obsession with a few dangers that may be familiar rather than likely." [8]

What might planners be missing today? After years of declining economic conditions, are planners blind to the rapid economic growth that might occur suddenly and relatively soon? Will Moore's Law, which has governed computer chip development for nearly a half century, be overturned by a development in quantum physics? That in an age of Wikipedia and Google, information professionals can act as they did in the 19th century, without risk to their perceived value or reputation? That technology professionals will lose their monopoly on technical knowledge, given the rapid adoption of consumer technology?

The possibilities are endless, which, for many strategic planners, poses a challenge.

With each set of scenarios providing multiple possible outcomes, many strategic planners are concerned that it is hard to use them to drive toward a single, guaranteed plan for moving forward. Proponents of scenario planning would likely say, "That is the point!" As Dwight Eisenhower once said, "In preparing for battle I have always found that plans are useless, but planning is indispensable." [9]

The act of creating the scenarios - identifying, collecting, and analyzing the relevant information, facts, and figures - and determining what those multiple worlds might mean for an organization, and how they would respond, is the value in the process. It trains executives and professionals to think critically about what information is relevant, and how they would collect that information in the future. It forces people to think about what key indicators they should be on the lookout for, and just how good or how bad a situation could be if it played out to its extremes.

van der Heijden, who was part of the scenario planning team that helped Shell Oil successfully navigate the oil crisis of the 1970s, wrote that the planning effort at the time had three main benefits: [10]

> *"The first objective of scenario-based planning became the generation of projects and decisions that are more robust under a variety of alternative futures. Better quality thinking about the future became the second objective of scenario-based planning. What the scenario did was to enable Shell's manufacturing people to be more perceptive, appreciate events as part of a pattern they recognized, and to appreciate their implications."*

Mindful of these three objectives, which in one form or another would work for most organizations, it becomes clear that the need is not to develop world class futurists from our ranks. But, helping people develop the ability to think critically, think outside their comfort zone, and think about the broad range of possibilities is incredibly important and valuable. As Herbert Simon has noted, "Every manager needs to be able to analyze problems systematically[.] Every manager needs also to be able to respond to situations rapidly, a skill that requires cultivation of intuition and judgment over many years of experience and training." [11]

More importantly and of relevance to this audience, it is a need that can be addressed through the work of information professionals, who have the knowledge, skills, and abilities to identify, collect, and analyze information, and to partner with leadership teams to help build that capacity throughout the whole of an organization.

The following section of this paper will outline exactly how scenario planners do what they do. It is both art and skill, but it can be learned by others. Later, after having explained what scenario planning is and how it is conducted, this paper will identify how information professionals are capable of partnering with their colleagues and leadership teams, and supporting these efforts in their own organization.

The Nuts and Bolts of Building a Scenario

This section will outline a basic process for scenario development, using two frameworks for thinking about the world, "TEMPLESS," which helps planners think about the world as it impacts their organizations, and "PPSSTR," which helps them think about the different parts of their organizations. With these frameworks in mind, scenario planners strive to identify "key uncertainties" which will impact their organization in the future. Scenario sets are built upon two key uncertainties, and, for each key uncertainty, two "antipodes," or radically different ways in which that key uncertainty could play out.

With key uncertainties and antipodes identified, the scenario planner can graphically lay out their four scenarios, or "worlds." Each world is then populated with salient details, showing how, if that world came to be reality, it would impact the organization. It is at this point that an organization can begin to think about its possible futures, how it can prepare, and how it would react should one of these worlds come to be realized.

What follows is an example, done at a relatively high level, and lacking in the nitty gritty details that make the worlds really come to life for decision makers. As the next section of the paper will show, this is where information professionals can add tremendous value and support to their organizations during the planning process.

Identifying Key Uncertainties

Developing a scenario begins with identifying the two key uncertainties that will affect your organization in the future. These uncertainties will vary wildly based on the organization building the scenario, and can range from the length of the Global Recession, to the number of English majors at American universities, to the cost of butter in organic grocery stores.

One common framework for thinking about key uncertainties is TEMPLESS, which aids scenario planners in thinking about eight external variables:

- **T**echnology
- **E**nvironment
- **M**arkets
- **P**olitics
- **L**aw
- **E**conomy
- **S**ociety
- **S**ustainability

"Technology" encapsulates consumer technology like the iPhone, enterprise technology like servers and datacenters, and other technological innovations and changes. Two example of key uncertainties related to technology might be: "Will people stop buying desktop computers and buy iPads instead?" or "Will organizations stop buying powerful servers and simply use cloud computing instead?"

"Environment" includes day-to-day weather patterns (four seasons, rain and snow, etc.), unexpected environ-

mental incidents (tsunamis and hurricanes) and long term factors like global warming. Two examples of key uncertainties related to environment might be: "Will a major earthquake occur that cripples California infrastructure?" or "Will global warming be definitively linked to human activity?"

"Markets" are both the commercial markets where organizations buy and sell goods and services, and the larger financial markets where individual and institutional traders buy and sell shares of ownership in companies. Two examples of key uncertainties related to markets might be: "Will people start doing all of their holiday shopping online, and stop using retail stores?" or "Will our large institutional shareholders require that we have a comprehensive environmental policy in place?"

"Politics" have to do with who is in office, and the political decisions made by local, state, or national political leaders, including those decisions that impact other organizations that will eventually impact (for instance, decisions regarding the funding levels of public education). Two examples of key uncertainties related to politics might be, "Will the Democrats hold the White House for the next forty years?" or "Will my local Education department allow charter schools in our district?"

"Law" covers the legal and regulatory decisions that govern an organization (e.g., laws against discrimination), the markets they operate in (e.g., "blue laws" that prohibit the sale of alcohol on Sundays), and the people they do business with (e.g., minimum wage laws). Two examples of key uncertainties related to law are, "Will I be required to provide Family Medical Leave to employees who have been with our organization for less than two months?" or "Will my state institute an annual tax holiday?"

"Economy" relates to the economic situations facing individuals or organizations, including tax rates, economic growth or recession, job trends and unemployment rates, and international trade issues. Two examples of key uncertainties related to economy might be, "Will the unemployment rate in the United States fall back to our traditional levels?" or "Will our trade levels with China remain the same?"

"Society" can be cultural or societal trends which impact specific organizations, geographic regions, or society as a whole. Two examples of key uncertainties related to society might be, "Will the rate of unmarried people living together continue to rise?" or "Will the percentage of people who use drugs in the United States stay the same over the next ten years?"

"Sustainability" refers to two different but related issues: First, the "green" meaning of the word which typically involves individual and organizational practices that are good for the environment; and secondly, business practices that enable continued growth and operations, which an organization can keep up (or "sustain"). Two examples of key uncertainties related to sustainability might be, "Will our employees demand that we increase the amount of our waste that is recycled?" or "Will our business be able to continue growing to meet customer demand?"

As these examples make clear, TEMPLESS is an externally-focused framework. If scenarios are being developed about purely internal organizational matters (how we organize ourselves or run our organization), TEMPLESS becomes much less relevant. In that case, scenario planners can use PPSSTR (it does not really roll off the tongue!) to identify internally-focused key uncertainties:

- **P**eople
- **P**rocess
- **S**trategy
- **S**tructure
- **T**echnology
- **R**elationships

"People" is redefining the workforce towards the cognitive, judgment, communication and technical attributes of successful workers. Two examples of key uncertainties related to people are, "Will we be able to hire the right employees for an office in Toledo?" or "Will our employees leave us if we do not pay 100% of their health benefits?"

"Process" is aligning and optimizing the performance of functional activities around customer outcomes while introducing innovation with diverse cross-functional teams. Two examples of key uncertainties related to process are, "Will we be able to redesign a specific process to reduce effort by 10%?" or "Will we be able to build a culture that values and includes innovation in everything we do?"

"Strategy" is developing, articulating, executing and measuring progress against a clear shared vision. Two examples of key uncertainties related to strategy are, "Will our organization decide to move into developing nations like Brazil, Russia, India, and China?" or "Will we decide to open an online store to sell our goods directly to customers?"

"Structure" is organizational relationships and work flows that improve an organization's ability to rapidly sense, analyze, and forecast changes in competitive environments. Two examples of key uncertainties related to structure are, "Will we be able to smoothly merge with the organization we just purchased?" or "Can we create a flat organizational structure that eliminates unnecessary bureaucracy?"

"Technology" is taking advantage of increases in information availability, storage and data fusion. Two key uncertainties related to technology are, "Can our employees spend one day per week working from home with the technology we currently issue them?" or "Can we make our office paperless?"

"Relationships" is identifying, establishing, growing, and maintaining relationships inside and outside the organization. Two key uncertainties related to relationships are, "Do we have relationships with people who we want to sell our goods to?" or "Do we understand what our customers really want out of our product?"

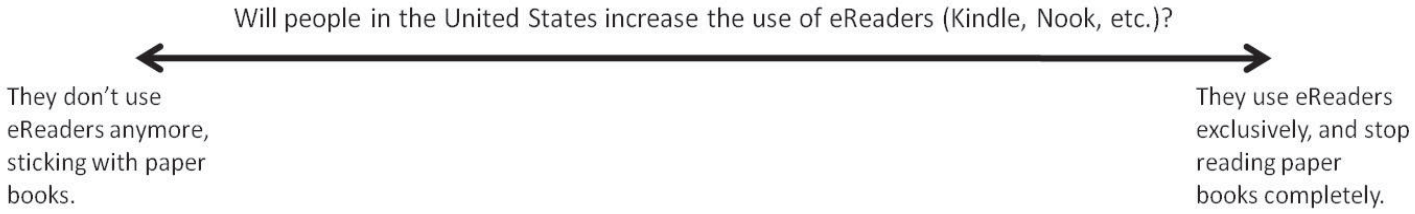
Going to Extremes (Twice!)

To begin building scenarios, the planner must start by identifying the key uncertainties they want to explore. It is important to pick key uncertainties that really matter; those that would be resolved by a difference that makes a difference. So, while we may not know if the price of paperclips will rise or fall in the future, we do know that since we only buy 10 boxes a year for our office, the price per box likely is not a key uncertainty.

As an example, let us put ourselves in the position of a head librarian at a public library, and pick two key uncertainties related to external issues: "Will people in the United States increase the use of eReaders (Kindle, Nook, etc.)?" and "Will our local Government give us more funding than we currently receive?"

Each of these key uncertainties have extreme ends, or "differences." These differences are expressed as diametrically opposed outcomes, or "antipodes." For instance:

The key uncertainty, "Will people in the United States increase the use of eReaders (Kindle, Nook, etc.)?" has the antipodes of "They do not use eReaders anymore, sticking with paper books" and "They use eReaders exclusively, and stop reading paper books completely."

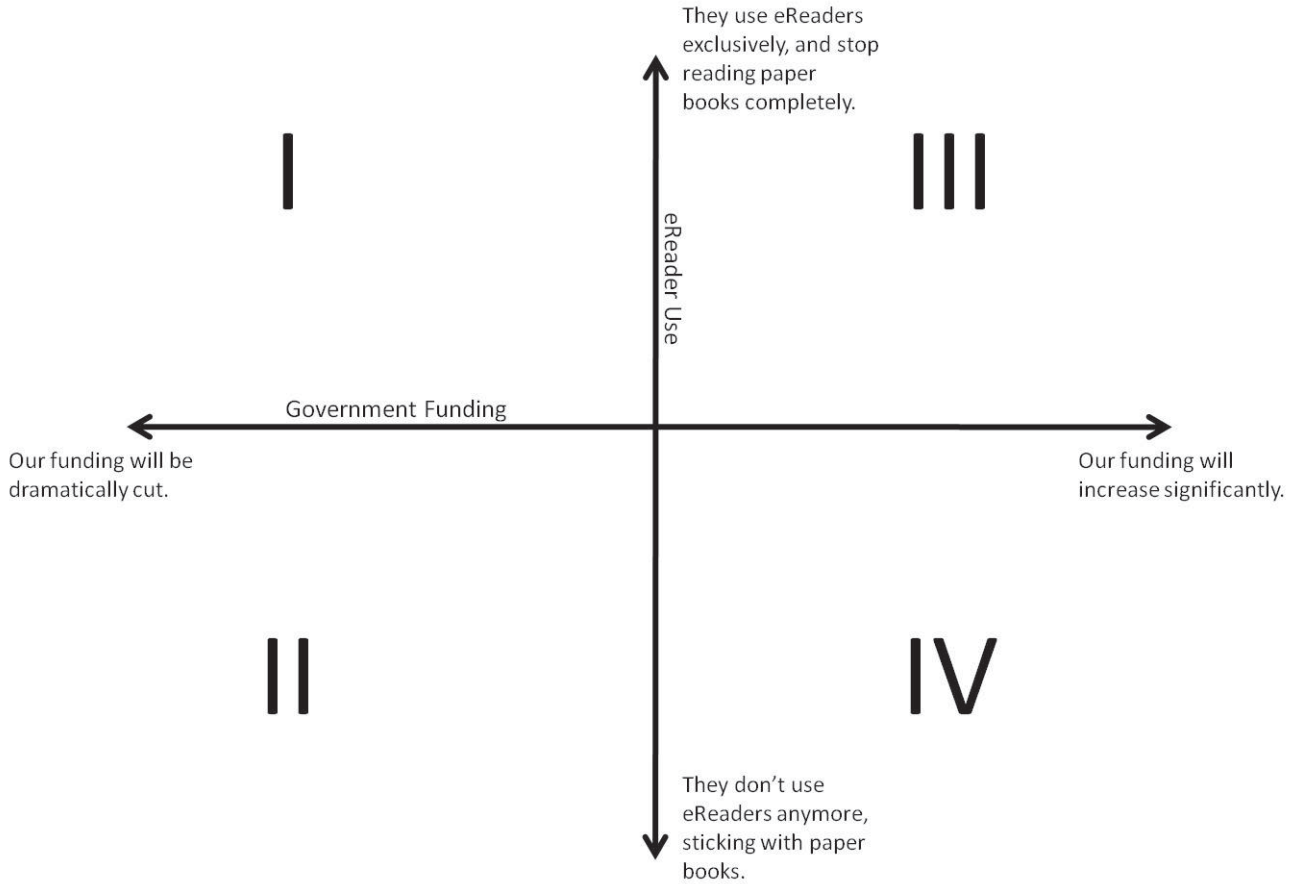


Graphic 1 - The antipodes show the extreme outcomes of eReader adoption, from total neglect to overwhelming adoption

The key uncertainty, "Will our local Government give us more funding than we currently receive?" has the antipodes of "Our funding will be dramatically cut" or "Our funding will increase significantly."

Graphic 2 - Funding, as many libraries have recently experienced, can range from "as much as we need" to "turn out the lights"

When we lay out our two key uncertainties and four antipodes along the X and Y axis, we are given four quadrants – our four scenarios.



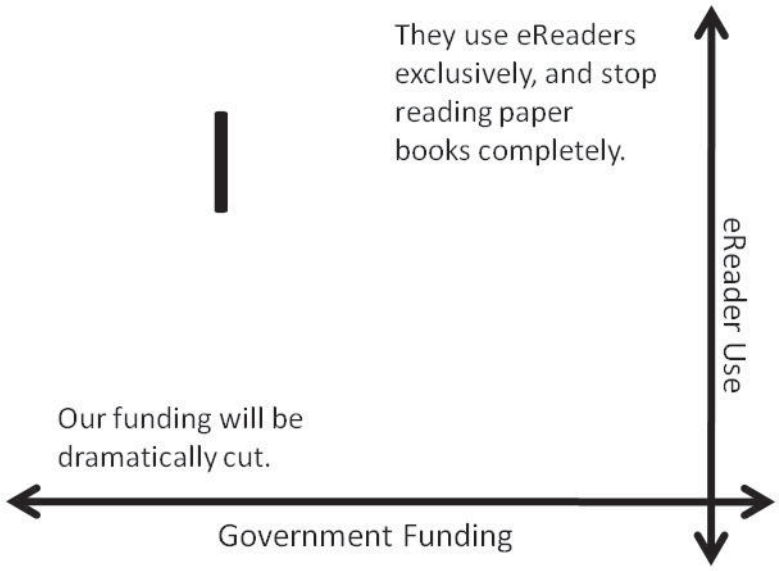
Graphic 3 - Four plausible realities... But what do they mean for our librarian?

Creating Four Worlds

At this point, the scenario planner now has a solid outline of his or her scenarios, and it is time to develop each scenario (or "world"). It is helpful to give each world a memorable name that is both unique and descriptive of the underlying dynamics of that future. Witty names work well. Then, populate that world with its most salient features, especially salient features that specifically highlight their impact on the scenario planner and their organization. When thinking about what those salient features are, the planner can use existing knowledge, educated insight, or even work through a small brainstorming exercise using TEMPLESS, PPSSTR, or other frameworks.

World One has our librarian dealing with high eReader usage, but a drastically low budget situation. The scenario planner might name it "Digital and Poor." What could such a future mean for our librarian?

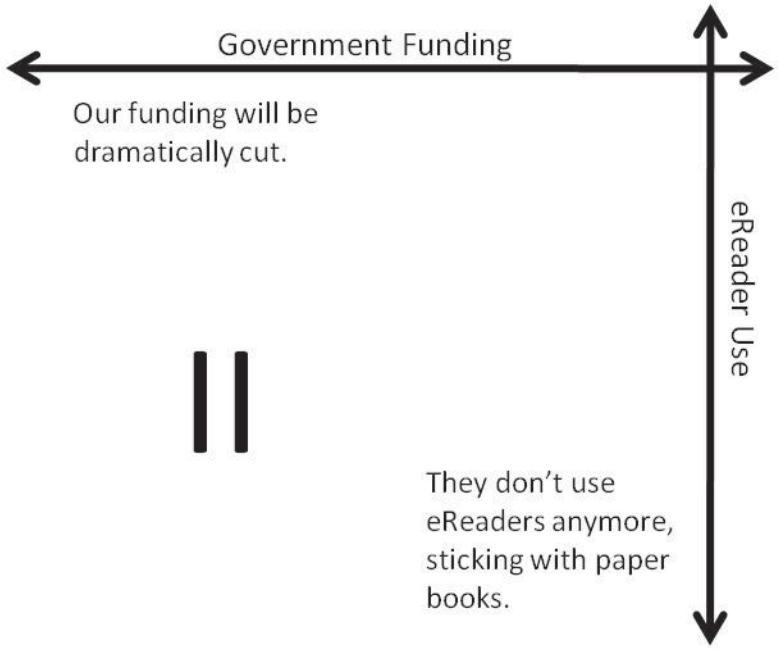
- There is only so much money to go around, which means the librarian needs to make choices about where to spend money. Since she knows her readers are increasingly preferring eReaders, she may choose to buy more digital books than paper books.
- Digital books do not take up any space, which means that as the library acquires digital books rather than paper books, the librarian will have more open space to work with, which can be used for collaboration space, comfortable seating, or spaces where librarians can work one-on-one with patrons. Or, since budgets are now tight, perhaps the librarian will add revenue-generating resources, such as vending machines, photocopy machines, or a coffee shop.
- Since more and more patrons will start accessing the library through its website as opposed to visiting the library in person, the librarian might need to hire fewer traditional librarians and more staff who can develop and maintain the website, provide online customer support, or execute other technical efforts.



Graphic 4 - The "Digital and Poor" World

World Two has low eReader usage, and similarly an unfortunately low budget. The scenario planner might name it "Paperback Poverty." What could a future world like this mean for our librarian?

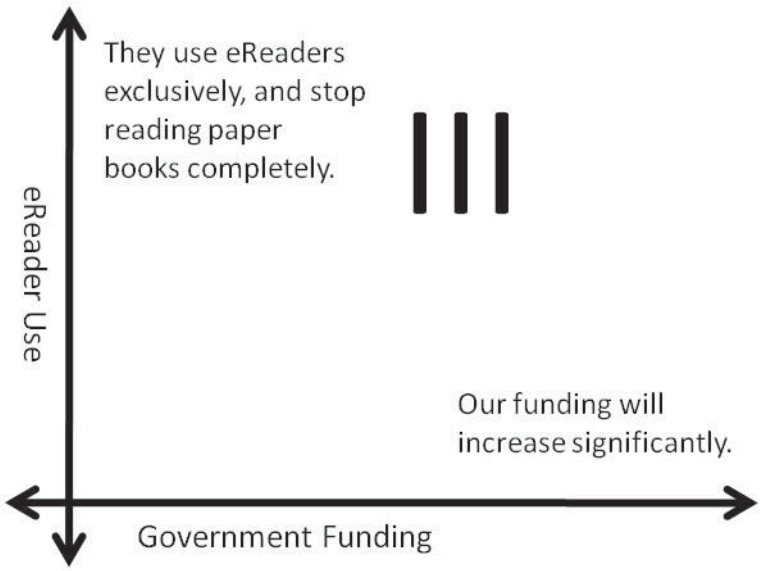
- Like in "Digital and Poor," the library is facing a poor budget situation, but in this world eReaders have not caught on. The librarian still faces a resource decision, but in this world it makes more sense to invest what little acquisition money they have on traditional paper books to align with patron preferences.
- Paper books take up physical space in the library, so if the librarian is looking to generate additional revenue, it cannot come through efforts that take up space (vending machines, copy machines, etc.).
- If eReaders are not popular, and younger generations do not like reading physical books, it might mean that society is in the early days of a long-term, generational-driven decline of long-form reading. A second-order effect of this is that there might be additional budget cuts since the population is not seen as valuing the service that the library provides.



Graphic 5 - The "Paperback Poverty" World

World Three has high eReader usage among constituents, along with a high budget situation. The scenario planner might name it "Bucks and Bytes." What could a future world like this mean for our librarian?

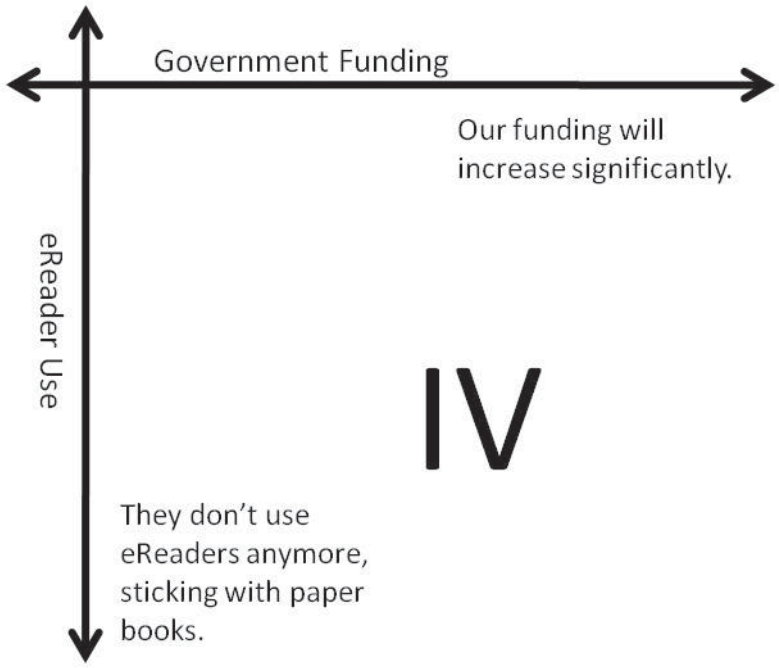
- With strong budgets and increasing eReader usage, it makes sense for our librarian to invest in both paper books and digital resources, but perhaps to grow the digital resources section faster than was originally planned
- More space in the library might be dedicated to computers and other technological resources; alternatively, it might be turned into meeting or collaboration space, particularly if the use of paper books starts to dramatically decrease
- If community members are adopting eReaders faster than the general population elsewhere in the country, then the traditional book sale fund raiser might not work as well, but the library might look to innovate on the process, and look to use the internet to sell old books to people elsewhere in the country, through Amazon, eBay, or other online retailers



Graphic 6 - The "Bucks and Bytes" World

World Four has low eReader usage, but a high budget level. The scenario planner might name it "Greenbacks and Paperbacks." What could a future world like this mean for our librarian?

- The budget division is an easy one: the librarian needs to spend resources heavily on paper books, since eReaders have not been adopted by the community
- While the librarian does not need to have a book sale to raise money, he or she may decide to hold one anyway, in order to clear off the shelves and open up space to add new books to keep readers enticed and returning
- Human Resources would focus more on hiring and training staff able to help patrons in the library and among the stacks, and shy away from building up capability in digital areas such as tech support for eReader users, and knowledge about eReader devices



Graphic 7 - The "Greenbacks and Paperbacks" World

Information Professionals: Ideally Positioned to Lead

Despite the fact that strategic planning is, as was discussed earlier, a natural and necessary part of any organization, many professionals are reluctant to try and get involved in the process in one's own organization. His or her hesitations can be born from a concern that they do not have the skills or knowledge necessary to play a valuable role, or that strategic planning simply is not part of their job. The last section of this paper showed that the first concern is patently false: strategic planning, and particularly scenario planning, is a process which anyone can easily learn and take part in. As for the second concern, Kees van der Heijden has made clear in his writing that, "discussing strategy is a natural part of any management task, not the exclusive domain of specialists." [12]

So if scenario planning is a skill anyone can learn, and it is not the exclusive domain of specialists, the question remains: What role can information professionals play in the process?

In the absence of a genuine psychic or working crystal ball, the critical element necessary in undertaking scenario planning is accurate, relevant, and useful information. The clearest role that information professionals can play in the scenario planning effort is through their capability and readiness to gather and make sense of that information.

As van der Heijden has identified, "Most scenario projects include an element of research. The purpose may be, e.g.: [13]

- *To increase the level of granularity of the story; which has an impact on the persuasiveness of a scneario as its richness of detail. Hitting upon the right anecdote, the one compelling image is not trivial, but often requires sifting significant volumes of data.*
- *To increase the depth and dimensionality of driving forces, spelling out exactly what we mean by them. For example, a key driver such as "liberalization" can be conceptualized in many different ways. The team needs to get beyond a rather vague idea of "freeing up the markets."*
- *To identify more probably and worked-out dynamics; the dynamics of scenario narratives should delve into a fully plausible nexus of events, patterns, and an intricate web of feedback loops that helps the client to understand the situation.*

The first part of this is an ability that many information professionals take for granted. While most people can find bits and pieces of data through Google, Wikipedia, and the New York Times archives, an information professional has the knowledge and skill to get the most up-to-date information, comprehensive and complete, and free of bias and other flaws. That difference in information can be hard to recognize for those who do not know any better, but that difference is sizable, as any information professional should be able to tell you.

The second part of the information professional's role is more significant. While many people can read reports and other data, fewer can analyze and translate that data in a manner that helps leaders and organizations understand what it means and why it is critically important. As Mortimer J. Adler and Charles Van Doren put it in their classic How to Read a Book: [14]

> *Perhaps we know more about the world than we used to, and insofar as knowledge is a prerequisite to understanding, that is all to the good. But knowledge is not as much a prerequisite to understanding as is commonly supposed. We do not have to know everything about something in order to understand it; too many facts are often as much of an obstacle to understanding as too few. There is a sense in which we moderns are inundated with facts to the detriment of understanding.*

Demonstrating the ability to understand and explain the information will cause many executives to stop falsely classifying the information professional as a simple researcher, and start seeing them more as an internal consul-

tant and thought partner – as someone who adds true value.

Information professionals have the ability and capability to serve the strategic planning functions of their organizations, but perhaps more importantly, they have a professional responsibility to do so. As one element of the Special Libraries Association Ethics Guidelines state, "An Information Professional strategically uses information in his/her job to advance the mission of the organization." [15]

Taking part in organizational strategic planning likely is not in the job description of the average information profession, and they could easily get by without volunteering to play a part. But by stepping up, taking part, and offering their knowledge and expertise, information professionals would uphold the highest ideals of their profession, strategically using information to advance the objectives of their organization.

Appendix A: Five Case Studies

What follows are five brief, two pages each, case studies of scenario planning in action, each focusing on four worlds from the perspective of a different organization. These are kept brief, but each case study talks about each of the four worlds, and then encourages the information professional to consider the role he or she could play in building and interpreting that case study for the sponsoring organization.

The first case study focuses on a large publishing house as it faces questions about the future adoption of eReaders, combined with an uncertain future for the act of reading.

The second case study, from the vantage point of a college library, uses one of the same key uncertainties as the first case study, reading levels, but combines it with a question of how much collaboration or meeting space students need as part of their academic work.

Government intelligence analysts are at the core of the third case study, which examines how the key uncertainties of operational tempo (the frequency and quantity of military and intelligence operations) impacts the intelligence analyst when combined with an abundance or lack of intelligence information coming in for analysis.

The fourth case study is a personal one for many readers, taking the vantage point of an information professional who is dealing with varying economic conditions combined with the success or failure in aligning with organizational leadership.

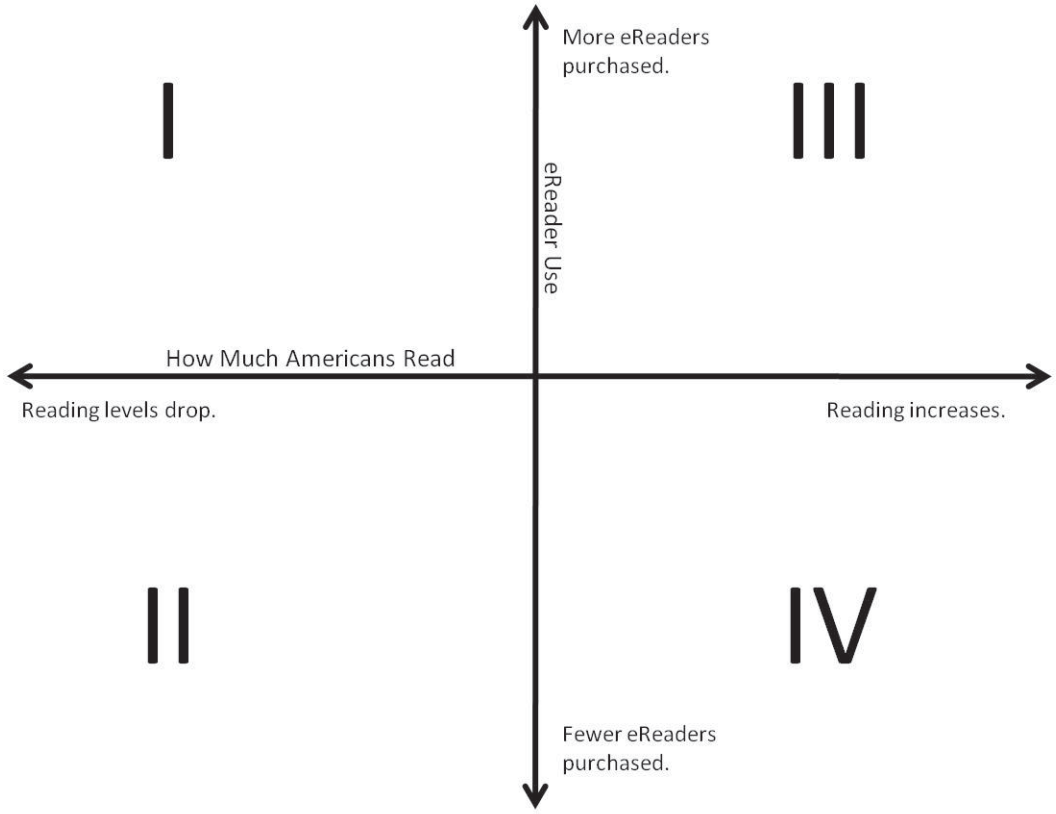
The fifth and last case study takes a professional organization (in this case, Special Libraries Association) and examines what four futures may look like based on a decision about raising or lowering professional dues, combined with the existence or lack of competitors in the marketplace.

The cases are all fictional and written simply for the purpose of discussion, but they are also realistic examples of some of the issues brought up when planning for the future. As readers examine each of the five case studies, they are encouraged to think critically about how they would approach the act of scenario planning in each case.

- Which questions would be addressed, and which data sources would be used?
- How would they step back, and make sure they are looking at the scenario critically, and not stuck to a single perspective?
- What would they do if they were "in" the scenario, and what could they do ahead of time to position themselves for the best possible outcome?

Case Study 1: Large Publishing House

This scenario is created from the perspective of a large publishing house that is concerned about the impact of eReaders, as well as the general reading level of their typical customer base. They examine those two key uncertainties, and develop four possible worlds as a result.



Graphic 8 - A publishing house faces a mixed bag of possible futures

World 1 represents high eReader adoption, but a decrease in overall reading levels. It might cause the publisher to quickly grow their electronic book portfolio to avoid the "double whammy" of decreased readership and decreased paper book purchases. For a publishing company looking at this scenario, it is a troubling world, but certainly not doom and gloom (after all, those eReaders are not being purchased to be paperweights; something is being read on them!).

World 2 is a dark world for a publishing company: eReaders have not been adopted, and readership is down across the board. The publishing company may choose to grow into adjacent markets - blogs, reference materials, online publications, companion pieces to TV shows, etc. This is a horrific world for a company that depends on people reading to stay in business. Not only is the traditional sales vehicle (the paperback or hard cover) slipping away, but people do not appear to be quickly adopting the new technology that could serve as an alternative market.

World 3 represents a far happier scenario. The rise in eReader usage as well as reading levels means that sales are likely up across the board, but that the company should consider growing faster into electronic books than may have been planned, to capture more of that growth. This world is great for the publishing house, because not only can they stick to what they know, but they can start to experiment and adapt into new areas, and try out new processes and technology, which could positively impact the long-term strategy for the company.

World 4 represents what many older publishers would love to see: growth in reading, but without a shift to eReaders. In this world, most publishers would grow their paperback and hard cover portfolios, and put on a full court press advertising them. This world is far more dangerous than it appears, however, because it reinforces and supports those leaders who want to be complacent and stick to what has worked well in the past. This could cause the organization to stop innovating and adapting to new ideas. In the short term this could work out well, but it could position them for long-term failure.

An information professional involved in the planning process might want to look for information that examines not only the factors highlighted in these four worlds, but also data that explains what is causing these changes. For instance:

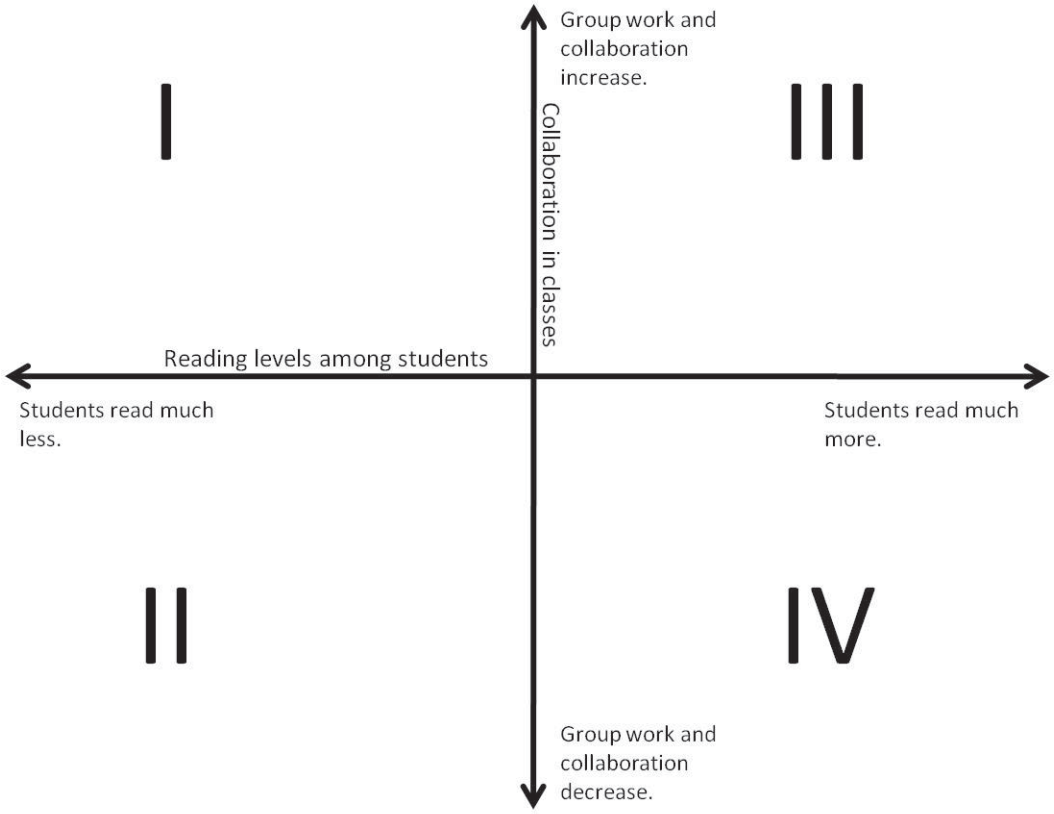
- Are readership levels up and down equally across demographic groups, or does it increase in some areas (perhaps retirees) and decrease in others (working adults)?
- Likewise, are eReaders being adopted or neglected evenly, or is reality a bit more complex? For instance, are students using eReaders for personal use, but do they dislike them for academic work and school books? Is the same true for adult professionals, or is it reversed: they prefer to have all their office reports on eReaders, but want to hold a hardcover in their hands as they relax at night?
- What is meant by "read"? Is it just traditional book sales? What about online publications, blogs, magazines, etc? In this case, is the scenario developer too narrowly defining "read" to suit their own needs or fit nicely within their comfort zone?

Similarly, the information professional could help by switching perspective, and examining the data from a different view:

- How will our competitors view this information? Will they reach the same conclusions we will?
- What would a reader say to this information? Would they consider it to be good news / bad news, or would they interpret it differently?
- What would we never do as a result of this information? Why? What does that say about us?
- If we had no stake in this world at all, what advice would we give to someone who did? Is that advice at all different from what we are telling ourselves right now? Are we being bad advisors to ourselves?

Case Study 2: College Libraries

This scenario is one that is facing college and university libraries around the country, and probably around the world. With readership levels in flux, especially with young readers, and colleges moving to collaborative learning models, how will this impact the traditional role the libraries serve on campus? In this situation, the planner examines two key uncertainties around group collaboration in courses and overall reading levels, and produces four possible worlds.



Graphic 9 - The demand and use for college libraries can rise and fall in part based on what happens elsewhere in the institution

World 1 represents a situation not unlike the one our librarian experienced earlier in this paper; in this case, with collaboration needs on the rise, and readership on the decrease, a library may decide to shift things around physically to create more group meeting and collaboration space for class work and student projects. In this case, the library is shifting its traditional role in order to continue to stay relevant in student life.

World 2 is a step for the worse. Readership is down, and collaboration and group work has not caught on. What is the library to do? They may need to justify keeping their space and budget, with faculty members and administrators clamoring to get more meeting rooms or office space. Alternatively, they may wish to make a proactive push out of the library, partner with faculty members, and find way to integrate themselves into the classrooms and academic work of the students as a way of creating demand and maintaining relevance.

World 3 represents a bonanza for the academic library. Not only is readership on the rise, which draws in students, but collaboration and group work is on the rise, and students will likely look to the library for a place to meet and work. This is great for relevancy, but perhaps troubling for capacity - with the need for all those books, where will you add meeting space? Perhaps the library needs to examine what students are reading, and if some of that demand is for electronic resources, which do not take up physical space. Alternatively, moveable stacks or

taller shelving units could free up space and add capacity for more books.

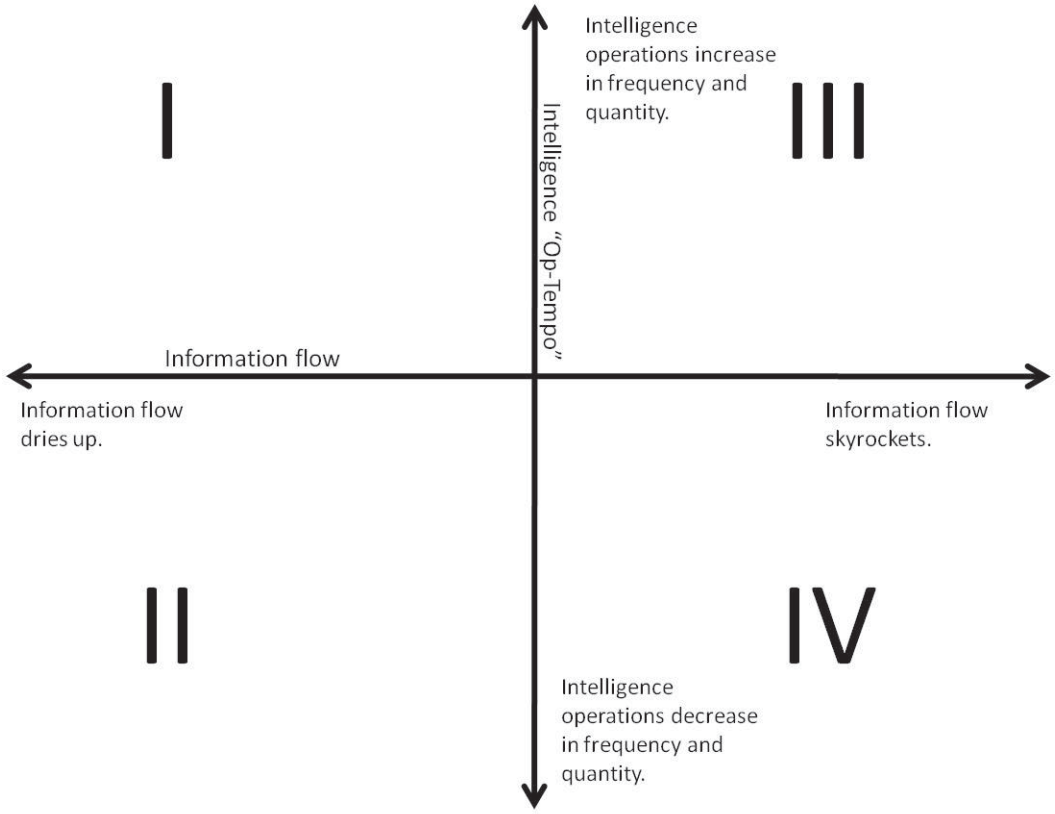
World 4 has our library continuing to be relevant, but only in its traditional role as a resource for books and reference services. This is good, from the perspective that there continues to be demand. But, it also means that if readership drops a few years later, there won't be the need for collaboration space to keep students coming in and visiting. In this world, the library should look for ways to innovate to create demand, continue relevance, and ensure students keep walking through the doors.

An information professional involved in the planning process might want to examine some of this information in more detail, particularly:

- What causes the faculty members to increase the amount of collaboration necessary to successfully participate in and complete their courses?
- What are the long-term classroom trends that might impact the library? Is there an institution-wide plan to increase the number of books that students must read before graduation? Is there a push by the career services office to increase the level of collaboration skills that students have when they graduate?
- What else is taking place at the university that could cause demand to rise or fall, and how can the library begin planning and preparing to meet those needs?

Case Study 3: Intelligence Analysts

Government intelligence analysts deal with two large pressures in their day to day lives: the frequency of intelligence and military operations ("op-tempo") and the flow of intelligence they receive from sources. This scenario examines four worlds that come about when both of these key uncertainties are examined simultaneously.



Graphic 10 - Intelligence analysts deal with a variety of constraints and requirements

World 1 represents a scenario in which intelligence analysts are supporting a high number of intelligence and military operations around the world, but the flow of intelligence and information coming to them has started to dry up. In this scenario, analysts need to innovate and find new ways of turning what little information they have into actionable and valuable information that can serve their colleagues in the field.

World 2 has a similarly decreasing flow of information reaching the analysts, but at the same time, the number of operations they are supporting is decreasing. This means that the intelligence operatives and military personnel in the field are likely getting the analyzed intelligence they need to do their job. At the same time, the intelligence agencies may be reducing staff because they do not need as many people around. Intelligence analysts may need to find new ways of providing value and adding insight, and their agencies may need to rethink how they maintain competencies and expertise without experiencing a brain drain that hurts them years down the line when the op-tempo increases again.

World 3 represents a growth in intelligence and military operations around the world, and similarly a growth in the amount of information flowing to the intelligence analysts. In this world, the analysts are not at risk of downsizing, but they may be at risk of drowning under the flow of information and demands from the field. This world requires intelligence analysts to identify new ways of doing business, and new uses of tools and technology, in an effort to provide actionable intelligence without missing key pieces of information among all the data they are working through.

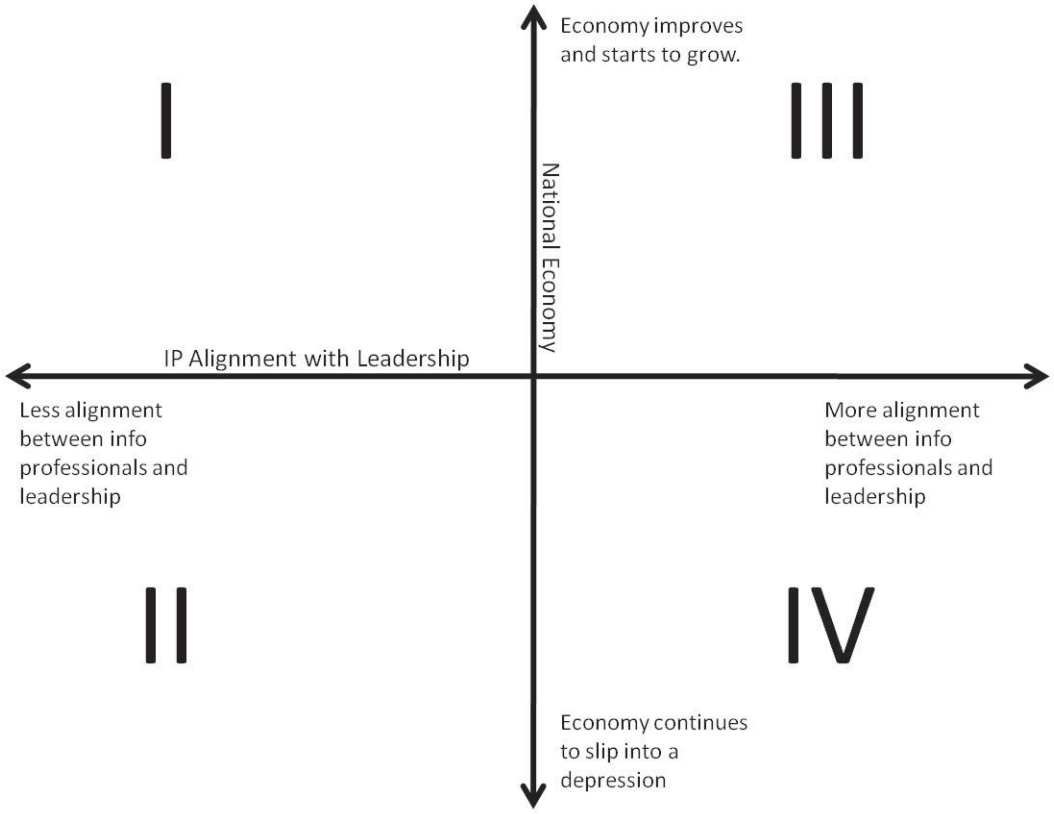
World 4 is a unique one: the flow of information to the intelligence analysts is growing rapidly, but the demands placed upon them for analyzing and interpreting that information is decreasing. Our information professionals in this scenario need to find new ways of diving into the intelligence they receive, and very specifically targeting their intelligence analyst techniques in a way that adds as much value as possible to the people in the field, without burdening them under so much information that they cannot handle the frequency and quantity of analysis.

This case study is especially challenging in that the flow of information is typically not predictable, and the operations tempo is based on a number of factors related to international relations and global affairs. An information professional involved in the planning process might want to look for information related to a number of factors:

- Determine the budget environment around military and intelligence operations. Some of this is political - in the United States, when the President is Republican, budgets are assumed to rise, and when a Democrat, they are more likely to be static or fall. This can impact the willingness of the country to get involved in conflicts, and the ability of the intelligence agencies to fund operations and intelligence gathering efforts.
- How active are multinational organizations such as the United Nations, African Union, and North Atlantic Treaty Organization (NATO)? Will their robustness (or lack thereof) increase or decrease the likelihood that the United States will be called in to intervene around the world?
- What is the current state of affairs in traditional hotspots around the world: The Middle East, the eastern coast of Africa, and the former Soviet nations such as Georgia? Are efforts underway there that will lead to a long-term decrease in violence? Or are there political factors arising that will mean they are more likely to go to war with their neighbors?

Case Study 4: Information Professionals

This scenario is more general in nature, placing a typical information professional at the heart of his or her own organization. It raises two of the largest issues facing the profession: How are information professionals (and, for that matter, other offices that are not directly generating revenue and sales) treated in tough economic times? And, how well are these professionals aligning with the needs of their leadership teams and top executives?



Graphic 11 - Will information professionals align with their leadership?

World 1 is an environment in which the economy has started to improve again, but information professionals have failed to align with the leadership of their organizations. At surface level, this is a good situation, because the pressure to cut costs will likely diminish or disappear. At the same time, with information professionals not aligned with leaders, who have just managed the organization through a very tough period of time, those leaders may look upon the information professionals as not having contributed to the success and survival of the overall organization. While the cuts may not continue, information professionals may not see an easier time ahead, still being viewed as a cost to the bottom line rather than an value added team member.

World 2 is about as bad as it gets for an information professional. The economy has continued to slide toward depression, and they have failed to build strategic relationships and alignment with their leadership team. When budget and organizational cuts come down, information professionals might see themselves as the first to go, even if they are not the largest cost to the organization (assuming, of course, that those who cost more were smart enough to build the necessary relationships ahead of time). For individual information professionals, they may find it challenging to find new work, as other organizations, facing the same economic conditions, have hiring freezes in place.

The world starts to look rosy in World 3, where the economic conditions are improving and there is strong, strategic alignment between information professionals and organizational leadership. In this world, growth likely causes organizations to start hiring again, budgets to be reinstated, and departments to start spending money on

capital improvements. For the well-aligned information professional, this means leadership teams will be more likely to allow them to subscribe to more resources, attend more conferences, and attempt to provide innovative new services and offerings that may not have immediate or even near-term returns on investments.

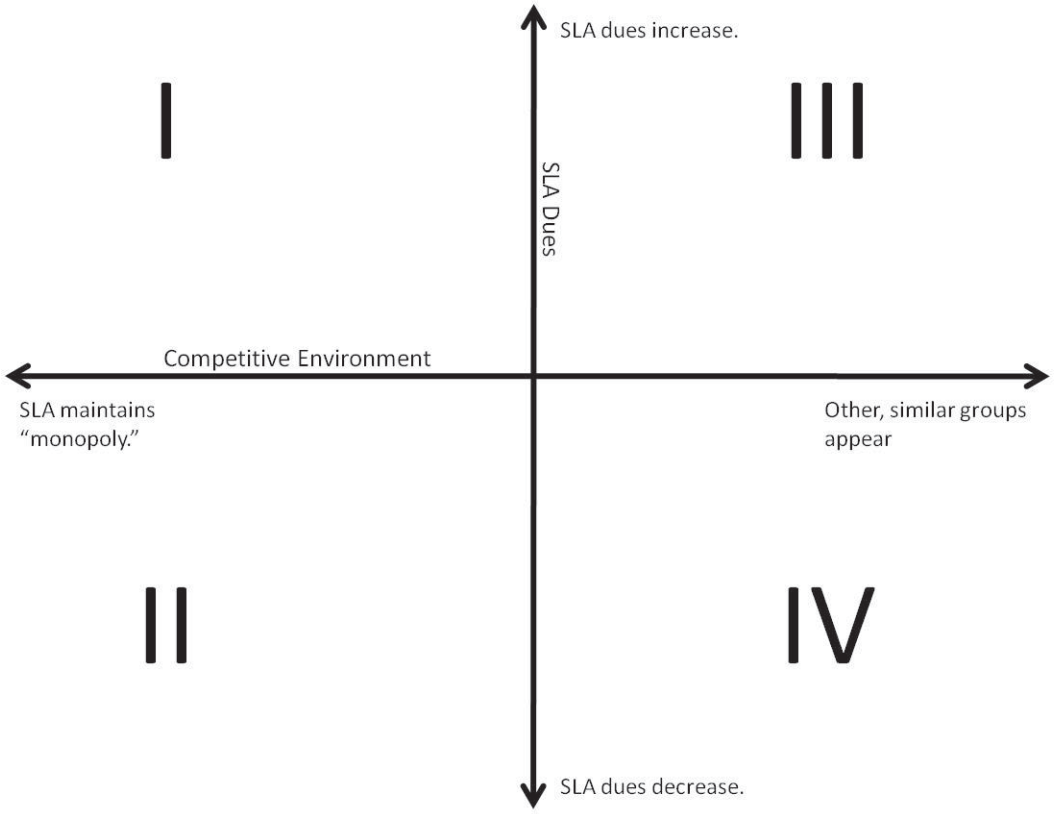
World 4 is, with apologies to Charles Dickens, neither the best of times nor the worst of times. Economic hardship still exists, but since the information professionals have closely aligned with their leadership teams, they are at decreased risk of being cut or closed down. In this world, it is likely that the information professional has teamed with leadership to find ways to help plot the organization through the hardship and toward a successful future, even if it is recognized that this time is not right around the corner.

This is an intensely personal case study for many readers, especially those who are in support offices in organizations that have been dealing with a downturned economy for several years. For those readers, the following questions might be appropriate to consider:

- What can you do tomorrow that help support the long-term success of your organization?
- What relationship does your office have with the leadership team of your organization? Do your organizational leaders know your office leadership by name? How often are you involved in helping a senior executive deal with a professional challenge that needs information and analysis?
- What can you and your colleagues do to build a stronger relationship with your leadership team, to support them in their strategic efforts?
- Similarly, what can you do to proactively partner with and support other offices throughout your organization? It is said that "a rising tide lifts all boats." What can you do, even on a micro level, to help raise the tide for your entire organization?

Case Study 5: Special Libraries Association

This scenario is one that many professional organizations face each year. What happens when a professional organization, in this case SLA, faces the need to raise membership dues? At the same time, how is the organization impacted by the "competitive environment," or in other words, another professional organization offering a viable alternative to SLA membership?



Graphic 12 - How much of SLA's success is predicated on its position in the market?

World 1 represents a tough economic decision on behalf of SLA leadership - to raise dues - combined with a pleasant competitive environment, where no other organizations are offering comparable services and benefits to the population of information professionals SLA serves. For most members, who either have the financial ability to pay the increased dues themselves, or who have employers who pay the dues for them, staying as a member of SLA is a "no brainer." After all, where else would they turn for the same services, professional network, and online knowledge base?

In World 2, SLA is somehow able to lower dues, and does so in an environment where there are no comparable organizations for SLA members to join and get the same level of information and networking. It is rare that an organization is in this situation, but it certainly can happen, especially if the organization is a "mutual" organization, or similar body that returns any excess funds to stakeholders. In this world, it is even likely that SLA will increase membership, since there is no competition, and those who previously chose not to join because of the cost may reconsider when the annual price drops.

World 3 is a tough environment for SLA. They must raise their dues to meet the rising cost of operating the organization. At the same time, a competitor (perhaps, for the sake of discussion, it is the fictitious Association of Library Aficionados, or ALA) decided to start a SLA-like sub-organization. While small competitors would start up without any brand awareness and a weak reputation, ALA is well established, well known, and well respected. Some SLA members may choose to defect to the new organization, for reasons that could include lower cost of

membership, desire to affiliate with other ALA members, or even displeasure with SLA over policies or the attempt to change the organization name in 2010.

World 4 represents an interesting scenario. A competitor has shown up, threatening to draw members and prestige away from the SLA. At the same time, SLA has decided to lower the cost of dues, either for operational reasons such as decreased operating cost, or strategic reasons such as an attempt to prevent the loss of members to the new competitor. In this case, the organization will need detailed insight into how their members decide which organizations to belong to, what resources and services they truly value, and how the competitor is planning on making a name for itself.

For many information professionals, these four worlds may require expertise beyond what they are able to provide. That is perfectly normal. One group of information professionals must be able to reach out to a broad network of other information professionals in order to get the knowledge, insight, information, and analysis that their organization needs. In this case, that might involve:

- Working with professionals who can survey their members and identify deep insights into membership demographics, the needs that a professional association can provide for, how they decide who to affiliate with, and who else impacts those decisions (peers, managers, etc.).
- Economic analysts coming in to provide insight into buying behavior related to dues and other professional expenses. What causes someone to say, "That is a fair price," while someone else would say, "Far too rich for my blood"?
- Organizational strategy professionals providing insight into competitive environments, helping the organization foresee the creation of alternatives and competitors before they are created, and early enough for the organization to reposition itself in a manner that helps it maintain its uniqueness and value.
- Communications and marketing professionals helping to shape the brand and image of the organization, or helping to interpret how other organizations are positioning themselves compared to you.

Appendix B: Reminders That Our Predictions Are Often Wrong

Throughout the entire scenario planning effort, planners and other involved parties strive to come up with good, realistic, and possible future worlds. Often, they will come across information that leads them to believe that they know how the future will unfold. Sometimes, they will be right, but often they will be wrong. The National Security Agency's Review of Emerging Technologies[16] recently published a list of failed predictions from the past two millennia. At the time, these predictions looked solid. Looking backwards, we can see their faults.

Below, those predictions are listed along with the reality that emerged. It serves as an amusing reminder that try as they might, even the wisest scenario planners will not always be right in everything they do. But, remember: it is the act of planning that matters most.

Prediction	Source and Date	Reality
"I also lay aside all ideas of any new works or engines of war, the invention of which long-ago reached its limit, and in which I see no hope for further improvement."	Roman engineer Julius Sextus Frontinus, cAD 84	Sadly, history has shown that we are remarkably capable of creating new works and engines of war, far beyond what could have been dreamt up in AD 84.
"...so many centuries after the Creation it is unlikely that anyone could find hitherto unknown lands of any value."	Advisors to King Ferdinand and Queen Isabella of Spain regarding a proposal by Christopher Columbus, 1486	Columbus received sponsorship from Ferdinand and Isabella, reaching the Bahamas in October 1492 [17]
"...four or five frigates will do the business without any military force."	Lord North, British Prime Minister, debating imposing the Stamp Act on the American Colonies, 1774	There was a large naval component to the American Revolution, and the British would lose over 2,000 ships during the war [18]
"How, sir, would you make a ship sail against the wind and currents by lighting a bonfire under her deck? I pray you, excuse me, I have not the time to listen to such nonsense."	Napoleon Bonaparte, when told of Robert Fulton's steamboat, 1800s	Fulton's ship, the Clement, made her maiden voyage on the Hudson River in 1807; [19] steamships would continue until diesel powered ships rose to prominence in the 20th century [20]
"What can be more palpably absurd than the prospect held out of locomotives travelling twice as fast as stagecoaches?"	The Quarterly Review, England, 1825	Stagecoaches would typically cover 60-70 miles in a day; [21] the top speed for a steam locomotive is 125mph, set by the LNER Mallard [22]
"Rail travel at high speed is not possible because passengers, unable to breathe, would die of asphyxia."	Dr. Dionysius Lardner, professor of Natural Philosophy and Astronomy, University College London, 1828	More than possible - in 2010, the Chinese high speed rail clocked in at 258mph - a new record [23]
"Men might as well project a voyage to the Moon as attempt to employ steam navigation against the stormy North Atlantic Ocean."	Dr. Dionysius Lardner, professor of Natural Philosophy and Astronomy at University College, London, 1838	Neil Armstrong and Buzz Aldrin would like to disagree - they stepped foot on the moon in July 1969 [24]

Prediction	Source and Date	Reality
"It's a great invention but who would want to use it anyway?"	Rutherford B. Hayes, US President, after a demonstration of Alexander Bell's telephone, 1877	Globally, there is 1 fixed landline for every 5 people; [25] in the US, there is 1 cell phone for every 2 people [26]
"When the Paris Exhibition closes, electric light will close with it and no more will be heard of it."	Erasmus Wilson, Oxford professor, 1878	Less than 50 years later, Popular Mechanics would note that 70% of homes in the U.S. had electricity [27]
"The phonograph has no commercial value at all."	Thomas Edison, 1880s	From the phonograph was born the music industry, valued today at over $40B [28]
"X-rays will prove to be a hoax."	Lord Kelvin, President of the Royal Society, 1883	Far from a hoax, they now play a vital role in medicine, science, engineering, and other fields [29]
"We are probably nearing the limit of all we can know about astronomy."	Simon Newcomb, astronomer, 1888	From stars and planets, to the theory of general relativity, we have learned quite a bit since 1888 [30]
"Fooling around the alternating current is just a waste of time. Nobody will use it, ever."	Thomas Edison, 1889	Alternative Current won out over Direct Current, and now powers our offices and homes[31]
"Heavier-than-air flying machines are impossible."	Lord Kelvin, President of the Royal Society, 1895	More than 23,000 commercial aircraft operate around the world every day [32]
"Radio has no future."	Lord Kelvin, President of the Royal Society, 1897	More than 223M people a week listen to the radio in the US [33]
"The ordinary 'horseless carriage' is at present a luxury for the wealthy; and although its price will probably fall in the future, it will never, of course, come into as common use as the bicycle."	Literary Digest, 1899	Perhaps not as common as bicycles around the world, but today, the US has more than 773 cars per 1000 people, the highest rate in the world [34]
"I must confess that my imagination refuses to see any sort of submarine doing anything but suffocating its crew and floundering at sea."	H.G. Wells, 1901	While not common for commercial or personal use, the submarine celebrated 100 years of military service in 2000 [35]
"The horse is here to stay but the automobile is only a novelty - a fad."	President, Michigan Savings Bank, advising Henry Ford's lawyer, Horace Rackham, not to invest in the Ford Motor Company, 1903	Despite recent troubles, an investment in Ford would have been a good on - the company had $118B in sales in 2009, and none of those sales were for horses [36]
"I confess that in 1901, I said to my brother Orville that man would not fly for fifty years... Ever since, I have distrusted myself and avoided all predictions."	Wilbur Wright, 1908	Wilbur was right... for two years; in 1903, the Wright Brothers took flight from Kittyhawk, and the rest, as they say, is history [37]

Prediction	Source and Date	Reality
"...the automobile has practically reached the limit of its development is suggested by the fact that during the past year no improvements of a radical nature have been introduced."	Scientific American, 1909	From safety technology, to consumer electronic integration, and emissions improvements, technological development in cars over the past 100 years has been phenomenal [38]
"Airplanes are interesting toys, but of no military value."	Marshal Ferdinand Foch, future WWI Supreme Commander of the Allied Armies, 1911	The United States Air Force alone has over 43 types of aircraft in service [39]
"The coming of the wireless era will make war impossible, because it will make war ridiculous."	Guglielmo Marconi, 1912	Less than two years later, the world would be plunged into the first of two World Wars [40]
"The cinema is little more than a fad. It's canned drama. What audiences really want to see is flesh and blood on the stage."	Charlie Chaplin, 1916	The curtain has not dropped on live stage productions, but movies has been amazingly successful, with over 1.32B tickets sold in 2010 [41]
"The idea that cavalry will be replaced by these iron coaches is absurd. It is little short of treasonous."	Comment of Aide-de-camp to Field Marshal Haig at a tank demonstration, 1916	The tank came of age in World War 2; the last horse-mounted cavalry charge took place in 1942 [42]
"There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will."	Albert Einstein, 1932	Nuclear energy has been use for weapons, and also for power generation; it currently is the primary power source for 14% of the world [43]
"There will never be a bigger plane built."	A Boeing engineer, after the first flight of the 247, a twin engine plane that holds 10 people, 1933	In 2005, Airbus revealed the A390, a "superjumbo" jet capable of carrying 555 passengers [44]
"A rocket will never be able to leave the Earth's atmosphere."	New York Times, 1936	Rockets did leave orbit, and in 1957 the USSR put Sputnik into orbit, causing a panic [45]
"Atomic energy might be as good as our present-day explosives, but it is unlikely to produce anything very much more dangerous."	Winston Churchill, First Lord of the Admiralty, then soon-to-be British Prime Minister, 1939	The truly devastating use of nuclear weapons in Japan in 1945 quickly brought about an end to the war - something "present day explosives" could not [46]
"The name of Igor Sikorsky will be as well known as Henry Ford's, for his helicopter will all but replace the horseless carriage as the new means of popular transportation. Instead of a car in every garage, there will be a helicopter..."	Harry Bruno, aviation publicist, 1943	Sikorsky never achieved the fame of Ford, nor the widespread adoption of the technology predicted by Bruno; today, Sikorsky is best known as an aircraft company owned by United Technologies [47]

Prediction	Source and Date	Reality
"[Television] won't be able to hold on to any market it captures after the first six months. People will soon get tired of staring at a plywood box every night."	Darryl Zanuck, movie producer, 20th Century Fox, 1946	Far from it. Today, the average American watches 24 hours of television a week [48]
"Where a calculator on the ENIAC is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1000 vacuum tubes and weigh only 1.5 tons."	Popular Mechanics, March 1949	Computers today far surpass what Popular Mechanics every imagined, with laptops weighing only a couple pounds and being less than 12" in size [4]9
"It would appear we have reached the limits of what it is possible to achieve with computer technology."	John von Neumann, computer scientist, 1949	Moore's Law, [50] among other developments, has pushed technology far beyond what von Neumann foresaw in 1949
"It will be gone by June."	Variety, commenting on rock 'n roll in 1955	Almost 60 years later, Rock is still going strong, and has its own historical museum [51]
"Nuclear-powered vacuum cleaners will probably be a reality in 10 years."	Alex Lewyt, president of vacuum cleaner company Lewyt Corp., in the New York Times, 1955	While Dyson, Hoover, and Oreck would probably love to see it happen, this prediction is regarded by many as one of the worst ever made [52]
"Space travel is utter bilge."	Dr. Richard van der Reit Wooley, Astronomer Royal, space advisor to the British government, 1956	Not only has government space travel flourished, but 2001 saw the first private space tourist go into orbit [53]
"The world potential market for copying machines is 5000 at most."	IBM, to the eventual founders of Xerox, 1959	What would they have thought if they knew that today, about 1.1M copiers are sold each year? [54]
"Before man reaches the moon, your mail will be delivered within hours from New York to Australia by guided missiles. We stand on the threshold of rocket mail."	Arthur Summerfield, US Postmaster General, 1959	It certainly never happened, although FedEx,[55] DHL,[56] and others can get your packages around the world in days
"There is practically no chance communications space satellites will be used to provide better telephone, telegraph, television, or radio service inside the United States."	T. Craven, FCC Commissioner, 1961	Iridium provides satellite phone service globally; [57] several dozen satellites provide global positioning service (GPS) to users around the world; [58] and television signals are beamed down from orbit every day [59]
"It will be years - not in my time - before a woman will become Prime Minister."	Margaret Thatcher, October 26, 1969	Less than a decade later, Thatcher herself would become Prime Minister [60]
"Two years from now, 'spam' will be solved."	Microsoft chairman Bill Gates, 2004	In 2010, about 90% of all emails sent in the world were spam [61]

Appendix C: Additional Readings on Scenario Planning

A large number of books and articles have been published on the practice of scenario planning, and a larger number still demonstrating the process around a given environment or set of circumstances. What follows is a short list of additional reading for the budding scenario planner who wishes to understand how to improve their ability, or the extent to which scenario plans can be used in a variety of circumstances.

Jeffrey Barnett, Joseph A. Engelbrecht Jr, et.al., "Tackling Tomorrow Today: Alternate Futures and Convergent Technologies of 2020" (A Report for the National Security Agency's Signals Intelligence Directorate and the National Security Council: 2004)

Harold S. Becker, "Scenarios: A Tool of Growing Importance to Policy Analysts in Government and Industry," *Technological Forecasting and Social Change,* No. 23 (1983): 95-120.

Richard K. Betts, *Surprise Attack: Lessons for Defense Planning* (Washington: The Brookings Institution, 1982).

Michael Barzelay and Colin Campbell, *Preparing for the Future: Strategic Planning in the U.S. Air Force* (Washington, DC: Brookings Press, 2003).

Edward Cornish, *Futuring: The Exploration of the Future* (Bethesda, Md., World Future Society, 2004).

Liam Fahey and Robert M. Randall, eds., *Learning from the Future: Competitive Foresight Scenarios* (New York: John Wiley and Sons, Inc., 1998).

Warren Fishbein and Gregory Treverton, "Rethinking 'Alternative Analysis' to Address Transnational Threats," *The Sherman Kent Center for Intelligence Analysis Occasional Papers*, Vol. 3, No. 3 (October 2004).

Jerome C. Glenn and Theodore J. Gordon, "State of the Future." *The Millennium Project*. (Washington, D.C.: American Council for the United Nations University: 1996)

Herman Kahn, "On Studying the Future," *Handbook of Political Science: Strategies of Inquiry.* Vol. 7. (Reading, Massachusetts: Addison-Wesley Publishing Company, 1975): 405-442.

Pamela H. Krause, Michael S. Loescher, Chris Schroeder, and Charles W. Thomas, *Proteus: Insights from 2020* (The Copernicus Press, 2000).

Mats Lindgren and Hans Bandhold, *Scenario Planning: The Link Between Future and Strategy* (New York: Palgrave Macmillan, 2003).

Henry Mitzberg, Bruce Ahlstrand, and Joseph Lampel, *Strategy Safari: A Guided Tour Through the Wilds of Strategic Management* (New York: Free Press, 1998).

Gregory S. Parnell, Jack A. Jackson, Roger C. Burk, Lee J. Lehmkuhl, and Joseph A. Engelbrecht Jr., "R&D Concept Decision Analysis: Using Alternate Futures for Sensitivity Analysis," *Journal of Multi-Criteria Decision Analysis* (Vol. 8, 1999): 119-127.

John L. Peterson, *The Road to 2015: Profiles of the Future* (Corte Madera, Ca., Waite Group Press, 1994).

Bill Ralston and Ian Wilson, *The Scenario Planning Handbook: Developing Strategies in Uncertain Times* (The Thompson Corporation, 2006)

Gill Ringland, *Scenario Planning: Managing for the Future* (New York: John Wiley & Sons, 1998).

T. Irene Sanders, *Strategic Thinking and the New Science: Planning in the Midst of Chaos, Complexity, and Change* (New York: Free Press, 1998).

Paul Saffo, "Six Rules for Effective Forecasting," *Harvard Business Review,* (July-August 2007): 122-131.

Theodore Schick, Jr. and Lewis Vaughn, *How to Think about Weird Things: Critical Thinking for a New Age* (London: Mayfield Publishing Company, 1995).

Peter Schwartz, *The Art of the Long View* (New York: Doubleday, 1991).

George A. Steiner, *Strategic Planning: What Every Manager Must Know* (New York: Free Press, 1979).

Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007).

Alvin Toffler, *Future Shock* (New York: Random House, 1970).

Alvin Toffler, *The Third Wave* (New York: William Morris and Company, 1980).

Stephen Toulmin, *Foresight and Understanding: An Enquiry into the Aims of Science* (New York: Harper & Row, Publishers, Inc., 1961).

Michael D. Watkins and Max H. Bazerman, "Predictable Surprises: The Disasters You Should Have Seen Coming," *Harvard Business Review*, March, 2003: 72-80.

Duncan J. Watts, *Six Degrees: The Science of a Connected Age* (New York: Norton, 2003).

Paul Watzlawick, John H. Weakland, and Richard Fisch, *Change: Principles of Problem Formation and Problem Resolution* (New York: W.W. Norton & Company, Inc., 1974).

Eddie Weiner and Arnold Brown, *Future Think* (Upper Saddle River, N.J.: Person Prentice Hall, 2006).

Robin W. Winks, ed., *The Historian as Detective: Essays on Evidence* (New York: Harper & Row, Publishers, 1969).

Endnotes

Cover image used under a Creative Commons license. Image is credited to Flickr user pshutterbug (pshanmugam@mac.com) and available from http://www.flickr.com/photos/pshan427/2331162310/

1 - Henry Mintzberg, The Rise and Fall of Strategic Planning (New York: Free Press, 1994, 17

2 - Joseph A. Engelbriecht, Jr., Robert L. Bivins, Patrick M. Condray, Merrily D. Fectau, John P. Geis, II, and Kevin C. Smith, Alternative Futures for 2025 (Maxwell Air Force Base, AL: Air University Press: 1996), 1.

3 - Michael Robert, Strategy Pure and Simple (New York: McGraw Hill, 1993), 143

4 - Kees van der Heijden, Scenarios: The Art of Strategic Conversation (West Sussex, England: John Wiley & Sons, Ltd, 2005), 155-156.

5 - Joseph A. Engelbriecht, Jr., Robert L. Bivins, Patrick M. Condray, Merrily D. Fectau, John P. Geis, II, and Kevin C. Smith, Alternative Futures for 2025 (Maxwell Air Force Base, AL: Air University Press: 1996), 9-10.

6 - Thomas Schiller, forward to Pearl Harbor by Roberta Wohlstetter (Stanford, CA: Stanford University Press, 1962), vii.

7 - Willie Pietersen, Reinventing Strategy: Using Strategic Learning to Create and Sustain Breakthrough Performance (New York: John Wiley & Sons, 2002), 33.

8 - Thomas Schiller, forward to Pearl Harbor by Roberta Wohlstetter (Stanford, CA: Stanford University Press, 1962), viii.

9 - Richard Nixon, Six Crises (New York: Touchstone, 1962), unknown.

10 - Kees van der Heijden, Scenarios: The Art of Strategic Conversation (West Sussex, England: John Wiley & Sons, Ltd, 2005), 5-7.

11 - Herbert Simon, "Making Management Decisions: The Role of Intuition and Emotion," Academy of Management Executive (February 1987), 63.

12 - Kees van der Heijden, Scenarios: The Art of Strategic Conversation (West Sussex, England: John Wiley & Sons, Ltd, 2005), 10.

13 - Kees van der Heijden, Scenarios: The Art of Strategic Conversation (West Sussex, England: John Wiley & Sons, Ltd, 2005), 266.

14 - Mortimer J. Adler and Charles Van Doren, How to Read a Book (New York: Simon & Schuster, 1972), 4.

15 - "SLA Board Approves Ethics Guidelines," Special Libraries Association, last accessed 01 May 2011, http://www.sla.org/content/SLA/professional/index.cfm.

16 - "The Art of Forecasting and Futures Planning" The Next Wave: The National Security Agency's Review of Emerging Technologies, Vol. 18, No. 4, 2011, 4-7.

17 - "Christopher Columbus," Encyclopedia Britannica, last accessed 01 May 2011, http://www.britannica.com/

EBchecked/topic/127070/Christopher-Columbus%20.

18 - Richard Jensen, "Military History of the American Revolution," last accessed online 01 May 2011, http://tigger.uic.edu/~rjensen/am-rev.htm.

19 - "The First Steamboats on Lake Ontario and the Niagara River," A Century of Sail and Steam on the Niagara River, last accessed on 01 May 2011, http://www.maritimehistoryofthegreatlakes.ca/Documents/Cumberland/default.asp?ID=c008.

20 - "Steamboat," Wikipedia, the Online Encyclopedia, last accessed online 01 May 2011, http://en.wikipedia.org/wiki/Steamboat.

21 - "Mile Market M to B 82," U.S. Historic Survey Stones and Monuments on Waymarking.com, last accessed online 01 May 2011, http://www.waymarking.com/waymarks/WM3A0A.

22 - "The Gresley A4 Pacifics," The London & North Eastern Railway (LNER) Encyclopedia," last accessed online 01 May 2011, http://www.lner.info/locos/A/a4.shtml.

23 - "China's High-Speed Train Sets New Speed Record," China Daily, 28 September 2010, last accessed online 01 May 2011, http://www.chinadaily.com.cn/china/2010-09/28/content_11361177.htm.

24 - "The Apollo Program: Apollo 11 (AS-506) Lunar Landing Mission," Smithsonian National Air and Space Museum, last accessed online 01 May 2011, http://www.nasm.si.edu/collections/imagery/apollo/as11/a11.htm.

25 - "Fixed Telephone Lines per 100 Inhabitants, 1997-2007," International Telecommunication Union, last accessed online 01 May 2011, http://www.itu.int/ITU-D/ict/statistics/ict/graphs/fixed.jpg.

26 - "Cell Phones in USA," Planet Omni: Cell Phones and SIM Cards since 1994, last accessed online 01 May 2011, http://www.planetomni.com/ARTICLES-Cell-Phones-in-USA.shtml.

27 - "One Hundred Years of Electricity," Popular Mechanics Magazine, May 1937, 772-776, last accessed on 01 May 2011: http://books.google.com/books?id=n-MDAAAAMBAJ&pg=PA772&dq=Popular+Mechanics+1931+curtiss&hl=en&ei=nOz1TKGlGoT48AbhovSDBw&sa=X&oi=book_result&ct=result&resnum=5&ved=0CDYQ6AEwBA#v=onepage&q&f=true.

28 - "Music Industry," Wikipedia, the Free Online Encyclopedia, last accessed 01 May 2011, http://en.wikipedia.org/wiki/Music_industry#cite_ref-20.

29 - "X-Rays," National Aeronautics and Space Administration, Mission: Science," last accessed 01 May 2011, http://missionscience.nasa.gov/ems/11_xrays.html.

30 - "The Science Channel's 100 Greatest Discoveries: Astronomy," The Science Channel, last accessed 01 May 2011, http://science.discovery.com/convergence/100discoveries/big100/astronomy.html.

31 - "Alternating Current," Magnet Lab: National High Magnetic Field Laboratory, last accessed 01 May 2011, http://www.magnet.fsu.edu/education/tutorials/java/ac/index.html.

32 - "Airline Industry Overview," Massachusetts Institute of Technology Global Airline Industry Program, last accessed 01 May 2011, http://web.mit.edu/airlines/analysis/analysis_airline_industry.html.

33 - "Radio Trends on Air and Online," Radio Market Research & Broadcasting Statistics, last accessed 01 May 2011, http://www.voices.com/articles/market-research/radio.html.

34 - "Thematic Atlas of Europe and North America: Transport," United Nations Economic Commission for Europe, last accessed 01 May 2011, http://www.unece.org/stats/trends2005/transport.htm.

35 - "The Submarine," United States Navy, last accessed 01 May 2011, http://www.navy.mil/navydata/ships/subs/subs.asp.

36 - "FORTUNE 500: Our annual ranking of America's largest corporations, 2010" FORTUNE Magazine online, last accessed 01 May 2011, http://money.cnn.com/magazines/fortune/fortune500/2010/full_list/.

37 - "The Wright Brothers & The Invention of the Aerial Age," Smithsonian National Air and Space Museum, last accessed 01 May 2011, http://www.nasm.si.edu/wrightbrothers/.

38 - "Automobile Companies - The Significance of Latest Automobile Technology in India," Web Development Services, last accessed 01 May 2011, http://www.cordobasur.net/automobile-companies-the-significance-of-latest-automobile-technology-in-india/

39 - "The U.S. Air Force," United States Air Force, last accessed 01 May 2011, http://www.af.mil/information/factsheets/index.asp.

40 - FirstWorldWar.com, a Multimedia History of World War One, last accessed 01 May 2011, http://www.firstworldwar.com/.

41 - "US Movie Market Summary 1995 to 2011," The Numbers: Box Office Data, Movie Stars, Idle Speculation," last accessed 01 May 2011, http://www.the-numbers.com/market/.

42 - "Calvary (United States)," Wikipedia, the Free Online Encyclopedia, last accessed 01 May 2011, http://en.wikipedia.org/wiki/Cavalry_(United_States)#cite_note-0.

43 - "Another drop in nuclear generation," World Nuclear News, last accessed 01 May 2011, http://www.world-nuclear-news.org/newsarticle.aspx?id=27665&terms=another+drop+.

44 - Stefan Lovgren, "Airbus Unveils A380 "Superjumbo" Jet," National Geographic News, last accessed 01 May 2011, http://news.nationalgeographic.com/news/2005/01/0118_050118_airbus.html.

45 - "The History of Aviation and Modern Rocketry," The Ultimate Space Place, last accessed 01 May 2011, http://www.thespaceplace.com/history/rocket2.html.

46 - William Burr, "The Atomic Bomb and the End of World War II," National Security Archive Electronic Briefing Book No. 162," last accessed 01 May 2011, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/index.htm.

47 - Sikorsky corporate website, last accessed 01 May 2011, http://www.sikorsky.com/.

48 - "Television & Health," Internet Resources to Accompany The Sourcebook for Teaching Science, last accessed 01 May 2011, http://www.csun.edu/science/health/docs/tv&health.html.

49 - "The Top 10 Best Small Laptops," Notebook and Laptop Reviews, last accessed 01 May 2011, http://laptopadvisor.blogspot.com/2009/04/top-10-best-small-laptops.html.

50 - “Moore’s Law,” Intel, last accessed 01 May 2011, http://www.intel.com/technology/mooreslaw/.

51 - Rock & Roll Hall of Fame organizational website, last accessed 01 May 2011, http://rockhall.com.

52 - Google search results for “Nuclear Powered Vacuum,” last accessed 01 May 2011, http://www.google.com/search?q=nuclear+powered+vacuum

53 - Commercial Spaceflight Federation organizational website, last accessed 01 May 2011, http://www.commercialspaceflight.org/.

54 - Colin Stewart, “Copying Success,” OC Register, 31 July 2007, last accessed 01 May 2011, http://articles.ocregister.com/2007-07-31/business/24678461_1_copiers-toshiba-america-business-solutions-cable-channels.

55 - FedEx corporate website, last accessed 01 May 2011, http://www.FedEx.com

56 - DHL corporate website, last accessed 01 May 2011, http://www.DHL.com

57 - Iridium corporate website, last accessed 01 May 2011, http://www.iridium.com/.

58 - “GPS.gov,” United States Government, last accessed 01 May 2011, http://www.gps.gov.

59 - Gareth Marples, “The History of Satellite TV - A Vision for the Future,” The History Of, last accessed 01 May 2011, http://www.thehistoryof.net/history-of-satellite-tv.html.

60 - “Margaret Thatcher,” Wikipedia, the Free Encyclopedia, last accessed 01 May 2011, http://en.wikipedia.org/wiki/Margaret_Thatcher.

61 - “Email Metrics Report,” Messaging Anti-Abuse Working Group, last accessed 01 May 2011, http://www.maawg.org/email_metrics_report.

Contact:
PJ Neal
pjneal@gmail.com