For print:

[rubric] Create Your Company's Future: Scenario Planning

[Head] Using Scenario Planning to Reshape Strategy

[Deck]Rather than trying to predict the future, organizations need to strengthen their abilities to cope with uncertainty. A new approach to scenario planning can help companies reframe their long-term strategies by developing several plausible scenarios.

[Byline]By Rafael Ramírez, Steve Churchhouse, Alejandra Palermo, and Jonas Hoffmann

[Bio]Rafael Ramírez is a professor of practice and director of the Oxford Scenarios Programme at the Saïd Business School at the University of Oxford in the United Kingdom. Steve Churchhouse was the director of digital for Rolls-Royce plc until April 2017. Alejandra Palermo is manager of external relations for the London, U.K.-based Royal Society of Chemistry. Jonas Hoffmann is an associate professor at Skema Business School's campus in Sophia Antipolis, France. Comment on this article at http://sloanreview.mit.edu/x/58426, or contact the authors at smrfeedback@mit.edu.

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The Leading Question

How can organizations use scenario planning to prepare for unpredictable and turbulent futures?

Findings

- Instead of trying to determine the most probable outcome, explore a number of plausible scenarios.
- Develop scenarios by considering the effects of plausible changes in the larger contextual environment — such as changes in macroeconomic conditions or in technology.
- Include a variety of participants in the scenario planning process.

Exhibits: 3

1. **About the Research**
2. **The Role of the Contextual Environment in Scenario Planning**
3. **Putting Scenario Planning to Work**

[main text] In recent years, organizations have been caught off guard by economic volatility, unexpected political events, natural disasters, and disruptive innovations. In response, we are seeing increased interest in scenario planning. Rather than tying their company's future to a strategy geared to a single set of events, many senior executives are coming to the view that smart management benefits from a richer understanding of the present possibilities afforded from multiple views about possible futures.

Scenario planning came to prominence following World War II and gained recognition in the corporate world in the late 1960s and 1970s, around the time when Royal Dutch/Shell used it to help address the turbulence[1] caused by the 1973 oil crisis. While several different approaches to scenario planning have emerged since then, this article focuses specifically on what we call the Oxford scenario

planning approach.[2] This approach is intended to be collaborative in order to get individuals and groups at all levels and functional backgrounds within an organization to examine an array of factors that contribute to the future and, in the process, to reframe their collective understanding of the present. (See **"About the Research."**)

Unlike approaches to scenario planning that take a *probabilistic* stance (that is, making predictions in percentage terms or as best-case/worst-case scenarios[3]) or a *normative* stance (that is, envisioning how a future should look like), the Oxford scenario planning approach is based on *plausibility*. By recognizing the part of uncertainty that is unpredictable[4] and by actively exploring the sources of the turbulence and uncertainty, the goal is to iteratively and interactively generate new knowledge and insights to help organizations reperceive their circumstances.[5]

During periods of turbulence, unpredictable uncertainty, novelty, and ambiguity (what we like to refer to as TUNA conditions[2]), organizations frequently experience serious challenges that threaten existing value chains, communities, and even whole fields of endeavor. Such conditions can be unsettling and destabilizing on many different levels. But they also present opportunities for organizations to reframe their strategies and innovate.[6]

A core feature in the Oxford approach is making a distinction between the immediate business environment an organization inhabits (where business transactions take place) and the broader environment, or context, in which it operates.[7] In principle, our approach consists of two layers. The first layer is the immediate business environment and includes a company's suppliers, customers, competitors, partners, and other stakeholders. The second layer is made up of all the factors that are beyond the organization's direct influence. Scenario planning is about exploring how the second layer might transform the first layer. (See **"The Role of the Contextual Environment in Scenario Planning."**)

In recent years, the Oxford approach has been used to examine a variety of circumstances, including the future of retailing in India, the tourism industry in Mexico, the changing environment in global shipping,[8] and the future role of the European Patent Office.[9] Based on our experience, different organizations have gone about scenario planning in different ways — there is no cookie-cutter method. Nevertheless, we have found that there are a handful of best practices that the most effective scenario planning processes use. First, they draw on the knowledge and perspective of a broad cross-section of parties, both inside and outside the senior management team. Second, both the participants and the organization are willing to invest time and resources to gain insights.

And third, successful scenario planning processes are committed to examining and understanding *plausible* futures as opposed to *probable* futures. In turbulent and uncertain conditions, it is impossible to assign precise probabilities to possible scenarios.[10] As a result, the Oxford scenario planning approach eschews assigning probabilities to scenarios and instead focuses on identifying and developing scenarios that the group finds plausible, challenging, and useful. Each scenario consists of a story that relates to possible changes in the larger contextual system in which an organization operates.[11]

In this article, we examine two cases in which the Oxford approach to scenario planning was used. The first case involves Rolls-Royce plc, a leading supplier of power systems for aircraft and the marine and energy markets; the second case looks at the Royal Society of Chemistry, a London, U.K.-based international organization involved in advancing the field of chemical sciences. In addition to showing how these organizations used scenario planning, we will discuss the challenges and opportunities of scenario planning more broadly. (See **"Putting Scenario Planning to Work."**)

[A head] Scenario Planning at Rolls-Royce

Rolls-Royce was founded in 1906 to produce quality cars in the United Kingdom. Although Rolls-Royce Holdings plc is no longer in the auto business (that operation is owned by BMW AG), it is currently involved in the design, manufacturing, and distribution of power systems for aviation and other industries. With underlying revenue of £13.8 billion and about 50,000 employees,[12] the company

has 50% of the wide-body airliner propulsion market. Rather than selling the equipment outright, it generates much of its revenue by selling power services by the hour to aircraft operators.[13]

Rolls-Royce avoided the worst consequences of the 2008 financial crash, thanks to its substantial order book and the stability of its aftermarket service business, but in early 2014 the company ran into difficulties. These involved a cyclical decline in wide-body airliner orders, the slowdown in the growth rate of the Chinese economy, and the end of a commodities boom, which impacted the corporate jet business. Also, oil price declines affected both the marine and energy markets, and the company's civil nuclear power business suffered in the wake of the accident at a nuclear power plant in Fukushima, Japan, in 2011. While these events were mostly unrelated, they affected every aspect of Rolls-Royce's business. During 2014 and 2015, management issued five profit warnings, and the share price fell more than 50%. An activist investor bought just over 10% of the stock, and there were calls from some commentators to break the company up.

The arrival of a new CEO in July 2015 greatly intensified the company's search for ways to improve the company's prospects. That summer, several dozen of the company's top managers participated in an executive education course at Oxford University. One of the early sessions focused on scenario planning. Based on what the executives heard, some of them began to lobby internally within Rolls-Royce for a company-wide scenario planning process. The idea was to catalog significant factors that might affect Rolls-Royce by the year 2040[14] and to develop a set of strategic questions. Management agreed to pursue this course, and over the next few months, management, in conversation with board members, began working with some of the authors of this article to design and run a program for developing and reviewing a set of future scenarios.

[B head] Process To kick off the process at Rolls-Royce, about 25 mid- and senior-level Rolls-Royce executives were selected from different business units, functions, and locations. In preparation for a three-day workshop slated for early 2016, this group was asked to begin studying a wide range of topics deemed to have relevance to the company's future. Among the topics: the future of Moore's law; tools for detecting counterfeit parts (and the distinctions between fake and real); and how transportation needs are likely to change in response to factors such as environmental concerns and migration patterns.

On the first day of the workshop, the participants were asked to present posters summarizing their research. Then the group was divided into four subgroups and given the task of creating scenarios for Rolls-Royce for 2040. According to the assignment, the scenarios had to be plausible and relevant to Rolls-Royce's circumstances, and also had to challenge some of the underlying assumptions of the company's current strategies.

On the second day, the subgroups shared their draft scenarios with the larger group. Based on the feedback, participants began to coalesce behind three draft scenarios. The first scenario envisioned a world of high connectivity, where efficiency and collaboration would be the norm. The second one saw the emergence of a new world order, where India and China leverage technology to rival the United States, and other countries are forced to adjust accordingly. And the third scenario anticipated a highly divided (and unequal) digital future that some groups would be able to take full advantage of and others would not.

On the third day of the workshop, participants held a final meeting to review and critique the scenarios, and to consider four strategic questions.

- **What would digitization look like in the future?** For example, in what ways would digital technology radically reshape society and the way business is conducted?

- **What factors would affect relations between employees and companies in 2040?** For example, how might changing employee expectations about long-term employment affect how organizations are structured?

- **What conditions will determine the future of emerging markets?** For example, to what extent would political factors and factors such as controls on immigration weaken the trend toward globalization?

- **How might technology pathways develop?** For example, how will future technologies change the power systems market?

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[B head] Outcomes Following the three-day workshop, Rolls-Royce management endorsed the scenarios as a new basis for the 2016 strategic planning process and began sharing them with the wider strategy community and the company's senior executives. In practice, this meant that any investment proposal had to take into account how it would be affected by each of the three scenarios and what, if anything, should be done to mitigate or exploit the scenarios; investments that didn't meet this qualification were rejected. The scenarios therefore became a determining factor in the selection of the investment initiatives that emerged from the 2016 strategy process. Already, outlines of the scenario futures have begun to become apparent. There is little doubt, for example, that the unfolding digital future provides advantages to some groups and disadvantages to others. According to Rolls-Royce, the scenarios provided the backdrop for the company's 2017 strategy development process.

[A head] Scenario Planning at the Royal Society of Chemistry

In contrast to Rolls-Royce, where the objective of the scenario planning process was to envision future directions for one organization, the goal at the Royal Society of Chemistry (RSC) was broader: to understand how the chemical sciences might evolve over the next 10 to 20 years, and how the changes might impact industry, academia, and society at large.

Scientific, social, and technological trends are rapidly changing the way people live and work, and these changes have affected the nature and practice of chemistry as well as the roles of chemists. While chemistry is a mature discipline and forms the basis of our fundamental understanding of what happens at the atomic and molecular levels, it is also concerned with the creation of new matter and interacts with disciplines such as biology and astronomy. What's more, it plays a key role in solving practical problems such as curing disease; developing sustainable energy, food, and water; and creating new industries.[15] As chemistry faces new opportunities and obligations, the fundamental question was: "How should people think about the future of chemistry?"[16]

The mission of the Royal Society of Chemistry is to advance excellence in the chemical sciences for the benefit of science and humanity. Its roots go back to the 1840s, when a group of 77 scientists, who included doctors, academics, manufacturers, and entrepreneurs, founded the Chemical Society of London. Today, the RSC has more than 55,000 members worldwide and a reputation as an influential champion for the chemical sciences.

In December 2014, the RSC launched a long-range planning initiative with a broad set of goals. Although the initiative did not refer to scenario planning per se, its aim was to identify possible future directions for the chemical sciences and to anticipate, plan, and prepare for how the field might unfold over the next 10 to 15 years.

The RSC began by identifying some of the big questions its leadership wanted to consider: How might the identity of chemistry change? Could chemistry be facing a future in which academic chemistry departments disappear altogether? If public funding is not available to support the type of blue-skies research that has traditionally produced the next major advances, how will future research be funded? And how will increasingly sophisticated technology and computational techniques change the way new hypotheses are analyzed and tested?[17]

[B head] Process The RSC convened a one-day workshop for the leadership team and selected senior managers to consider a wide range of factors. The workshop helped focus senior staff members from throughout the organization on the importance of taking a broad look at how the field was changing and set the stage for defining the new role the RSC could play.

What followed was the development of a multiphase scenario planning program. In phase one, which ran for three months, approximately 50 stakeholders from industry, government and academia who had been selected by the RSC leadership team, were interviewed by phone to identify possible trends.

Next, there were a series of follow-up in-person interviews with some of the stakeholders in order to understand controversial viewpoints or, in some cases, to secure buy-in from key chemical industry leaders. During this process, several themes emerged. Some of the themes had a direct bearing on the chemical sciences (for example, new opportunities for funding research). Others raised questions about how technology might influence the chemical industry, and the effect of changes on intellectual property, the market, and social factors.

Based on the themes, the RSC ran three one-day scenario-planning workshops (two in London and one in Boston) as a vehicle for identifying weak signals that might emerge as important catalysts of future change. The goal was to spark conversations about the future in order to help executives, academics, and policy-makers make more proactive decisions. Each workshop was attended by about 10 people.

In an effort to challenge the assumptions of leaders in the chemical sciences, the RSC developed four scenarios.

- The first scenario focused on the benefits chemistry brings to the world — its ability to provide answers to global challenges, such as climate change, water shortages, natural resources scarcity, and providing health care for an aging population.
- The second scenario focused on changes in the way chemistry is done and how it is organized, envisioning a world where the chemical sciences are increasingly automated and decentralized.
- The third scenario spoke to the growing separation of chemistry into subdisciplines and how that might negatively impact the pipeline of future chemists.
- And the fourth scenario explored the impact of reduced public funding for the chemical sciences.

[B head] Outcomes These scenarios helped to develop the RSC's long-term strategy and to nudge leaders in the chemical sciences to move beyond conventional thinking and plan for the future. The RSC's original long-range planning team continues to play a role in encouraging the chemical community to reflect on opportunities and challenges. The findings from the scenario planning process were issued in a 2016 report[18] aimed at broadening engagement with RSC communities. The organization's leadership team has said it wants to initiate new activities based on the scenarios, including launching new programs to advance the future of chemistry education and scholarly communication consistent with developments in open-access publishing and the trends in open science; bringing the RSC "futures thinking" conversation to a wider audience (including the organization's general assembly and meetings with international partners around the world); and preparing for the different possible futures through internal strategic conversations with senior management and the RSC's external governing body.

Each element of the RSC's new strategy, which the governing board is slated to approve in July 2017, has been tested against the opportunities and challenges identified by the scenario planning work. The next priority will be to amplify the voice of the chemistry community. This will involve the RSC management sharing success stories from the chemical sciences community not only with other companies but also with governments, funders of research, and society at large. In addition, the RSC has set a goal of improving how it listens to the broader community, understanding community needs, and learning to respond proactively.

[A head] Reframing Strategy

As the Rolls-Royce and RSC cases show, scenario planning can help strategists look beyond their current circumstances — and with longer time horizons — to test existing strategies, make sense of the causes and effects of turbulent, uncertain, or ambiguous conditions; invent new options; open up or enhance the quality of strategic conversations; and pave the way for collaborative strategies.

So, what does this mean for strategists or policy-makers at companies and nonprofit organizations that want to consider future directions? Based on our experience, we have four recommendations.

[C-head] 1. Invest time and effort in preparing participants. First, it's important to identify who the intended participants in the scenario planning process should be and how these participants learn.

Typically, because the board of directors' role is to question and prod the executive team, scenario planning is easier to align with the board than with the executive team. But in cases where strategies have run into trouble or there is a new management team, senior leaders may welcome the opportunity to engage in scenario planning. We have found scenario planning generates the most value when it's clear who the intended learners are and what they wish to learn. Indeed, as a rule of thumb, organizations should expect to spend twice as much time setting expectations and defining the intent and usability of their scenarios as they do producing the scenarios themselves. It pays to invest time and effort throughout the process — both in preparing the participants and setting expectations at the outset, as well as in using the scenarios in strategy development. Otherwise, the scenario planning exercise may become a waste of time.

[C-head] 2. Help participants identify the assumptions about the future that underpin their current strategy. You should be prepared to help the learners articulate their sense of the future and the set of assumptions they are using in their current strategy. In our experience, this part of the process depends heavily on gathering information and developing insights gained from internal and external interviews. Scenario planning that explores a limited number of scenarios (usually between two and four) helps to develop an alternative to the existing framing.

[C-head] 3. Be prepared to invest significant amounts of time and resources in the scenario planning process. Although every situation is different, the amount of time and resources required will depend on what the organization is trying to achieve and its goal. Scenarios that will be presented broadly or publicly tend to require much more detail and peer review (and, as a result, more time and budget) than less formal scenarios involving small teams that are used to working together.

[C-head] 4. Remember that scenario planning is an iterative process. In our experience, this point cannot be overemphasized. It's important to recognize that the initial set of scenarios that organizations develop may not be sufficient. Often, additional insights are gathered in a second iteration. Rolls-Royce, for example, began with a total of 12 scenarios before multiple iterations led it to focus on three.

Organizations need to have criteria for assessing whether the scenarios they develop are plausible. (By plausible, we mean that they should be neither too improbable nor too familiar.) At the same time, executives and board members need to ask themselves whether the scenarios are sufficiently challenging, easy to communicate, and capable of being adopted.

As we have worked with organizations, we have noticed that considerable value can be extracted from reconsidering and reperceiving the immediate business environment that each of the different scenarios implies. In reconsidering how the roles of one actor change from one scenario to another, managers can gain new perspectives and see how new actors begin to emerge. The scenario planning approach we have described helps organizations assess the kinds of threats and opportunities that might occur in turbulent, unpredictable, and ambiguous settings. By freeing the mind from the current framing, strategists can use the process to envision and begin to implement a new set of options.

Exhibit 1: About the Research

This paper is part of a long-standing research and practice stream on scenario planning practices and the use of scenarios as a scholarly methodology. The research has included integrating scenario planning with other fields such as social ecology, sense-making, and design through the Oxford Futures Forum, an interdisciplinary forum. The research has also included an inquiry on specific scenario planning issues raised by participants in executive development programs. Among other things, we have conducted a survey that has been completed by 163 professionals who attended our executive education program and that assesses how organizations use scenario planning interventions. In addition, we have conducted philosophical and social science investigations into the nature of plausibility, probability, uncertainty, and turbulence. In addition to coauthoring two books, *Strategic Reframing: The Oxford Scenario Planning Approach* (Oxford University Press, 2016) and *Business Planning for Turbulent Times: New Methods for Applying Scenarios* (Earthscan 2008), the lead author of this article has examined the ideas in a number of articles. We wish to thank a number of our colleagues, including Kees van der Heijden and Angela Wilkinson, as well as Trudi Lang, Cynthia Selin, John W. Selsky, Jerry Ravetz, and Malobi Mukherjee.

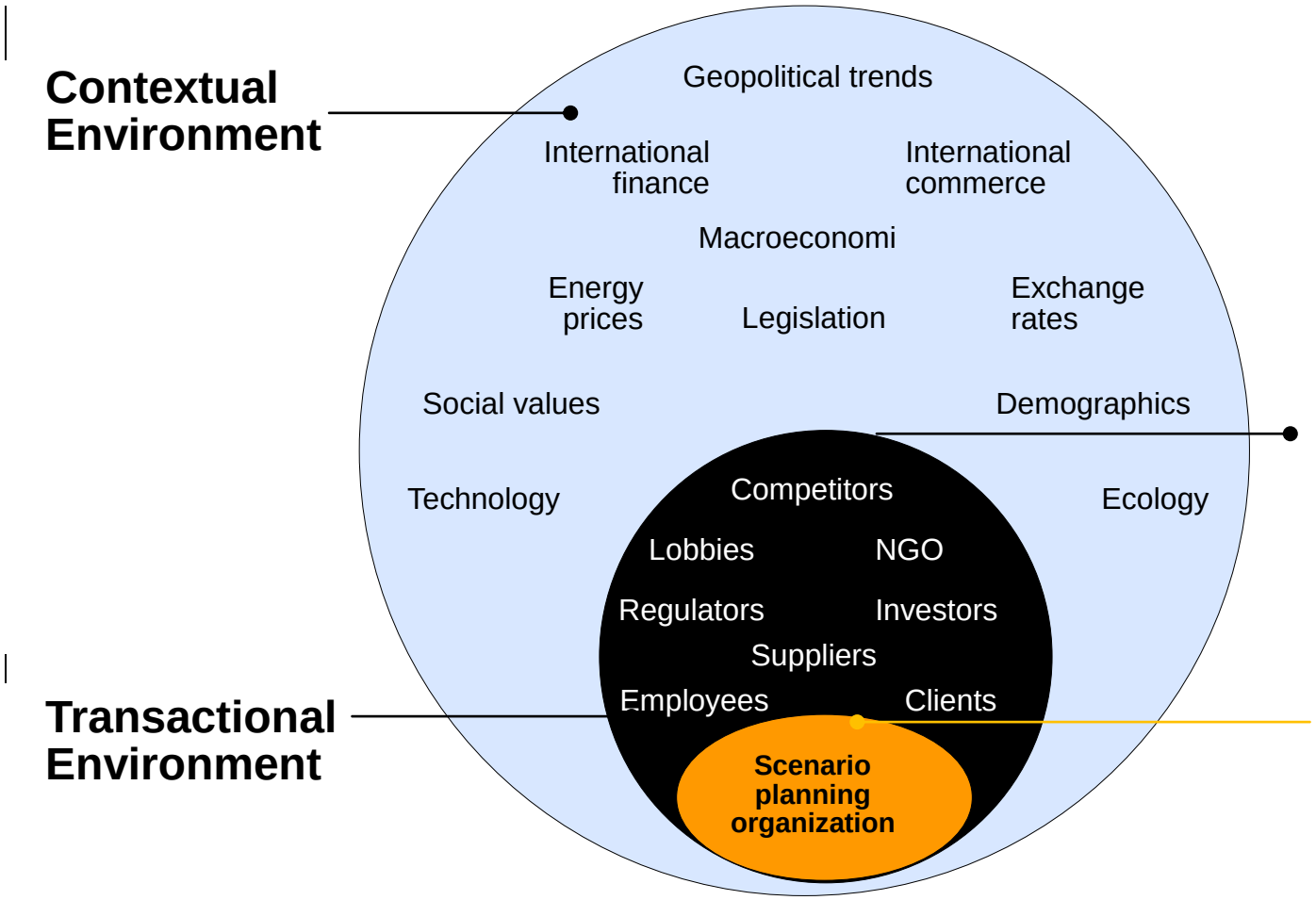
Contextual Environment
Geopolitical trends
International finance
International commerce
Macroeconomi
Energy prices
Legislation
Exchange rates
Social values
Demographics
Technology
Ecology
Competitors
Lobbies
NGO
Regulators
Investors
Suppliers
Employees
Clients
Scenario planning organization
Transactional Environment

Exhibit 2: The Role of the Contextual Environment in Scenario Planning

In using the Oxford scenario planning approach, it is important to distinguish between immediate actors one does business with (located in the smaller circle) and the diverse factors in the larger contextual environment. The contextual factors are beyond the influence of the organization.

Scenario planning is about exploring how larger contextual factors might affect an organization. Scenarios are developed by combining contextual factors (particularly ones that are less well-known and more uncertain). Each scenario will be based on a unique combination of contextual factors.

Exhibit 3: Putting Scenario Planning to Work

Several features distinguish the Oxford approach to scenario planning from other methods. Here are five important characteristics:

1. **Scenario planning involves attending explicitly to what is framed in and what is framed out when setting strategy.** In the scenario planning process, what matters is not so much the organization's strategy itself but the *frame* that strategy is built on. The frame is made up of assumptions, and these assumptions implicitly shape how the strategy comes together. For example, a frame might include the period of time you are considering; the breadth of factors to be included; whether the scenario planning process is to be predominantly competitive or collaborative; whether it is a one-time activity as part of the yearly planning cycle; or whether the strategy should be shared or kept secret.

2. **By proposing a limited number of scenarios, scenario planning enables organizations to reperceive current and plausible future contexts.** For example, at the Royal Society of Chemistry, the links between different disciplines and between scientists and artificial intelligence are different in each of the scenarios.

3. **Scenario planning relies on iterative reframing and reperception.** By building several frames from the contextual environment factors, strategists have an opportunity to see the actors they do business with take different roles in each scenario. For example, a supplier in one scenario could be a partner in another scenario. This allows strategies to revisit the role configuration used in the current strategy — reexamining the assumptions and bringing in new questions to consider.

4. **Everyone involved in and impacted by the process should be considered a learner.** This means that people involved with scenario planning need to work *on* the organization rather *in* it. Having external facilitators or dedicated staff members assigned to the process helps make this possible.

5. **Scenario planning is designed to explore different types of weak signals.**[i] Either they are weak because they are very new (scenario planning considers how they might look when they have been around longer and are stronger); they are weak in relation to other signals managers might respond to (scenario planning focuses on how they might become most salient); or they are weak in relation to the dominant cultural, strategic, or professional frame (scenario planning invites its intended users to look at them from an alternative framework). In order to explore weak signals, scenario planning needs to focus on the plausible as opposed to the probable.

References

[1] F.E. Emery and E.L. Trist, "The Causal Texture of Organizational Environments," Human Relations 18, no. 1 (February 1965): 21-32; and R. Ramírez, J. Selsky, and K. van der Heijden, eds., "Business Planning for Turbulent Times: New Methods for Applying Scenarios" (London: Earthscan, 2008).
[2] R. Ramírez and A. Wilkinson, "Strategic Reframing: The Oxford Scenario Planning Approach" (Oxford, U.K.: Oxford University Press, 2016).
[3] "Best-case" and "worst-case" scenarios are not seen as true scenarios for the purposes of the Oxford scenario planning approach; instead, they are disguised forecasts.
[4] F. Knight, "Risk, Uncertainty, and Profit" (Boston: Hart, Schaffner, and Marx Prize Essays 31; Houghton Mifflin Co., 1921).

[5] R. Ramírez and C. Selin, "Plausibility and Probability in Scenario Planning," Foresight 16, no. 1 (2014): 54-74; E. Eidinow and R. Ramírez, "The Aesthetics of Story-Telling as a Technology of the Plausible," Futures 84, part A (November 2016): 43-49; and R. Ramírez and J. Ravetz, "Feral Futures: Zen and Aesthetics," Futures 43, no. 4 (May 2011): 478-487.
[6] R. Ramírez and J. Selsky, "Strategic Planning in Turbulent Environments: A Social Ecology Approach to Scenarios," Long Range Planning 49, no. 1 (February 2016): 90-102; and R. Ramirez and U. Mannervik, "Strategy for a Networked World" (London: Imperial College Press, 2016).
[7] This distinction was first introduced by Emery and Trist in "The Causal Texture of Organizational Environments" and was more fully developed in K. van der Heijden, "Scenarios: The Art of Strategic Conversation" (New York: John Wiley & Sons, 1996).
[8] See "Shipping Scenarios 2030," www.shippingscenarios.wartsila.com.
[9] See S. Elahi and R. Ramírez, "Appendix E: European Patent Office Case Study," in Ramírez and Wilkinson, "Strategic Reframing: The Oxford Scenario Planning Approach."
[10] Probability involves possible deviance from trajectories established from past facts and their distribution. In turbulent conditions, these facts and their distributions are either irrelevant or nonexistent.

[11] Ramírez and Wilkinson, "Strategic Reframing: The Oxford Scenario Planning Approach," 42-43.
[12] Rolls-Royce Holdings plc Annual Report 2016, www.rolls-royce.com.
[13] The "power by the hour" concept was introduced in the 1960s for the Viper engine developed by Armstrong Siddeley (which later became Bristol Siddeley and then Rolls-Royce). It was conceived as a tool to provide maintenance cost assurance. The company contracted with customers for the total in-service cost of the product, not only providing airline customers with predictable operating cost but also aligning Rolls-Royce's commercial incentives with those of the customer.
[14] The year 2040 was chosen because it was beyond Rolls-Royce's long-range technology scanning horizon of 20 years and beyond the planned introduction dates for any products under consideration.

[15] S. Matlin, G. Mehta, and H. Hopf: "Chemistry Embraced by All," Science 347, issue 6227 (March 13, 2015): 1179.

[16] G. Whitesides, "Reinventing Chemistry," Angewandte Chemie International Edition 54, issue 11 (March 9, 2015): 3196-3209.

[17] Researchers at Johns Hopkins University recently developed a "map" to predict the safety of untested chemicals, using data collected by the European Chemicals Agency.
[18] "Future of the Chemical Sciences," www.rsc.org.
[i] R. Ramírez, "What Might Decision-Making Be in a Complex World?" invited lecture coauthored with J. Ravetz, T. Lang, and A. Wilkinson, International Risk Assessment and Horizon Scanning Symposium 2010, March 2010, Singapore.