

HOW SCENARIOS BECAME CORPORATE STRATEGIES:
ALTERNATIVE FUTURES AND UNCERTAINTY
IN STRATEGIC MANAGEMENT

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ABSTRACT

How Scenarios Became Corporate Strategies tracks the transformation of scenario planning, a non-calculative technique for imagining alternative futures, from postwar American thermonuclear defense projects to corporate planning efforts beginning in the late 1960s. Drawing on archival research, the dissertation tells a history of how different corporate strategists in the second half of the twentieth century attempted to engage with future uncertainties by drawing heterogeneous and sometimes contradictory rational and intuitive techniques together in their developments of corporate scenario planning. By tracing the heterogeneity of methodologies and intellectual influences in three case studies from corporate scenario planning efforts in the United States and Britain, the dissertation demonstrates how critical and countercultural philosophies that emphasized ‘irrational’ human capacities like imagination, consciousness, and intuition—often assumed to be antithetical to the rule-bound, quantitative rationalities of corporate planning efforts—became crucial tools, rather than enemies, of corporate strategy under uncertainty after 1960.

The central argument of the dissertation is that corporate scenario planning projects were non-calculative speculative attempts to augment the calculative techniques of traditional mid-century strategic decision-making with diverse human reasoning tools in order to explore and understand future uncertainties. Consequently, these projects were intertwined with an array of sometimes contradictory genealogies, from technical postwar military planning practices to countercultural intellectual resources that questioned the technological imperatives of modern life. Yet, by the mid-1980s,

corporate scenario planning efforts transformed from contemplative strategies for exploring uncertainties into a method associated with the capacities of “thought leaders.” It was through the rising thought leadership industry of the late-twentieth-century that scenarios gained legitimacy, enabling multinational corporations to rely upon the charismatic authority of scenario practitioners in the face of unknowable futures. In making this argument, the dissertation revises assumptions in the history of postwar science and technology and science studies that pivot on the importance of impersonal, calculative strategies and technical capacities in uncertain conditions.

To my wolf pack: Lowell, Zev, and Kate

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CHAPTER 1:

INTRODUCTION

‘Surely planning can’t be worthwhile in these uncertain times’ is the usual reaction to hearing that one is a corporate planner. People talk about increasing uncertainty, but on what basis? Life is no more or less uncertain than it has ever been. The future was, is and always will be uncertain. What has changed is the general consciousness of uncertainty brought about by feelings of insecurity during a period of major social transition and disruption.

-P. W. BECK, Planning Director, Shell UK Limited,
“Corporate Planning for an Uncertain Future”¹

In December 1969, the American think tank Hudson Institute initiated a study on “The Future of the Corporation and the Corporate Environment.”² It was spearheaded by the director of the Hudson Institute, the notorious American defense strategist Herman Kahn. Kahn made a name for himself with his audacious arguments detailing how thermonuclear war was not only possible, but also survivable.³ By the mid-1960s, however, Kahn had broadened his approach to “thinking about the unthinkable” from the

¹ P.W. Beck, “Corporate Planning for an Uncertain Future,” *Long Range Planning*, Vol 15, No 4 (August 1982): 12.

² Program on “Orientation to Hudson’s Corporate Environment Study,” Hudson Institute (December 5, 1969). Hudson Institute Archive, National Defense University.

³ Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960).

narrow confines of war for the American military establishment to economic, social, and political issues for governments internationally, and eventually, multinational corporations.⁴

As Kahn explained in the “Future of the Corporation and the Corporate Environment” brochure: decision-making under uncertainty required that corporations learn to understand the long-term dynamics of their external “corporate environment,” made up of changing “technological, economic, social, cultural and political” forces.⁵ Contrary to what one might expect from postwar business strategists, the study did not promote the latest probabilistic calculus from sophisticated data gathering and analyzing techniques in the fields of long-range and strategic planning. In the wake of rapid technological innovations, large-scale geopolitical turmoil, and rising critiques of modern industrial society from countercultural movements in post-1968 America, even corporations wrestled with the shortcomings of their technological tools in the face of what they envisioned to be a discontinuous future. Management scholars and corporate executives asserted that calculative forecasts, the mainstays in decision-making for the mid-century corporation, were only capable of predicting “continuity that extends yesterday’s trends into tomorrow.”⁶ In the words of one former Shell Planning Director,

⁴ On “thinking about the unthinkable,” see Herman Kahn, *Thinking about the Unthinkable* (London: Wieldenfeld and Nicholson, 1962); on the RAND Corporation’s move from military to social and political projects, see David Jardini, “Out of the Blue Yonder: The Rand Corporation’s Diversification into Social Welfare Research, 1946-1968,” PhD dissertation, Carnegie-Mellon University, 1996.

⁵ Hudson Institute, “The Corporate Environment, 1975-1985,” *Futures* (June 1970): 180; Herman Kahn, “On Studying the Future,” Hudson Institute (June 1975).

⁶ Peter Drucker, *The Age of Discontinuity* (Transaction Publishers, London: 1969), xxx; Beck, “Corporate Planning for an Uncertain Future,” 14-16; Hudson Institute consultant Robert Ayres wrote “forecasting in general is beset by hazards for the would-be prophet. Most of these hazards—the uncertainty and unreliability of data, the complexity of “real world” feedback

the “whole basis of modern planning”—which included the quest for rationally informed decision-making, and the heavy emphasis on sophisticated computer-assisted mathematical models—became “increasingly suspect” at the end of the 1960s.⁷ Hudson Institute suggested that corporations needed ways to effectively deliberate the uncertainties, ambiguities, and discontinuities that would ultimately enable them to have an advantage against their competitors.

By the end of the 1960s, many corporate planners contended that corporations had invested millions in futures that would never come.⁸ The problem, according to many corporate planners, stemmed from the fact that their forecasts were recklessly “present oriented,” loaded with economic data based on recent performance, such as Gross National Product (GNP) measures, consumer spending, energy estimates, earnings summaries and cash flow.⁹ These forecasts were unable to account for alternative possibilities that might arise from the dramatic social and political transformations and technological changes that defined the era, forces assumed to be incalculable. More than

actions...apply to all forms of forecasting.” He continues, “there are some pitfalls due to the special characteristics of invention and innovation as social processes.” Robert U. Ayres, *Technological Forecasting and Long-Range Planning* (New York: McGraw-Hill Book Company, 1969), 18-28.

⁷ In the dissertation, I refer to the jointly held Anglo-Dutch petroleum company Royal Dutch/Shell—a merger between Shell Transport and Trading and the Royal Dutch Petroleum Company—as “Shell” for simplicity. However, it is often also called the Royal Dutch Shell Group of companies. See, Keetie Sluyterman, *Keeping Competitive in Turbulent Markets*, vol. 3 of *A History of Royal Dutch Shell* (Oxford: Oxford University Press, 2007); Beck, “Corporate Planning for an Uncertain Future,” 13.

⁸ For example, the energy industry heavily invested in the chemicals industry and nuclear power in the 1960s because of forecasts suggesting growth of these industries, leading to “chronic overcapacity.” Beck, “Corporate Planning for an Uncertain Future,” 14.

⁹ Burt Nanus, “Profiles of the Future: The Future-Oriented Corporation,” *Business Horizons* (February 1975): 5-12.

this, many considered forecasts to be caught up in short-term planning horizons that were months and possibly years ahead, neglecting the long-term future decades and even centuries ahead. Thus, these forecasts did little to help corporations realize the alternative courses of action they promised to provide management. That is, even before the economic turbulence of the 1970s collapsed the rates of economic growth in the United States, multinational corporations were concerned with their forecasting techniques. These forecasts—undergirded by mathematical tools that gave planners and economists too much confidence in probabilistic distributions and economically ‘stable’ futures as they narrowly focused on abstract numbers and rigid rules—according to many management theorists and corporate planners, were incapable of properly considering the changing dynamics of social and political phenomena.¹⁰

Given this awareness that calculative tools were ill-equipped to understand an “unknown and to some degree unknowable future,” how were corporate planners to make sense of the ambiguous direction of their changing long-term environment?¹¹ According to the Hudson Institute at the turn of the 1970s, it was not solely through mathematical planning models. Kahn alleged these calculative techniques overtook earlier postwar corporate planning efforts, thwarting judgement, insight, and optimism in favour of data generation and pessimism.¹² In the face of future uncertainties, Hudson

¹⁰ Drucker, *The Age of Discontinuity*; Alvin Toffler, *Future Shock* (New York: Bantam Books, 1971); Daniel Bell, *The Coming of Post-Industrial Society* (New York: Basic Books, 1973).

¹¹ Herman Kahn and Anthony Wiener, “The Use of Scenarios,” in *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (New York: Macmillan, 1967), 262.

¹² Herman Kahn, “A Paradigm for the 1965-1975 Debate” (Hudson Institute, 22 November 1963), 59-60.

Institute promoted a methodology called scenario planning that developed in the fringe field of speculative military “futurology” immediately following World War II.¹³

Scenario planning is a form of strategic thinking that creates “plausible” *stories* about the future in an effort to explore future uncertainties.¹⁴ In Herman Kahn fabrications, scenarios trained staid positivist planners to become imaginative strategists. Scenarios were stories that focused on “new concepts and possibilities, fine distinctions, and subtle nuances,” making them “essential training” for corporate planners in the last quarter of

¹³ In the dissertation, I avoid using the terms futurology and futures studies, as many corporate scenario planning practitioners do not describe their efforts in this way. Additionally, the term itself is subject to a considerable degree of dispute. While many scholars use futurology to refer to the more ‘scientific’ efforts to prognosticate the future that were on the rise in the 1950s and 60s, like forecasting, others use the term in a way more aligned with its originator, the German Marxist futurist Ossip Flechtheim. In his 1949 article “Futurology: The New Science?” Flechtheim argued that the discipline of futurology should be a systemic utopian attempt to reflect on present, not a science of prediction: “In the absence of written or unwritten records, however, Futurology must make use of a different method of approach. It cannot work with the chronological sequence of detailed facts. Instead it will avail itself of interpretation, generalization, and speculation to a considerably higher degree. In this respect, its kinship to cultural anthropology, theoretical sociology, or even social philosophy becomes apparent,” Ossip Flechtheim, “Futurology: The New Science?” *The Forum*, April 1949, 208; Towards the end of the 1960s, the more critical strands of futurology became futures studies. See also, Jenny Andersson, “The Great Future Debate and the Struggle for the World,” *The American Historical Review* 117, no. 5 (2012): 1411-1430; Jenny Andersson and Egle Rindzevičiūtė’s *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future* (New York: Routledge, Taylor & Francus, 2015).

¹⁴ *Plausible* futures, as opposed to *probable* futures, tend to be a defining feature of scenarios. Though, Oxford scenario practitioners Rafael Ramirez and Cynthia Selin suggest this relationship is more complicated. Rafael Ramirez and Cynthia Selin, “Plausibility and Probability in Scenario Planning,” *Foresight* 16, no. 1 (2014): 54-74. Though the origins are disputed, this feature existed in Herman Kahn and Hudson Institute’s original definitions of scenarios in the 1960s. See, Kahn and Wiener, “The Use of Scenarios,” 262-264. Former Shell chief economist Michael Jefferson has argued that it was a feature of the post-Keynesian economist G. L. S. Shackle’s work as early as 1947 in his book *Expectation in Economics*. Michael Jefferson, “The Passage of Time: Shackle, Shell and Scenarios,” In P.E. Earl et al., *G.L.S. Shackle* (London: Palgrave Macmillan UK, 2014), 204; “Imagination,” reflected Herman Kahn, “has always been one of the principal means for dealing in various ways with the future, and the scenario is simply one of the many devices useful in stimulating and disciplining the imagination.” Herman Kahn, “Some Strange Aids to Thought,” in Kahn, *Thinking about the Unthinkable*, 145.

the twentieth century.¹⁵ Sponsored by nearly 100 multinational corporations, including Coca-Cola, General Electric, and International Business Machines (IBM), the Corporate Environment Study assured for Hudson Institute the corporate marketability of *scenarios*, speculative stories of the alternative ways the future might play out. In Hudson Institute's campaign for corporate scenarios, they pulled together a jumble of contradictory techniques, including formal, rule-based technical techniques from World War II military strategy advancements with creative and critical theories concerned with human reasoning, and socio-technical studies of science and technology from the fields of sociology, history, and philosophy. Importantly, scenarios were performative. They included a mixture of storytelling complete with sprawling charts, heady metaphors, and catch phrases, shaping the way that corporate strategy has been conceived into the early twenty-first century.¹⁶

Since the 1980s, corporate scenario planning methodologies have proliferated. Though there are multiple genealogies and methodological approaches to corporate scenario planning, many boast of the importance of the scenario practitioner's imaginative capacities to conjure multiple plausible futures in order to explore their

¹⁵ Herman Kahn, "The Objectives of Future-Oriented Policy Research," in Paul Dragos Aligica and Kenneth R. Weinstein, *The Essential Herman Kahn: In Defense of Thinking* (Lanham: Lexington Books, 2009), 156.

¹⁶ As I will discuss in Chapter 2, Hudson Institute's Corporate Environment Program became popularized through its association with sociologist Daniel Bell's "end of ideology" discussions. Historian of science Elena Aronova has argued the "end of ideology" turned the social-economic and political studies of science into a central topic of concern in Cold War America, providing a pre-history of the discipline of science studies. Elena Aronova, "The Conquest for Cultural Freedom, *Minerva*, and the Quest for Instituting "Science Studies" in the Age of the Cold War," *Minerva* 50 (2012): 307-337.

strategic options.¹⁷ In the mid-1980s, Harvard Business School management strategist Michael Porter advocated for scenario planning in his canonical business strategy text, suggesting that the technique's ability to enhance judgement and consider alternatives aided a company's "competitive advantage."¹⁸ The California-based management consulting firm Global Business Network (GBN), now part of the global consulting firm Monitor Deloitte, dedicated their consultancy services to scenario planning, as they rode the wave of optimistic uncertainty and excess cash flow during the dot-com boom in the 1990s. Prestigious American business schools, like Harvard Business School and The Wharton School at the University of Pennsylvania, include scenario methodologies in their contemporary efforts to train the next generation of business strategists to develop insights on a wider range of options in order to "take advantage of the unexpected opportunities."¹⁹ Even mainstream management consulting firms like McKinsey & Company and Bain & Company utilize scenario methodologies to help their clients deliberate strategic options by identifying and evaluating the kinds of uncertainties plaguing future options.²⁰ At Oxford Saïd Business School, corporate leaders pay

¹⁷ Researchers use the term "scenario practitioners" to differentiate those, like planners and managers, who put scenarios into action in their corporations and organization and the academics that study scenarios in an effort to develop a scholarly field of scenario planning. In this dissertation, however, I use the term to refer more broadly to individuals that have put scenario planning into practice, including academic scenario planners.

¹⁸ Michael Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: Free Press, 1985).

¹⁹ Paul J. H. Schoemaker, "Scenario Planning: A Tool for Strategic Thinking," *MIT Sloan Management Review* (Winter 1995); David A. Garvin and Lynne Levesque. "A Note on Scenario Planning," *Harvard Business School Background Note* 306-003, November 2005. (Revised July 2006.)

²⁰ Hugh G. Courtney, Jane Kirkland, and S. Patrick Viguerie, "Strategy under Uncertainty," *McKinsey Quarterly* (June 2000); Martin Toner, Nikhil Ojha, Piet de Paepe and Miguel Simoes de Melo, "A Strategy for Thriving in Uncertainty," *Bain Insights* (12 August 2015).

thousands of pounds to learn the scholarly “Oxford scenario planning approach” in order to “reframe their long-term strategy by developing several plausible scenarios” in future situations defined as turbulent, uncertain, novel, and ambiguous.²¹

This dissertation tracks the transformation of scenario methodologies aimed at long term decision-making in uncertain future environments from American thermonuclear defense strategy to corporate planning efforts beginning in the late 1960s. Drawing on archival research, the dissertation tells a history of how different business strategists in the second half of the twentieth century attempted to creatively engage with future uncertainties by drawing heterogeneous and sometimes contradictory rational and intuitive techniques together in their developments of corporate scenario planning. By tracing the heterogeneity of methodological approaches and intellectual influences involved in corporate scenario planning, the dissertation demonstrates how critical and countercultural philosophies that emphasized ‘irrational’ human capacities like imagination, consciousness, and intuition, and others that questioned the technological imperatives of modern life—often assumed to be antithetical to the rule-bound, quantitative rationalities of corporate planning efforts—became crucial tools, rather than enemies, of corporate strategy under uncertainty after 1960.

Though the methodologies and rationales behind the diverse corporate scenario planning efforts differed, where they overlapped was in their critiques of calculative forecasting strategies, ones they believed were ill-equipped to exclusively inform the

²¹ Rafael Ramirez, Steve Churchhouse, Alejandra Palermo, and Jonas Hoffman, “Using Scenario Planning to Reshape Strategy,” *MIT Sloan Management Review* (13 June 2017); These contextual conditions are referred to by Ramirez and Wilkinson as TUNA. Rafael Ramirez and Angela Wilkinson, *Strategic Reframing: The Oxford Scenario Planning Approach* (Oxford: Oxford University Press, 2016).

development of future corporate strategies. At the same time, corporate scenario planners did not outright reject the rule-bound conception of rationality even as they moved away from the quantitative, predictive dimensions. Instead, many sought to harness ‘irrational’ subjective human reasoning capacities—perception, judgement, insight—in disciplined, systematic ways.

The central argument of the dissertation is that corporate scenario planning projects were non-calculative speculative techniques that sought to augment the calculative techniques of traditional strategic decision-making with diverse human reasoning tools in order to explore and understand future uncertainties. Consequently, these projects were intertwined with a complex array of often contradictory genealogies, from technical postwar military planning practices to countercultural intellectual resources that challenged the traditional values and assumptions that governed American modern industrial society. Yet, by the mid-1980s, corporate scenario planning efforts transformed from contemplative strategies for exploring uncertainties into a technique associated with the capacities of “thought leaders.” It was through the rising “thought leadership” industry of the late twentieth century that scenario planning gained legitimacy, enabling multinational corporations to rely upon the “charismatic authority” of scenario practitioners in situations where the way forward was unknown.²² In making this argument, the dissertation revises assumptions in the history of postwar science and technology and science studies that pivot on the importance of impersonal calculative strategies and technical capacities in uncertain conditions.

²² I build from historian of science Steven Shapin’s expansion of Weber’s “charismatic authority” in bureaucratic industrial science of late modernity in Chapter 4. Steven Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation* (Chicago: University of Chicago Press, 2009).

Since the early twentieth century, economists and planners have recognized the unknowable character of future contingencies as an important, if unacknowledged, component in economic decision-making practices from macroeconomics to long-range planning.²³ In the 1920s, it was “Chicago School” economist Frank Knight who distinguished measurable “risk” from unmeasurable “uncertainty.”²⁴ For Knight, even though both uncertainty and risk were shaped by the unknowns of the future, risk was confined to circumstances susceptible to measurement, whereas uncertainty was reserved for unmeasurable phenomena, a necessity Knight identified for the production of profit.²⁵ This history of corporate scenario planning is one example of the attempt to explore uncertainties in corporate decision-making.²⁶ Though many critical scholars have examined the necessity of uncertainty for markets to function, most have focused on the

²³ For example, even John Maynard Keynes, so-called father of macroeconomic theory, acknowledged that economics could not account for “uncertain knowledge.” [There are matters about which] there is no scientific basis on which to form any calculable probability whatever. We simply do not know. Nevertheless, the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact...” John Maynard Keynes, “The General Theory of Employment,” *The Quarterly Journal of Economics*, Vol. 51, 2 (February 1937): 213. Though, Keynesian economists generally neglected this claim, one exception was the post-Keynesian economist G.L.S. Shackle, See Charles Fredrick Carter, G. P. Meredith and G. L. S. Shackle (Editors). *Uncertainty and Business Decisions: The Logic, Philosophy, and Psychology of Business Decision-Making Under Uncertainty: A Symposium* (Liverpool: Liverpool University Press, 1957); another advocate of this concept was operations researcher B. O. Koopman, “Fallacies in Operations Research,” *Operations Research* 4, no. 4 (1 August 1956): 423.

²⁴ Frank Knight, *Risk, Uncertainty and Profit* (Boston: Houghton Mifflin Company, 1921).

²⁵ Knight, *Risk, Uncertainty and Profit*.

²⁶ Scenario planning, unlike forecasting, sought to account for forces previously imagined to be unmeasurable, like cultural change and geopolitical turmoil. This technique differs from those, like macroeconomic GDP calculations, that scholars like Michelle Murphy and Timothy Mitchell have argued helped to conjure “the economy” as a distinct sphere. Scenario planning used stories in order to make sense what was previously considered unmeasurable. Michelle Murphy, *The Economization of Life* (Durham: Duke University Press, 2017); Timothy Mitchell, *Rule of Experts: Egypt, Technopolitics, Modernity* (Berkeley: University of California Press, 2002).

manipulation of uncertainty in the context of contemporary financial and climate crises, domains where uncertainty translates into an object for the rational calculation of potential threats and opportunities amenable to profit creation.²⁷

Different from postwar calculative efforts seeking to reduce and contain uncertainty as “risk” in order to make it more manageable, this dissertation understands corporate scenario planning methods as epistemological tools to explore and exploit uncertainty. Crucially, corporate scenario planning efforts emerged in corporate planning departments and consulting firms alongside other calculative techniques as a rebellion against the failures of computing technologies and their inability to consider the unknowable. In this, it follows historian of technology Edward Jones-Imhotep’s contention that technological breakdowns, malfunctions, and failures—where failure is defined as a “*condition* that machines experience” rather than a “*class* of technologies”—play an important, and undertheorized, role in the history of modern technology.²⁸

In the late 1970s, the Post-Keynesian economist George Shackle used the term “unknowledge” to describe the impossibility of assigning probabilities to a future capable of unexpected change.²⁹ Shackle embraced corporate scenario planning efforts in his

²⁷ See, for example, Melinda Cooper, “Turbulent Worlds: Financial Markets and Environmental Crisis,” *Theory, Culture & Society*, Vol. 27, 2-3 (2010): 167-190; Brian Massumi, “National Enterprise Emergency Steps Toward an Ecology of Powers,” *Theory, Culture & Society* 26, 6 (2009): 153–85; Jerome Whittington, “The Prey of Uncertainty: Climate Change as Opportunity,” *ephemera* 12, ½ (2012): 113-137; Michel Foucault, *The Birth of Biopolitics: Lectures at the College de France, 1978-1979* (New York: Picador, 2010). These approaches follow sociologist Ulrich Beck’s description of “risk society,” a characteristic of modern society that adapts risk management strategies designed to minimize the chances of future dangers. Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992).

²⁸ Edward Jones-Imhotep, *The Unreliable Nation: Hostile Nature and Technological Failure in the Cold War* (Cambridge: MIT Press, 2017), 10-13.

²⁹ George Shackle, *Imagination and the Nature of Choice* (Edinburgh: Edinburgh University Press, 1979), 135.

crusade against the “instrumental rationality” of mainstream economics.³⁰ That is, Shackle opposed traditional economic theory, predicated on rational self-interest and general equilibrium, arguing instead that economists and planners were overly subservient to their mathematical tools.³¹ In doing so, this dissertation expands the understanding of future speculation in business beyond the rational calculation of risk that pervade science studies and the history of science literature.³² Corporate scenario planners relied just as much on qualitative, sociological techniques like Kurt Lewin’s field theory, and cognitive psychological techniques, focusing on perception and imagination. They also employed poets, critical theorists, and artists, to not only help make sense of non-calculative social domains but to fill in the indecipherable future of the business environment. Put differently, there are a multitude of ways that corporate strategists have made sense of uncertain contingencies that cannot be reduced to calculative processes.

³⁰ Jefferson, “The Passage of Time: Shackle, Shell and Scenarios,”; George Shackle, *Epistemics and Economics: A Critique of Economic Doctrines* (Cambridge: Cambridge University Press, 1972), xiv.

³¹ Shackle, *Epistemics and Economics: A Critique of Economic Doctrines*.

³² Anthropologist Caitlin Zaloom makes a similar argument for re-conceptualizing risk in financial markets that exceeds the negative valence, as only protection against future dangers, in her study of futures markets. Caitlin Zaloom, “The Productive Life of Risk,” *Cultural Anthropology* 19, 3 (2004): 365-391.

Cold War Rationality and the History of Science and Technology

This dissertation is indebted to historians of science and technology and science studies scholars that have investigated the heterogeneous epistemologies making up decision-making tools during and immediately after the postwar period, including but not limited to the disciplines of economics, operations research, management science, systems analysis, and cybernetics.³³ However, this dissertation does not seek to follow the majority of scholars in the history of science that focus on the strict, quantitative, rule-bound concept of “Cold War rationality,” one that is closely associated with postwar military advancements and command-and-control projects.³⁴ Yet, by no means does the dissertation claim to be the first to attempt to “deflate” Cold War rationality.³⁵ This widespread version of rationality is generally understood to be based upon the overconfident belief in the technical tools of science and technology, or scientism, as the guiding force in postwar decision-making efforts from the social sciences to economics. This version follows science studies scholar Paul Edwards’ claim in his *The Closed*

³³ See, for example, Sharon Ghamari-Tabrizi, *The Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War* (Cambridge: Harvard University Press, 2005); William Thomas, *Rational Action: The Sciences of Policy in Britain and America, 1940-1960* (Cambridge: MIT Press, 2015); Hunter Crowther-Heyck, *Herbert A. Simon: The Bounds of Reason in Modern America* (Baltimore: Johns Hopkins University Press, 2005); Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago: University of Chicago Press, 2010); Orit Halpern, *Beautiful Data: A History of Vision and Reason since 1945*, (Durham: Duke University Press, 2015).

³⁴ For a prime example, see Paul Erickson, Judy L. Klein, Lorraine Daston, Rebecca Lemov, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality* (Chicago: University of Chicago Press, 2013).

³⁵ For the best overview of the limits to Cold War rationality, see Michael Pettit, “Deflating Cold War Rationality,” *Studies in the History and Philosophy of Science* 58 (2016): 46-49.

World (1996), that the computer instigated a technocratic worldview that enclosed subjects, subjecting them to “one in which calculations and abstractions mattered more than experiences and observations.”³⁶ It informs historian of economics Phillip Mirowski’s examination of the military origins of neoclassical economic models in *Machine Dreams* (2002), and historian of technology Thomas Hughes’ argument in *Rescuing Prometheus* (1998) that empirical, technocratic epistemologies emerging from the military-industrial complex governed large-scale systems engineering projects in the postwar era.³⁷ More recently, in the collaboratively written *How Reason Almost Lost Its Mind*, historians of science Lorraine Daston and others, assert that after World War II, a disembodied, rule-bound concept of “rationality” meant to guide decision-making rose to prominence, leaving behind the Enlightenment concept of “reason,” itself based upon human capacities like judgment and imagination.³⁸ As this dissertation will show, this clean separation between a rule-bound concept of rationality and irrational human capacities, like consciousness and intuition, was not the case in the history of corporate scenario planning. After World War II, corporate scenario planners from the Hudson Institute to the American multinational conglomerate corporation General Electric aimed to explicitly cultivate the role that diverse human imaginative and intuitive capacities, as

³⁶ Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge: MIT Press, 1997), 120.

³⁷ Phillip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science* (Cambridge: Cambridge University Press, 2002); Thomas Parke Hughes, *Rescuing Prometheus: Four Monumental Projects that Changed the Modern World* (New York: Pantheon, 1998).

³⁸ Erickson et. al, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality*, 8-9.

well as rule-bound techniques, played in shaping visions of an ultimately unknowable future.³⁹

To date, this sharp distinction between rationality and reason also guides the historiography of decision-making techniques aimed at making sense of the longer-term future that began in the 1960s.⁴⁰ Though, crucially, these decision-making techniques extended from interwar developments in operations research in American and Britain.⁴¹ Historical literature generally divides these ‘futurists’ into one of two camps. First, there are the forecasting futurists, who imagined the future as a generally knowable space, made up of quantifiable elements. In this group, military strategists, corporate planners, and economists, put their faith in the tools of scientific modeling—like the postwar Delphi Technique, quantitative risk assessment, and game theory—to capture the future, and reduce it, in order to control decision-making for military and corporate interests.⁴² This version typically highlights the work of midcentury RAND researchers, like Olaf Helmer, and his claims that new calculative practices, aided by increasingly capable computers, would solve the socio-political problems in the future.⁴³

³⁹ See, for example, Ian Wilson, “Futures Forecasting for Strategic Planning at General Electric,” *Long Range Planning* (June 1973): 39-42; for a larger history of the role that psychological techniques played in midcentury corporate management, see Kira Lussier, “Personality, Incorporated: A History of Psychological Capital,” PhD dissertation in progress, University of Toronto, 2017.

⁴⁰ Andersson, “The Great Future Debate and the Struggle for the World”; Andersson and Rindzevičiūtė, *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future*.

⁴¹ Thomas, *Rational Action*.

⁴² Andersson, “The Great Future Debate and the Struggle for the World,” 1426.

⁴³ Olaf Helmer, “The Future of Science” (Rand Corporation, 1967).

Second, there are the ‘philosophical’ futurists who criticized the forecasters, demanding that only human imagination and creativity could rescue the future from the grips of military-industrial complex. Here, philosophers, social critics, and activists, inspired by the tools of continental philosophy and literature, sought to open the world to radical future possibilities for society while waging critiques against unrestricted technological growth, capitalism, and modernity.⁴⁴ In this group one finds European futurists, like Bertrand de Jouvenel, who considered speculation about the future to be more an ‘art’ than a ‘science’ in his *The Art of Conjecture* (1967).⁴⁵ It also includes Fred Polak, who in his *The Image of the Future* (1973), claimed that the potentials of positive images of the future were necessary to guide society.⁴⁶ Critical midcentury intellectuals, like Lewis Mumford and Marshall McLuhan, who were also involved in the futures studies movement in the last quarter of the twentieth century, have generally been categorized under this approach.⁴⁷

Neither characterization, however, appropriately describes the corporate scenario planning techniques and epistemologies bound up in the history told in this dissertation. Thus, this dissertation demonstrates how the history of corporate scenario planning unsettles the distinction between the epistemological strategies guiding the closed futures

⁴⁴ Andersson, “The Great Future Debate and the Struggle for the World.”

⁴⁵ Bertrand de Jouvenel, *The Art of Conjecture* (New York: Basic Books, 1967).

⁴⁶ Fred Polak, *The Image of the Future*, trans. Elise Boulding (Amsterdam, 1973).

⁴⁷ Lewis Mumford, *The Myth of the Machine* (New York: Harcourt Brace Jovanovich, 1970); Marshall McLuhan, *The Medium is the Message* (New York: Bantam, 1967). Both Mumford and McLuhan were members of the World Futures Studies Federation, an organization dedicated to introducing “critical future oriented thinking in all branches of knowledge.” Andersson, “The Great Future Debate and the Struggle for the World,” 1429.

of the forecasters linked to military and industrial futures and the emancipatory open futures of futures studies after the late 1960s. Rather, scenario techniques were predominantly attempts to build new visions of corporate futures through a critical engagement with tools highlighting the irrational subjective and intuitive capacities of humans. For example, in the early 1970s at Stanford Research Institute (SRI), the mythologist Joseph Campbell wrote about imaginative transcendental futures in the research report *Changing Images of Man* (1974) that then circulated to multinational corporations through SRI's Business Intelligence Program, a future business environment consulting arm.⁴⁸ By the mid-1980s, the multinational energy and petrochemical company Shell partnered with critical biologists—like the atmospheric scientist James Lovelock and the Chilean neurobiologist Francisco Varela—in order to use their theories of biological and machinic self-organization as intellectual resources for rethinking nondeterministic corporate planning; at the same time, critical theorists applied these resources as counter-epistemologies to capitalism.⁴⁹ In cognitive scientist Warren McCulloch's 1945 experimental biological model for decentralized neural net communication—what he called “heterarchy”—scenario planning consultant Jay Ogilvy saw a nondeterministic logic of relations that could serve as an ideal for complex organization not only in the mind, but also in the self *and* in the corporation in the late

⁴⁸ See Chapter 3 “The Transcendental Scenario.” Arnold Mitchell, “Life Ways and Life Styles,” Business Intelligence Program (Menlo Park: Stanford Research Institute, 1973): 32. Art Kleiner Collection, Box 2:2, Folder 1, Futures Library, University of Oxford.

⁴⁹ For more on James Lovelock and Francisco Varela's relationship to corporate scenario planning efforts, see the conclusion.

1980s.⁵⁰ As such, the history in this dissertation presents an occasion to reflect on the tangled genealogies that exceed the characterizations passed down by the historiography of postwar history of science.

In contrast to the majority of work on the postwar sciences of decision making, historian of science William Thomas has argued that strategists in fields from operations research to management science in the mid-twentieth-century embraced a variety of goals and methodologies aimed at improving complex decision-making as they claimed to be acting “rationally.”⁵¹ Thomas argues that before the postwar period, these strategists did not perceive the tools of science as the reigning intellectual authority; theoretical techniques, like game theory and simulation, were not imagined to be capable of overcoming cultural and political differences or providing the ultimate solutions to complex problems. Moreover, even if at times during the postwar period decision-making researchers relied on their scientific credentials to bolster their expertise, the definition of “science” was not a given or without dispute. However, Thomas continues to emphasize that the quest for rationality as *the* guiding epistemology, even as he seeks to expand the definition of rigid, rule-bound scientific rationality to include the diverse methodologies aimed at improving complex decision-making.

In this dissertation, I expand the focus on rationality leading the historical literature on postwar decision-making processes by including the combinations of

⁵⁰ Jay Ogilvy, “The Postmodern Business,” *The Deeper News* 1, no. 5 (Global Business Network, 1989). Stewart Brand Papers, Special Collections, Stanford University; on heterarchy, see Warren S. McCulloch, *Embodiments of Mind* (Cambridge: MIT Press, 1965); also, Bretton Fosbrook, “Evolution through *Heterarchical* Organization,” Roundtable on Management after Organization Man, *Business History Review* Vol. 90, 4 (2017): 719-725.

⁵¹ Thomas, *Rational Action*.

affective, intuitive, mystical, and psychedelic epistemologies that also guided corporate scenario planning techniques. As historian of science Sharon Ghamari-Tabrizi has argued, atomic weapons initiated a massive shift in authority for the sciences of war, from the wisdom of decorated generals to the intuitions of defense scientists, as they produced the unimaginable threat of human annihilation, and initiated deep anxieties that gripped American society.⁵² During the end of his tenure as a systems analyst for the Air Force think tank the RAND Corporation between 1947-1960, Kahn dove into the uncertainties of the future by crafting scenarios that joined avant-garde performance art and “sick jokes” in an attempt to discuss the unthinkable subject of hypothetical annihilation.⁵³ At the Global Business Network in the late 1980s, poststructuralist philosophy professor turned consultant Jay Ogilvy presented theories of relations as nondeterministic frameworks for scenarios in order to bridge, in his words, “the rationality of Enlightenment thinking” with the irrational processes of “consciousness, intuition, and affective sensitivity.”⁵⁴ This dissertation thus builds from feminist theorists, and feminist sciences studies scholars in particular, who have called attention to how imaginaries, affects, and intuitions are also products of postwar techniques,

⁵² Ghamari-Tabrizi, *The Worlds of Herman Kahn*.

⁵³ Kahn, *On Thermonuclear War*.

⁵⁴ At a 1989 corporate gathering of executives and intellectuals called “People in the Nineties,” Ogilvy discusses his earlier *Many Dimensional Man*. In the book, Ogilvy wrote against the arguments espoused by Herbert Marcuse in *One Dimensional Man* (1964)—that capitalism in advanced industrial society demands one-dimensional, rigid identities and bureaucratic hierarchies. Jay Ogilvy, *Many Dimensional Man: Decentralizing Self, Society, and the Sacred* (New York: Doubleday, 1977). Ogilvy’s 1969 dissertation—under the supervision of philosopher Paul Weiss, a doctoral student of Alfred North Whitehead’s—from Yale University, “Relations,” was a metaphysical tome dedicated to the idea that to be is to be related. See, Fosbrook, “Evolution through *Heterarchical Organization*.”

technologies, and tools of the social sciences, engineering, and military projects.⁵⁵ Like these scholars, this dissertation attunes to affects, attitudes, beliefs and disbeliefs, visions and despairs that corporate scenario planning projects both conjured and attempted to explicate.

The diverse American countercultural, environmental, and civil rights movements of “long 1960s” heightened and focused the interests of scientists and engineers toward human subjective experience and existential philosophical engagement.⁵⁶ Historians of science have indicated how diverse American countercultural movements engaged with the tools of science and technology, having an influential impact on what it meant to do science and technology in American after the 1960s.⁵⁷ As historians of technology, like Matthew Wisnioski and Cyrus Mody, have shown, critiques of technology—that argued

⁵⁵ Sarah Ahmed, “Affective Economies,” *Social Text* 22, 2, (2004): 118–39; Natasha Myers, *Rendering Life Molecular: Models, Modelers, and Excitable Matter* (Durham: Duke University Press, 2015); Joseph Masco, *The Theater of Operations: National Security Affect from the Cold War to the War on Terror* (Durham: Duke University Press, 2014); Murphy, *The Economization of Life*.

⁵⁶ On the “long 1960s” as a critical moment of tumultuous changes in divergent fields that exceeds the periodization by decade, see Jon Agar, “What Happened in the Sixties?” *British Society for the History of Science* 41, 4 (December 2008): 567-600.

⁵⁷ For example, on engineering reformers and technological change, see Matthew Wisnioski, *Engineers for Change: Competing Visions of Technology in 1960s America* (Cambridge: MIT Press, 2012); on hippies and quantum mechanics, see David Kaiser, *How the Hippies Saved Physics: Science, Counterculture, and the Quantum Revival* (New York W.W. Norton, 2011); on humanistic psychologists and the scientific study of human subjective experience that appealed to counterculturalists as well as ‘the Establishment,’ see Nadine Weidman, “Between the Counterculture and the Corporation: Abraham Maslow and Humanistic Psychology in the 1960s,” In *Groovy Science: The Counter-Cultures and Scientific Life, 1955-1975*, ed. David Kaiser and W. Patrick McCray (Chicago: University of Chicago Press, 2016), 109-134; on California feminists and reproductive technologies, see Michelle Murphy, *Seizing the Means of Reproduction: Entanglements of Feminism, Health, and Technoscience* (Durham: Duke University Press, 2012); and, on the Black Panther Party and free medical clinics, Alondra Nelson, *Body and Soul: The Black Panther Party and the Fight Against Medical Discrimination* (Minneapolis: University of Minnesota Press, 2011).

modern technology was technocratic and in service of the American military-industrial complex—as well as concerns about the proper applications of technology, animated student activists as well as scientists and engineers housed in prestigious engineering and physical science departments.⁵⁸ In *Groovy Science* (2016), historians of science David Kaiser and W. Patrick McCray acknowledge that after the “long 1960s” American science was no longer monolithically defined by militarized mainframes and missiles built in the large-scale government programs and corporate research lab, nor the pursuit of “sterile technocracy” and impersonal “Big Science.”⁵⁹ Importantly, this work collapses the division passed down from countercultural ‘guru’ Theodore Roszak between countercultural movements—assumed to be against rationality and technocracy—and scientific experimentation.⁶⁰ While meticulous when it comes to the nuances in the different strands of counterculture and science, however, these scholarly efforts are generally one-dimensional when it comes to business, relying on, as is the case in *Groovy Science*, a narrative of commodification specific to 1970s advertising articulated by Thomas Frank in his 1997 book *The Conquest of Cool*.⁶¹

Studying the history of corporate scenario planning efforts thus provides an occasion to think through the fraught relationships between American countercultural

⁵⁸ Matthew Wisnioski, “Inside ‘the System’: Engineers, Scientists, and the Boundaries of Social Protest in the Long 1960s,” *History and Technology* 19 (2003): 313-33; Cyrus CM Mody, “How I learned to stop worrying and love the bomb, the nuclear reactor, the computer, ham radio, and recombinant DNA,” *Historical Studies in the Natural Sciences* 38, no. 3 (2008): 460.

⁵⁹ Kaiser and McCray, eds., *Groovy Science: The Counter-Cultures and Scientific Life*, 2.

⁶⁰ Theodore Roszak, *The Making of a Counter Culture: Reflections on the Technocratic Society and Its Youthful Opposition* (New York: Doubleday, 1969).

⁶¹ Thomas Frank, *The Conquest of Cool: Business Culture, Counterculture, and the Rise of Hip Consumerism* (Chicago: University of Chicago Press, 1997).

ideas, technological visions, and business after 1968. As media theorist Fred Turner has shown, it was a combination of military researchers, countercultural communalist, and journalists, businessmen, and entrepreneurs that introduced new computing technologies as tools for liberation into American mainstream consumer culture of the 1990s.⁶²

However, Turner argues that it was the California countercultural and entrepreneurial figure Stewart Brand and his Whole Earth networks, including the countercultural *Whole Earth Catalog*, the online virtual community the WELL (Whole Earth ‘Lectronic Link), and *Wired* magazine, that bridged scientific researchers and their collaborative workstyles developed in World War II military laboratories with countercultural critiques of bureaucracy, “command-and-control” strategies, and hierarchy from the 1960s.⁶³ I build from Turner’s historical work while suggesting that Stewart Brand was a symptom of a much larger synergic, but also tensional, relationship between countercultural critiques from the 1960s, systems rhetoric from World War II laboratories, and business, not an origin point.

Thus, the corporate scenario planning episodes examined in this dissertation provide evidence to support historian of science Hunter Heyck’s argument that the faith in the “high modern social sciences”—a period between the mid-1950s and the mid-1970s when American social scientists predominantly approaches their subject through the language of structures within complex, hierarchical systems— “fractured” in the

⁶² Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2010).

⁶³ Turner, *From Counterculture to Cyberculture*, 31-32.

1970s.⁶⁴ Corporate planners came to scenarios methods through a general disillusionment with the tools of the high modern sciences in management and economics, tools that many corporate planners understood to have failed to deliver effective decision-making techniques for long term strategies. Many of the corporate planners were trained as “high modernists”— and many originally believed in the formal modelling of social systems and rationalizations of procedures that defined what Heyck has called the “bureaucratic worldview.”⁶⁵ Yet, when these ideals failed to adequately prepare corporations for the turbulent economic futures of the 1970s, many planners looked to alternative methods, like scenario planning.

From “Planning” to “Strategy” in Strategic Management

Strategic management, the interdisciplinary study and managerial practice of business planning and strategy formation that rose to prominence in the 1950s and 1960s in corporate planning departments, management consultancies, and business schools, plays an important role in this dissertation. This dissertation situates corporate scenario

⁶⁴ Specifically, Heyck argued that “high modern social scientists” approached their subjects “as complex, hierarchical systems defined more by their structures than by their components. They sought to construct formal models of systems behavior, and they worked with eager conviction to embody those models in computer programs and simulations,” Hunter Heyck, *Age of System: Understanding the Development of Modern Social Science* (Baltimore: Johns Hopkins Press, 2015), 198-199; Daniel Rodgers, *Age of Fracture* (Cambridge: Harvard University Press, 2011); see also, Hunter Heyck, “Leviathan and the Ink Blot: The Politics of the Mind and Its Sciences in Cold War America,” *Studies in History and Philosophy of Biological and Biomedical Sciences* 53 (2015): 117.

⁶⁵ Heyck, *Age of System*, 10-12.

planning efforts within disputes animating a split between what some called the “deliberate” school of “strategic planning” and the “emergent” school of “strategic management” in the last quarter of the twentieth century.⁶⁶ In doing so, the dissertation treats mid-to-late-twentieth century strategic management, a discipline filled with amorphous knowledge-making techniques, as a site for knowledge production worthy of consideration in the history of science. I make this claim while acknowledging that to establish concretely what constitutes strategic management is much easier said than done.⁶⁷ The business strategists that utilized corporate scenario planning techniques in the think tanks and corporate planning departments analyzed in this dissertation came from assorted intellectual backgrounds. Many trained in the physical sciences—like engineering and physics—or the social sciences—like economics, sociology, and cognitive science; however, their corporate scenario planning efforts were fundamentally interdisciplinary. Contrary to what one might assume, none of the scenario practitioners were trained in business schools, a tradition historically driven by the case method.⁶⁸

⁶⁶ Henry Mintzberg, *The Rise and Fall of Strategic Planning: Reconceiving Roles of Planning, Plans, Planners*, (New York: Free Press, 1994); Henry Mintzberg and James A. Waters, “Of Strategies, Deliberate and Emergent,” *Strategic Management Journal*, Vol. 6 (1985): 257-272; others, like business strategist Pankaj Ghemawat calls it a difference between “static” and “dynamic” thinking. See, Pankaj Ghemawat, “Evolving Ideas about Business Strategy,” *Business History Review* 90, no. 4 (2016): 736-737.

⁶⁷ Contemporary management scholars have discussed this. See, for example, Michael E. Porter, “Industrial Organization and the Evolution of Concepts for Strategic Planning: The New Learning,” *Managerial and Decision Economics*, 4, 3, Corporate Strategy (September 1983): 172-180; Bruce Ahlstrand, Joseph Lampel, and Henry Mintzberg, *Strategy Safari: A Guided Tour Through the Wilds of Strategic Management* (New York: Simon and Schuster, 2001); Pankaj Ghemawat, “Competition and Business Strategy in Historical Perspective,” *Business History Review* 76 (2002): 37-74.

⁶⁸ On the history of business school management training, see Rakesh Khurana, *From Higher Aims to Hired Hands: The Social Transformation of American Business Schools and the Unfulfilled Promise of Management as a Profession* (Princeton: Princeton University Press,

The disputes animating the field of strategic management are best articulated by the academic management theorist Henry Mintzberg's *The Rise and Fall of Strategic Planning* (1994), a widely influential book based upon a 1978 article in *Management Science* that criticized the hegemony of midcentury strategic planning efforts, defined as "a deliberate conscious set of guidelines that determine decisions into the future."⁶⁹ In turn, Mintzberg distinguished "emergent" strategic management as those techniques containing outcomes that are realized but not always intended.⁷⁰ Professor of Business Strategy Pankaj Ghemawat argues that emergent strategies—what he calls "dynamic"—are capable of informing decision-making by "both thinking through time and thinking over time."⁷¹ It is this historical conception of "emergent" strategy formation, an alternative to the shortcomings of "deliberate" approaches, that the dissertation focuses on.

Though the study of strategy followed a much longer tradition in military analysis that many trace as far back as 500 BC, corporate strategic planning has important intellectual ties to innovations in the field of interwar operations research and the early-twentieth-century study of "business policy."⁷² In the 1950s, it was General Motors chief executive Alfred Sloan that first recognized the need for a formal approach to strategy

2007); on the case method, see John Forrester, "If p, Then What? Thinking in Cases," *History of the Human Sciences* vol 9, no. 3 (1996): 1-25.

⁶⁹ Mintzberg, *The Rise and Fall of Strategic Planning*; Henry Mintzberg, "Patterns in Strategy Formation," *Management Science*, Vol. 24, 9 (May 1978): 935.

⁷⁰ Mintzberg and Waters, "Of Strategies, Deliberate and Emergent," 945.

⁷¹ Ghemawat, "Evolving Ideas about Business Strategy," 737.

⁷² Lawrence Freedman, *Strategy: A History* (Oxford: University of Oxford Press, 2013); Thomas, *Rational Action*; Ghemawat, "Competition and Business Strategy in Historical Perspective."

based upon evaluating the strengths and weaknesses of corporate competitors, like Ford.⁷³ Alfred Chandler, in his 1962 classic *Strategy and Structure*, built from Sloan's account in his history of the development of the vertically-integrated, multidivisional corporation, as he campaigned for management hierarchies to coordinate diversifications and decentralization.⁷⁴ However, as business journalist Walter Kiechel has contended, the concept of corporate strategy as an overarching explanatory framework for understanding what corporations were doing did not arise until the early 1960s as management consultants consolidated, packaged, and sold an "arsenal of concepts, techniques, tools, knowledge, practitioners, and spokesmen."⁷⁵

Former RAND mathematician Igor Ansoff, one of the originators of the field of strategic planning, offered one of the first formal definitions, one that is most traditionally associated with the work of contemporary corporate planners. In his 1965 book *Corporate Strategy*, Ansoff defined corporate strategy as a "prescriptive logical analysis of how business firms should think through their adaptation to the environment."⁷⁶ This effort was generally consolidated at the executive level of a corporation, in the aim of growth and profit. Many strategic management practitioners followed Ansoff's rational approach, believing that it was possible to systematically

⁷³ Ghemawat, "Competition and Business Strategy in Historical Perspective" 38; Alfred P. Sloan Jr., *My Years with General Motors* (New York: Currency Doubleday, 1963).

⁷⁴ Alfred D. Chandler, *Strategy and Structure: Chapters in the History of the American Industrial Enterprise* (Cambridge: MIT Press, 1962).

⁷⁵ Walter Kiechel, *The Lords of Strategy: The Secret Intellectual History of the New Corporate World* (Cambridge: Harvard Business Press, 2010), 113.

⁷⁶ H. Igor Ansoff, *Corporate Strategy: An Analytical Approach to Business Policy for Growth and Expansion* (New York: McGraw-Hill, 1965), 13.

anticipate future threats and opportunities from a flexible, but ultimately knowable and controllable, business environment. In the 1960s, predominantly quantitative planning and forecasting models, theories, and techniques emerged claiming to better enable corporations to stay competitive amidst complex technological changes and diversification efforts through “analytical steps.”⁷⁷ Techniques included those from Harvard Business School Professor Francis Aguilar’s *Scanning the Business Environment* (1967), which taught managers how to scan the business environment made up of economic, technical, political, and social factors that impacted future business operations.⁷⁸ By the 1960s, managers were also trained to analyze the “strengths” and “weaknesses” (what many called “its distinctive competitiveness”) with the “opportunities” and “threats” the company faced in the business environment, a framework that came to be called SWOT.⁷⁹ Others used proprietary tools sold by management consulting companies—like the popular Boston Consulting Group growth-share matrix—to plot potential investments on a two-by-two matrix for easy comparison.⁸⁰ In the mid-1960s, the energy and petrochemical company Shell developed their own sophisticated financial forecasting systems, Unified Planning Machinery

⁷⁷ Ghemawat, “Competition and Business Strategy in Historical Perspective,” 4; Ansoff, *Corporate Strategy*.

⁷⁸ Francis Aguilar, *Scanning the Business Environment* (New York: Macmillan, 1967).

⁷⁹ Ghemawat, “Competition and Business Strategy in Historical Perspective.”

⁸⁰ Ghemawat, “Competition and Business Strategy in Historical Perspective,” 46. On the history of management consulting in the United States and Europe, see Matthias Kipping, “American Management Consulting Companies in Western Europe, 1920 to 1990: Products, Reputation, and Relationships,” *Business History Review* 73, 2: 190-220; Christopher Mckenna, *The World’s Newest Profession: Management Consulting in the Twentieth Century* (Cambridge: Cambridge University Press, 2006).

(UPM), an embodiment of system thinking, that attempted to capture an entire succession from oil extraction to consumer gas delivery into single-lined financial predictions.⁸¹ It was discarded after less than five years in operation.

When science studies scholars and historians of science have attended to twentieth century corporate planning techniques in their investigations, they have generally focused on what many consider strategic planning techniques.⁸² These include techniques of planning, budgeting, and financial forecasting, all based on the idea that future direction could be controlled by original plans. Or they have focused on particular efforts that relied upon quantification and rational analysis as means of management. They emphasized the role of the computer and centralized command and control models that prized quantification and rational analysis.⁸³ The central goal of this approach to planning is based on a well-known assumption explored in the history of science and science studies, summed up by the management theorist Henry Mintzberg: “the messy

⁸¹ Pierre Wack, “Scenarios: Uncharted Waters Ahead,” *Harvard Business Review* (Sept. 1985): <http://hbr.org/1985/09/scenarios-uncharted-waters-ahead>.

⁸² For example, the role that the “closed,” inflexible systems of Taylorism of the early twentieth century played in management has been well-covered. See, for example, JoAnne Yates, *Control Through Communication: The Rise of System in American Management* (Baltimore: Johns Hopkins University Press, 1989). Others have examined the rise of quantification in insurance, accounting, and cost-benefit practices in the twentieth century. See, Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995); More recently, contemporary modelling of financial markets has been subjected to scrutiny. See, for example, Donald Mackenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge: MIT Press, 2006).

⁸³ Others have examined the role that computers played in imagining the “open” systems of cybernetic management of the midcentury as they sought to use flexible mathematical models as management strategies. On corporate cybernetic management, see Andrew Pickering, “Stafford Beer: From the Cybernetic Factory to Tantric Yoga,” in *The Cybernetic Brain: Sketches from Another Future* (Chicago: University of Chicago Press, 2010); on Beer’s national utopian cybernetic projects, see Eden Medina, *Cybernetic Revolutionaries: Technology and Politics in Allende’s Chile* (Cambridge: MIT Press, 2011).

world of random noise, gossip, inference, impression, and fact must be reduced to firm data, hardened and aggregated so that they can be supplied regularly in digestible form.”⁸⁴



Call an informal retreat “planning,” let conventional planners organize it, and watch how quickly the event becomes formalized.

Figure 1. The Fall of Strategic Planning⁸⁵

Generally, however, science studies scholars have overlooked the internal critiques from corporate strategists and corporate executives of the “deliberate” approach in the mid-to-late twentieth century. As such, we have failed to notice that many late-twentieth century corporate strategists were not only aware of the critiques of various strategy tools as “technologies of rationality,” many have waged their own challenges to

⁸⁴ Mintzberg, *Strategy Safari*, 69.

⁸⁵ Henry Mintzberg, “The Fall and Rise of Strategic Planning,” *Harvard Business Review* (January-February 1994), 108.

the centrality of rationality and the hegemony of calculative strategies in long-term decision-making.⁸⁶ Disillusionment with strategic planning efforts appeared in the writings of corporate planners in the early 1970s as many were able to see the failures more than successes.⁸⁷ Others acknowledged the ability to control one's future direction as an illusion, as most strategies and successes could only be articulated in hindsight.⁸⁸ Among corporate planners, critiques also existed of strategic planning tools from the Department of Defense that spread to American government and corporate efforts, including Robert McNamara's infamous Planning-Programming-Budgeting System (PPBS)—an analytic technique introduced in 1961 that promised to rationalize budgeting cost-benefit process and decision-making through systems analysis—that corporate strategists like Mintzberg partially blamed for the failures of the Vietnam War.⁸⁹ Instead of offering command-and-control strategies, corporate scenario planners aimed to set the context of the decision-making process through stories about what the future could look like. By situating corporate scenario planning in the school of emergent strategy, the dissertation aims to demonstrate how corporate scenario planning methods and epistemological strategies in science studies are not as distant as imagined.

⁸⁶ For example, James March, "Rationality, Foolishness, and Adaptive Intelligence," *Strategic Management Journal* 27 (2006): 201-214.

⁸⁷ Mintzberg, *The Rise and Fall of Strategic Planning*; Also, Arie de Geus, *The* 184.

⁸⁸ Kees van der Heijden, *The Art of Strategic Conversation* (New York: John, Wiley & Sons, 1996), x.

⁸⁹ Mintzberg, *The Rise and Fall of Strategic Planning*, 98-99, 119-121; Also, de Geus, *The Living Company*, 184. On the history of the Department of Defense's Planning-Program-Budgeting System, see Stephanie Caroline Young, "Power and the Purse: Defense Budgeting and American Politics, 1947-1972," PhD dissertation, University of California Berkeley, 2009.

Alternative Futures

Scenarios, also called “alternative futures,” and in other places “alternative worlds” or “future histories,” were collections of “plausible” stories meant to “describe in more or less detail some hypothetical sequence of events.”⁹⁰ They are internally consistent narratives about not what the world *will* look like, but what the world *could* look like in the future. Sometimes, the narratives organized around uncertain elements by asking “what if?” in order to articulate different future pathways that might unfold. Before the mid-1960s, scenarios were used primarily for the uncertain and threatening American political-military efforts closely associated with the RAND Corporation. However, by the mid-1970s, scenarios were embraced and reformulated by corporations in order to support their competitive strategy efforts.

Scenarios have been defined in many ways. Starting in the late 1950s at the RAND Corporation, analysts introduced the production of scenarios as one way to generate “relatively plausible contexts” in the considerations of “future weapons” and “war-fighting strategies” that were overlooked by the prevailing quantitative methodologies of the period, including but not limited to game theory, Monte Carlo simulations, and probabilistic forecasts.⁹¹ Former Global Business Network scenario practitioner Peter Schwartz defined scenarios as “a tool for ordering one’s perceptions about alternative future environments in which one’s decisions might be played out.”⁹²

⁹⁰ Kahn, “A Paradigm for the 1965-1975 Debate,” 77.

⁹¹ Kahn, “A Paradigm for the 1965-1975 Debate,” 77.

⁹² Peter Schwartz, *The Art of the Long View: Planning for the Future in an Uncertain World* (New York: Currency Doubleday, 1991), 45; also, Thomas Chermack, *Scenario Planning in*

And former Shell planners Angela Wilkinson and Roland Kupers suggest: “Scenarios maintain the future as an open, but not an empty space, where facts, expectations, and perceptions intermingle, and a combination of critical, creative, and analytical thinking is essential.”⁹³

While recovering one history of scenario planning, I seek neither to rescue corporate techniques nor industrial interests from the wrath of critical historians and critical theorists and their social and political critiques. I take seriously such assessments: the long-standing violence of calculative—and non-calculative—techniques in corporate structures continues. While corporate power and dominance are difficult to underestimate, so is it too easy to cast all corporate techniques, and the associated imaginaries and practitioners, within the well-worn theoretical molds attaching naïve scientism to industrial and capitalistic interests under the shadows of the closed world of the last half of the twentieth century. Corporate scenario planning efforts were not singularly about commanding and controlling futures through the authority of science to sustain industrial interests or free markets, or to reinforce racial and economic inequalities, though perhaps, it did not challenge such efforts either. It was also an attempt to enable organizations to understand and explore uncertainty, which meant preparing unsuspecting executives to think differently about future growth, technological change, politics, and social values. In building alternatives, corporate strategists pulled together a multitude of contradictory techniques that have yet to be fully grappled with by historians.

Organizations: How to Create, Use, and Assess Scenarios (San Francisco: Berrett-Koehler Publishers, Inc., 2011), 14.

⁹³ Ramirez and Wilkinson, *Strategic Reframing: The Oxford Scenario Planning Approach*, 13.

This is especially important as science studies scholars turn their attention towards alternative futures in an age of financial and ecological crisis. Our hesitation—as critical historians of science and science studies scholars— towards an association with the sciences of war and/or the dynamics of capitalism, and the instrumentality and alienation they exert, is one of the reasons for such caricatures. We, as historians and critical scholars, excel at imagining ambitious corporate strategists violently wielding the tools of scientism against our futures in search of profit. But such exaggerations block us from dealing with our strange, entangled bedfellows. I am inspired by critical theorist Maggie Nelson’s suggestion that critical positioning be opening, as opposed to the rigidities that often follows this line of intellectual study.⁹⁴ Regardless, where many historians struggle is in piecing together complicated analyses that do justice to the power dynamics and the diverse techniques and imaginaries involved. Corporate scenario planning efforts occasions just such a rethinking.

Method and Organization

This dissertation does not tell the entire and definite history of corporate scenario planning. As scenario practitioners Angela Wilkinson and Rafael Ramirez explain, scenario planning can mean many different things to different organizations: approaches, techniques and methods, and intellectual inspirations, are varied, fragmented across time

⁹⁴ Like her, however, I fear *openness* is not strong or critical enough to sustain important scholarship. Maggie Nelson, *The Argonauts* (Minneapolis: Graywolf Press, 2015).

periods, intellectual communities, and industries.⁹⁵ Unlike many other scientific or planning professions, there are no professional qualifications required to conduct scenario planning, and there are no formal organizations dedicated to vetting the work of scenario planners.⁹⁶ With this, there is also considerable dispute over what constitutes effective scenario planning, a debate this dissertation does not engage in.⁹⁷ Instead, I focus on three distinct, yet interrelated, “historical episodes” in corporate scenario planning’s history that highlight the wide range of contradictory intellectual influences brought together through this corporate technique—at the Hudson Institute in the 1960s and early 1970s, Stanford Research Institute in the late 1960s and 1970s, and Shell in the mid-1970s to the 1980s.⁹⁸ Expanding historian of science Joel Isaac’s term, I use “interstitial corporation” to describe these liminal intellectual spaces between institutional and disciplinary environments and corporations beginning in the mid-century that gave rise to corporate scenario planning techniques.⁹⁹ In my analysis I pay attention to the methodological considerations, and do not focus on debunking, in order

⁹⁵ Ramirez and Wilkinson, *Strategic Reframing: The Oxford Scenario Planning Approach*, 5-6.

⁹⁶ Ramirez and Wilkinson, *Strategic Reframing: The Oxford Scenario Planning Approach*, 5

⁹⁷ For a discussion of scenario effectiveness, see Chermack, *Scenario Planning in Organizations: How to Create, Use, and Assess Scenarios*.

⁹⁸ Thomas, *Rational Action*.

⁹⁹ I build from Joel Isaac’s use of “interstitial academy” to describe the importance of clubs, societies, seminars, and academic disciplinary ventures in the human sciences and not just the classroom surrounding Harvard in the midcentury. But I offer that corporate intellectual spaces, including corporate research think tanks, planning department, executive retreats, corporate-sponsored conferences after the midcentury also provided important places for the proliferations of epistemologies in the amorphous human sciences. Joel Isaac, *Working Knowledge: Making the Human Sciences from Parsons to Kuhn* (Cambridge: Harvard University Press, 2012), 23.

to see the grand aims of the diverse corporate scenario strategists, as well as their nuances and contradictions.¹⁰⁰

The dissertation is a study of the *techniques* of corporate scenario planning. However, by techniques I do not mean to confine the investigation to the norms of experimental practice from laboratory science or the empirical, rule-bound procedures of technological experimentation from science studies and the history of science.¹⁰¹ Nor is this a study of how specific scenarios were utilized by corporations.¹⁰² Instead, this dissertation examines the “methodological” techniques of scenario planning.¹⁰³ That is, this dissertation is a study of how corporate scenario planners framed the methods of scenario planning.¹⁰⁴ Though corporate scenario planning was first and foremost a

¹⁰⁰ I follow historian of science Rebecca Lemov, who suggests that methodological considerations offer a “combinatory” view of grand theories and day-to-day practices that are lost in debunking projects. Rebecca Lemov, “Hypothetical Machines: The Science Fiction Dreams of Cold War Social Science,” *Isis*, 101, no. 2 (June 2010): 403, 405; this is similar to Robert K. Merton’s “middle range theories.” See, for example, Robert Merton, *Social Theory and Social Structure* (New York: Simon and Schuster, 1968), 5.

¹⁰¹ On experimental practices and scientific knowledge, see for example, Steven Shapin and Simon Shaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985). Though this dissertation inspired by the practice-oriented approach to the study of scientific knowledge—where practices are understood to be the material cultures and experimental procedures of science—scenario planning is first and foremost a theoretical technique. This method demands a more expanded scope than is traditionally understood to constitute material practices.

¹⁰² To undertake an investigation of how scenario techniques were used by corporations would require written descriptions of how corporations used the stories provided by corporate scenario planners, something that is restricted due to archival access.

¹⁰³ For an investigation of how “methodological thought” became a primary concern of the Cold War social sciences, see Lemov, “Hypothetical Machines: The Science Fiction Dreams of Cold War Social Science.”

¹⁰⁴ Joel Isaac has argued that doing “theory” is a kind of “social practice” rather than “a web of beliefs, a set of mental states, or a linguistic repertoire (bearing in mind that theories are things too).” Moreover, he asserts that “social practices” are unwieldy; they are “caught up in worldly, quotidian matters: performances, compartments, training regimes, and so on...” Joel Isaac,

theoretical technique for creating sets of stories, scenario planners were meticulous in their articulation of the process of how one could make knowledge about uncertain futures. These methodological considerations contain important “epistemological narratives” that were integral to the technique: they helped scenario planners to identify and legitimate themselves and their speculative methods.¹⁰⁵ In the analysis, I focus on a range of social practices in order to understand how the techniques of scenario planning helped to give shape and coherence to corporate scenario planners’ commitments to anti-positivism: the narratives about their epistemological methods—including the related citational practices and pedagogical training in how scenarios were to be performed; gatherings within the “interstitial corporation”; and performances.

By use of dispersed published and archival records, as well as interviews, this dissertation aims to recover corporate scenario planning techniques that developed across an array of think tanks, consulting firms, and multinational corporations through a diverse group of researchers. This effort to historicize corporate scenario planning has been made difficult by organizations that prefer to commission their own internal histories, and often deny scholars entry into their archives. I consulted hundreds of boxes of Hudson Institute archival material—including letters, memos, transcripts, conference and presentation agendas, financial statements, meeting notes, and paper drafts—that are

“Tangled Loops: Theory, History, and the Human Sciences in Modern American,” *Modern Intellectual History*, 6, 2 (2009), 400, 416.

¹⁰⁵ This follows Joel Isaac’s argument that the theoretical practices of “subcultural embodiment”—defined as the techniques “whereby a given theoretical paradigm is embodied in an array of subcultural elements” such as “proofs, epistemological narratives, and training regimes”—were used to legitimate “conceptual schemes.” Epistemological narratives are techniques that help to solidify modes of thinking. Isaac, “Tangled Loops: Theory, History, and the Human Sciences in Modern American,” 424.

housed, though only partially catalogued, at the National Defense University in Washington, D.C. I also reviewed archival materials, like electronic correspondence, articles, and paper and conference drafts, on Stanford Research Institute and Shell in Special Collections at Stanford University, that were dispersed in the uncatalogued Global Business Network papers, as well as the personal collections of Steward Brand and Fred Turner. The most extensive collection on corporate scenario planning is housed at the Oxford Futures Library at Saïd Business School at the University of Oxford, a collection that contains the personal files of Shell scenario planner Pierre Wack and the business journalist Art Kleiner. Some archival sources came from the personal collections housed in dusty basements and garages of corporate scenario planners and their family members, especially to fill in the holes of Stanford Research Institute's futures ventures and Shell's Group Planning efforts, a generous gesture for which I am grateful.

The body of the dissertation begins with Chapter Two, "The Paradigmatic Scenario." This chapter articulates the early history of scenario techniques. It tracks how Herman Kahn and the think tank the Hudson Institute modified scenarios from national thermonuclear defense strategy and presented them as advantageous to larger analyses of future economic, social, and political phenomena that gained popularity in the business world in the late 1960s. Instead of using high-speed computers in forecasting or operations research, the Hudson Institute concentrated on producing collections of narrative scenarios: explicit synoptic frameworks of alternative future worlds from technocratic fantasies to post-apocalyptic nightmares, and worlds in-between. These scenarios came in the form of consistently modified sets of charts, and took shape

through Kahn's free form, staccato presentations in isolated executive retreat centers. Secondly, I campaign for a more complex portrait than Cold War rationality by tracing the way that sociologist of science Robert Merton's paradigm guided the creation of scenario methods for Kahn.

Starting with Kahn's earlier methodological reservations about the limits of computing techniques to adequately formulate problems at RAND, this chapter argues that the objective of early scenarios was primarily methodological, rooted in military planning, and yet, substantiated by non-calculative sociological strategies and epistemological concerns shared by early work in the sociology of science. Hudson Institute's scenarios differed from calculative forecasts and simulations; they were a kind of speculative sociological technique specific to the second half of the twentieth century. In this, scenario planning broadens the historiography of the Cold War rationality. While scenarios emerged out of the ideological struggles of Cold War deterrence strategy in American defense-related think tanks, they were importantly animated by a critical sense of the limitations of computing techniques to adequately calculate social and political conditions. Kahn sought to develop scenarios as heuristic tools capable of flexibly modelling conceivable behaviour. It was as much a reaction to the closed and mechanistic systems of forecasting tools as it was a response to the 'ideological' anti-Establishment critiques from the New Left. The chapter demonstrates how at the end of the 1960s, Kahn and the Hudson Institute expanded the scope of scenarios, building on their unexpected popularity in the business world, as corporate leaders, anxious about the major social transformations and technological disruptions of the period, were interested in ways to think strategically about the uncertainties of the long-term future.

Chapter Three, “The Transcendental Scenario,” concerns the development of alternative futures by Willis Harman and associates at Stanford Research Institute starting in 1967. Specifically, it looks at the way that corporate scenario planning at SRI emerged from Harman’s alternative futures research, which drew diverse countercultural mystical and psychedelic epistemologies together with rationalist mathematical engineering methods typically associated with midcentury corporate planning.

In doing so, the chapter puts forward two arguments, one central to the development of the larger dissertation on the history of corporate scenario planning, the other a modest disciplinary claim in conversation with the field of science studies. First, the chapter contends that corporate scenario planning constitutes a more extensive gathering of genealogies, including LSD experimentation, parapsychology, and “Eastern” philosophy, than are typically associated with mid-to-late twentieth century corporate techniques. In this, SRI’s scenario techniques provides an example of the way the “rationalities” of mid-to-late twentieth century corporate strategy were created through diverse and contradictory genealogies that exceed the normative sense of calculative rationality understood by the history of science. Secondly, corporate scenario planning developed in conversations with postwar critiques of science and technology, epistemologies that animated the early history of science studies as well as business strategy. That is, critiques of technoscience arose from business leaders and bureaucrats that were struggling to deal with the unintended consequences of industrialization beginning in the late 1960s, pointing to a more entangled and complex portrait of the legacies of the discipline of science studies.

Chapter Four, “The Reperceptive Scenario” highlights how the rising industry of “thought leadership” journalism of the late twentieth century transformed beliefs about the multinational energy and petrochemical company Shell’s scenario planning methods from the 1970s, and was a significant contributor to the technique’s contemporary legitimacy in the field of strategic management. In the competitive business environment of the late-twentieth century, one increasingly driven by the newest, most ‘innovative’ ideas, multinational corporations like Shell increasingly relied upon the “charismatic authority” in situations where the way forward was unknown. By identifying the importance of what historian of science Steven Shapin calls the “personal equation” in contemporary corporations facing “radically uncertain futures,” the chapter shows how corporate scenario planning exceeds conventional understandings in the history of postwar science of impersonal planners who sought to operationalize calculative rationality.¹⁰⁶ However, as this chapter demonstrates, the “charismatic authority” of visionary “thought leader” scenario planners like Pierre Wack was produced and promoted by a financially-endowed business publishing industry that was invested in the selling the success of corporate scenario techniques even though a direct connection to Shell’s improved strategy or financial success was questionable.

The conclusion “Learning from Corporate Scenario Planning,” examines how post-structural theories of biological and machinic organization from the mid-1980s, often taken up by critical science studies theorists, were also used by the California-based management consulting company Global Business Network as they, along with Shell, sought to theorize scenario planning efforts. Specifically, the conclusion utilizes the case

¹⁰⁶ Shapin, *The Scientific Life*, 10.

of scenario planning at a series of meetings called the Learning Conferences to trace the considerable shared intellectual resources among the leading edge of late-twentieth century corporate planners and critical biological theorists. The explanatory frameworks of symbiotic Gaia theories of James Lovelock and Lynn Margulis, and the autopoietic organizational theories of Francisco Varela, for example, were welcomed by corporate scenario planners. This is more than a case of shared theoretical texts: many of these academics were enrolled as consultants to guide corporate strategists in nothing short of a reconceptualization of the nature and process of corporate strategy. In this, concepts like the Gaia hypothesis and autopoiesis, used as contemporary methods of challenging dominant modes of thinking in science and technology studies, and positioned as a struggle against capitalism, were also crucial metaphors in planning debates in late-twentieth century corporate strategy. The conclusion uses these late-twentieth century entanglements as invitations to critically engage with critical theories of science studies, which includes their uncomfortable connections with corporations. The distance between corporate scenario planning techniques and counter-epistemologies in science studies are not as expansive as we may have imagined.

CHAPTER 2:

THE PARADIGMATIC SCENARIO

In the early days at RAND most studies involved an attempt to find the “optimum” system, given some reasonably definite set of circumstances, objectives, and criteria. The emphasis was on comparing thousands, sometimes tens of thousands, of different systems under idealized conditions; then the “best” one would be picked... Naturally the high-speed computer often played a central role in all this.

Sometimes our researchers took a curious pride in the prowess of their high-speed computers. They would make such remarks as, “More than a million campaign calculations went into this analysis.” Or, “This is the first analysis done by man in which 10,000,000 multiplications were made.” Or even a more extreme boast, “These results came out of a complicated calculation performed by the most modern of high-speed computers using the most advanced mathematical techniques available. Do you want to argue with an electronic machine backed up by all the resources of modern science?”

The only possible answer to that question is, “Yes.”

-Herman Kahn ¹

In a 1957 RAND Corporation survey of systems analysis techniques, part of a draft tentatively titled *Military Planning in an Uncertain World*, Herman Kahn and Irwin Mann asked defense analysts to distinguish between two very different types of uncertainty. “Statistical uncertainty” was not the problem for military strategists; it was amenable to quantitative calculations because it pertained “to fluctuations phenomena and random variables.”² The larger barrier to enhancing military decision-making was the more problematic “real uncertainty.” Real uncertainty was the result of diverse “assumptions” and “objectives” that made probabilistic calculations impossible.³ Put a different way: statistical uncertainty is quantified by mathematical tools; real uncertainty falls outside the tools’ parameters and capabilities. Analysts, Kahn and Mann argued, needed to develop alternative approaches to deal explicitly with the inherent uncertainties in the ways people differently valued, for example, “categories of human lives, such as civilian and military, or friendly, neutral, and enemy.”⁴ This was, even to RAND analysts, incalculable. By the early-1960s, Kahn had moved from the RAND Corporation

¹ Kahn, *On Thermonuclear War*, 119; also R. John Williams, “World Futures,” *Critical Inquiry* 42, no. 3 (March 2016): 482.

² Herman Kahn and Irwin Mann, “Techniques of Systems Analysis” (Santa Monica: Rand Corporation, 1956), http://www.rand.org/pubs/research_memoranda/RM1829-1.html, 158.

³ Kahn and Mann, “Techniques of Systems Analysis,” 158.

⁴ Kahn and Mann, “Techniques of Systems Analysis,” 159.

to the think tank the Hudson Institute, and had developed what he argued was one of the most well-equipped methods for “muddling through” real uncertainty: the production of “scenarios.”⁵

(2) Real Uncertainty. This is the uncertainty that arises from the fact that people believe different assumptions, have different tastes (and therefore objectives), and are (more often than not) ignorant. It has been argued by scholars that any single individual can, perhaps, treat this uncertainty as being identical to the statistical uncertainty mentioned above, but it is in general impossible for a group to do this in any satisfactory way.¹

**Figure 2. “Real Uncertainty,” in
Herman Kahn and Irwin Mann, “Techniques of Systems Analysis”⁶**

Scenarios, according to Herman Kahn, were collections of “plausible” stories meant to “describe in more or less detail some hypothetical sequence of events.”⁷ They

⁵ Kahn liberally used the concept of “muddling through” to describe the work he was doing: “I am not issuing the term “muddling through” in a derogatory sense. As I understand it, the behavior describes by this term means to wait until one can see the problem clearly and then adopt a pragmatic and undogmatic approach in working out methods of solving it after it has been clearly formulated,” Kahn, *On Thermonuclear War*, 575; Kahn, “A Paradigm for the 1965-1975 Debate,” 77.

⁶ Kahn and Mann, “Techniques of Systems Analysis (Santa Monica: RAND Corporation, 1956), 158.

⁷ Kahn, “A Paradigm for the 1965-1975 Debate,” 77.

attempted to answer two questions: "1.) Precisely how might some hypothetical situation come about, step by step? [and] 2.) What alternatives exist, for each actor, at each step, for preventing, diverting, or facilitating the process?"⁸ Starting in the late 1950s at the RAND Corporation, analysts introduced the production of scenarios as one way to generate "relatively plausible contexts" in the considerations of "future weapons" and "war-fighting strategies" that were overlooked by the prevailing quantitative methodologies of the period, including but not limited to game theory, Monte Carlo simulations, and probabilistic forecasts.⁹ Scenarios were not predictions, and there were not confined to "doomsday" worst-case scenarios.¹⁰ Rather, at their base, they were narrative articulations of "what if?" pushed to the furthest degree of plausibility.

Herman Kahn made a name for himself at RAND with his audacious *On Thermonuclear War*, a 668-page argument detailing how thermonuclear war was not only possible, but also survivable. It became a bible for defense analysts in the early 1960s, signaling a larger shift in military strategy from the authority of decorated generals to that of civilian "analysts" with an assortment of academic credentials in fields from mathematics, computer science, and sociology.¹¹ Historian Sharon Ghamari-Tabrizi

⁸ Herman Kahn and Anthony J. Wiener, *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (New York: Macmillan, 1967), 6.

⁹ Kahn, "A Paradigm for the 1965-1975 Debate," 77.

¹⁰ Kahn's chapter "Will the Survivors Envy the Dead?" in his 1960 *On Thermonuclear War* is the most cited example of "doomsday" scenarios. The history of Kahn's apocalyptic worst-case scenarios has been well-examined. For a prime example of a more nuanced history, see Ghamari-Tabrizi, *The Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War* (Cambridge: Harvard University Press, 2005).

¹¹ Ghamari-Tabrizi, *The Worlds of Herman Kahn*.

has called Kahn a “visionary of the thermonuclear era.”¹² As anthropologist Joseph Masco has argued, a key accomplishment of the American Cold War military complex were imaginaries of planetary destruction aimed at producing affective states.¹³ A special assistant to the Secretary of Defense once remarked: “we at the Department of Defense have been living off the intellectual capital accumulated by Herman Kahn.”¹⁴ It was no secret that both military generals and IBM executives went to Hudson Institute’s pricey lecture-seminars to see Herman Kahn’s charismatic scenario briefings on topics from geopolitical trends to changing values.¹⁵ *New York Times* journalist Richard Kostelanetz described Hudson Institute as a “one-man think tank.”¹⁶ And, Herman Kahn was called by the *LA Times* the “guru of his very own Hudson Institute.”¹⁷

At RAND, Kahn’s flamboyant and ebullient presentations interwove “rationalist” methodologies made up of structural charts and pragmatic principles traditionally associated with interdisciplinary Cold War research centers with, as Sharon Ghamari-Tabrizi has put it, a “self-consciously avant-garde sensibility.”¹⁸ It was at RAND that the energies of creative intellectuals like Herman Kahn gained traction in the face of the

¹² Ghamari-Tabrizi, *The Worlds of Herman Kahn*, 1.

¹³ Masco, *The Theater of Operations*.

¹⁴ Arthur Herzog, “Report on a ‘Think Factory,’” *New York Times Magazine* (10 November 1963): 12.

¹⁵ William McWhirter, “I am one of the 10 most famous obscure Americans,” *Life* (6 December 1968): 110.

¹⁶ Richard Kostelanetz, “One-man think tank,” *New York Times Sunday Magazine* (1 December 1968).

¹⁷ James Real, “RAND vs. the Urban Crisis,” *Los Angeles Times* (30 June 1968): 20.

¹⁸ Ghamari-Tabrizi, *The Worlds of Herman Kahn*, 55.

anxieties surrounding the unreal possibility of nuclear annihilation. Before the mid-1960s, scenarios were used primarily for political-military speculation on war escalation closely associated with the RAND Corporation. This was the case when Kahn broke away from RAND in 1961, and started the Hudson Institute, along with defense analyst Max Singer and MIT mathematician Donald Brennan.

Financed by contracts from the federal government and private industry donations, the think tank pitched their narrative-based approach to “thinking about the unthinkable” to audiences outside of the military establishment. The unknowable character of the future was a significant problem for postwar military strategists as well as business strategists. During the 1960s, Hudson Institute consulted with a diverse range of clients, from educational policy government agencies to the Department of Defense, NASA, and Stanford Research Institute; from US-based corporations like General Motors to multinational corporations like Shell.¹⁹ When the Hudson Institute started, they were one of numerous “think factories” that banked on the intellectual capital defense

¹⁹ Douglas Martin, “Anthony J. Wiener, Forecaster of the Future, Is Dead at 81,” *The New York Times* (26 June 2012), <http://www.nytimes.com/2012/06/27/us/anthony-j-wiener-forecaster-of-the-future-is-dead-at-81.html>.

analysts gained directly after WW2.²⁰ These efforts were part of a larger tradition started by RAND of attempting to reframe war strategies for use by business executives.²¹

In May of 1964, Hudson Institute inaugurated their Futures Program, widening their focus from defense studies to broader and more long-range economic, social and political contexts. For example, in one three-hour presentation to the managing directors of the construction company Bechtel Corporation, topics included changing values (including anti-institutionalism and the rise of humanism), technological crises that might hinder growth, the increasing influence of Japanese business, and the importance of the decentralized organizational structures of multi-national corporations.²² Hudson presented their scenarios as an important integrative context within which to consider corporate planning: a global view that considered a world economy in an interconnected

²⁰ In addition to futures work, Hudson also forayed into the world of economic development in Angola, Thailand, France, Columbia and New York. The Hudson Institute was also responsible for projects ranging from the more sinister “flying think tank” approach that was commissioned by Portuguese government to bolster colonialism to the more aspirational proposal to redevelopment New York’s “Welfare Island,” claiming to provide affordable apartments for all classes of people. In Columbia, they planned construction of an audacious ocean-to-ocean passage and power generating waterway between the Pacific and the Caribbean. Defense contracts continued in the face of Vietnam and the controversies over anti-ballistic (ABM). Paul Dickson, *Think Tanks* (New York: Ballantine Books, 1971), 99; Neil Pickett “A History of Hudson Institute,” (Croton-on-Hudson: Hudson Institute, 1992): 10-11; Bowen Northrup, “They Think for Pay,” *Wall Street Journal* (20 September 1967).

²¹ Sharon Ghamari-Tabrizi has argued that RAND’s 1950s advertisements in *Fortune* originally exposed businessmen to the merits of systems analysis. Ghamari-Tabrizi, *The Worlds of Herman Kahn*, 56; Journalist John McDonald also wrote an optimistic 1951 article in *Fortune* “The war of wits.” McDonald saw in the first postwar think tank’s scientific analysis of war opportunities for business: “For any given sum of money and any particular division of this money, and for any particular choice of design characteristics of the weapon, an imaginary war is ‘fought’ and the damage to targets is computed according to the payoff chosen for the study.” John McDonald, “The war of wits,” *Fortune* (1 March 1951): 158, 152. On the more general topic of the mid-century militarization of the social sciences, see Joy Rohde’s *Armed with Expertise: The Militarization of American Social Science Research During the Cold War* (Ithaca: Cornell University Press, 2013).

²² Letter from Ashton J. O’Donnell, Manager of Business Development for Bechtel Corporation to Herman Kahn, 26 April 1971. Hudson Institute Archive, National Defense University.

global society. For a fee between \$5,000 and \$25,000 corporations could join the Futures Program, gaining access to reports, newsletters and seminar courses dedicated to the exploration of the future through scenario methods.²³ In the first year, clients included Corning Glass International, International Defense Analysis, International Business Machines Corporation, Lockheed, and Sprague Electronic.²⁴

This chapter articulates the early history of scenario techniques.²⁵ It tracks how the Hudson Institute modified scenarios from American thermonuclear defense strategy

²³ “Futures Program” brochure, Hudson Institute, 1964, Hudson Institute Archive, National Defense University.

²⁴ Memo from Felix Kaufmann, head of the Futures Program at Hudson Institute to James J. Ling, Ling-Temco-Vought, 21 May 1964, Hudson Institute Archive, National Defense University.

²⁵ Herman Kahn’s contribution to the field of scenario planning as a way to “think about the unthinkable” has been well-documented. See Roland Krupers and Angela Wilkinson, *The Essence of Scenarios: Learning from the Shell Experience* (Amsterdam: Amsterdam University Press, 2014); Peter Schwartz, *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company* (New York: Currency Doubleday, 1996); Art Kleiner, *The Age of Heretics: Heroes, Outlaws, and the Forerunners of Corporate Change* (New York: Currency Doubleday, 1996). This is most often limited to a sentence or two acknowledging Kahn. These superficial acknowledgements, however, overlook Kahn’s larger project and intellectual aspirations. These studies acknowledge Kahn’s military scenarios at RAND and neglect to mention Hudson Institute’s transition to business scenarios at the end of the 1960s, including the popular “Corporate Environment Study” that began in 1969.

Many of the canonical scenarios from the 1970s from this dissertation, including Royal Dutch/Shell (Chapter 4) and Stanford Research Institute (Chapter 3), for example, were originally produced by Hudson Institute, including the famous “Belle Epoque,” a scenario for 1975-1985 that was described as a world “duplicating in growth and spirit the decade before World War I which experienced such a rise in international communication, capital flow and world trade in an era of relative peace.” Herman Kahn and Leon Martel, “Corporate Environment Study” Research Memorandum #5 “Hudson Standard World #1, September 1974, 6, Hudson Institute Archive, National Defense University.

Additionally, historians of science and technology have examined the postwar efforts to quantify complex social and political phenomena as simplified technical equations in fields such as operations research, linear programming, and game theory. Historians of science Lambert Williams and William Thomas have named this approach, one they identify as being misguided, as “technologist-as-“world controller.”” Yet, there has been no sustained inquiry into how the non-calculative methods of producing scenarios developed and moved from war planning to corporate planning. See Lambert Williams and William Thomas, “The Epistemologies of Non-Forecasting Simulations, Part I: Industrial Dynamics and Management Pedagogy at MIT”, *Science in Context*

and presented them as advantageous to larger analyses of future economic, social and political phenomena for governments, and then, multinational corporations.²⁶ Instead of using high-speed computers in forecasting or operations research, the Hudson Institute concentrated on producing collections of narrative scenarios: explicit synoptic frameworks of alternative future worlds from technocratic fantasies to post-apocalyptic nightmares, and worlds in-between. These scenarios came in the form of consistently modified sets of charts and fragmented, rapid-fire presentations. Though Kahn was explicit that he “made them up,” scenarios drew on unexpected sources, including the qualitative methodological considerations of sociologist of knowledge and science Robert K. Merton’s paradigm.²⁷

Starting with Kahn’s earlier methodological reservations about the limits of computing techniques to adequately formulate problems at RAND, this chapter argues that the objective of early scenarios was primarily methodological, rooted in military planning, and yet, substantiated by non-calculative sociological strategies and

22, no. 02 (June 2009): 248. See also: Paul Erickson, *The World that Game Theorists Made* (Chicago: University of Chicago Press, 2015); Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge: MIT Press, 1997); Erickson et. al, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality*; Phillip Mirowski’s *Machine Dreams: Economics Becomes a Cyborg Science* (Cambridge: Cambridge University Press, 2002).

²⁶ Peter Galison identifies three features of nuclear disaster scenarios: apocalyptic imaginaries; specific present references; and, caricatured sketches of reality to create “an extension of some elements of the world into its asymptomatic extreme.” Though there are many distinctions between the two kinds of scenarios, the third feature is the most prominent in Hudson Institute’s scenarios. See Peter Galison’s “The Future of Scenarios: State Science Fiction,” In *The Subject of Rosi Braidotti: Politics and Concepts*, by Bolette Blaagaard and Iris van der Tuin (London: Bloomsbury Academic, 2014), 40; also, Peter Galison, “The Half Life of Story,” In *Hall of Half-Life*, by Tessa Giblin, (Graz: Steirischer Herbst, 2015).

²⁷ Kahn and Wiener,” *The Year 2000*, 8.

epistemological concerns shared by early work in the sociology of science.²⁸ Hudson Institute's scenarios differed from calculative forecasts and simulations; they were a kind of speculative sociological technique specific to the second half of the twentieth century. In this, scenario planning broadens the historiography of Cold War rationality.²⁹ While scenario techniques emerged out of the ideological struggles of Cold War deterrence strategy in American defense-related think tanks, they were importantly animated by a critical awareness of the limitations of computing techniques to adequately calculate social and political conditions. The histories on Cold War rationality highlight the calculative or rule-based dimensions of rationality, ignoring the imaginative dimensions, like intuition and creativity.³⁰ At the Hudson Institute, researchers certainly appealed to the rational rule-based processes of science. At the same time, however, their techniques, like scenario planning, attempted to self-consciously account for uncertainty, possibility, and unknowability. Kahn sought to develop scenarios as heuristic tools capable of flexibly modelling conceivable behaviour.³¹ This move was as much a reaction to the

²⁸Lemov, "Hypothetical Machines: The Science Fiction Dreams of Cold War Social Science," *Isis*, 101, no. 2 (June 2010): 403, 405

²⁹ Erickson et. al, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality*. Here, I continue to build from historian of science William Thomas' argument that postwar developments in systems analysis, operations research, and management science, what he calls the "sciences of policy" did not perceive the tools of science as the reigning intellectual authority, capable of overcoming cultural and political differences, or providing the ultimate solutions to complex problems. Thomas aims to upend what he sees as an assumption guiding the historiography of postwar science and technology: that acting rational was a product of naïve faith in the powers of science and technology, a project this dissertation continues. Thomas, *Rational Action*.

³⁰ Erickson et. al, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality*.

³¹ This is similar to the discussion put forth by Lambert Williams and William Thomas regarding MIT Industrial Dynamics and Forrester. Williams and Thomas, "The Epistemologies of Non-Forecasting Simulation."

closed and mechanistic systems of forecasting tools as it was a response to the ‘ideological’ anti-Establishment critiques from the New Left.³² Over the course of the late 1960s, Kahn and the Hudson Institute formalized and disseminated scenarios as an ideal approach for stretching and disciplining imaginative speculation in the growing field of corporate strategy.

It is important to make clear the intellectual inspirations for Hudson Institute’s methodological approach for two reasons. The first reason is to connect this sociological methods to corporate strategy in order to further historian of science Orit Halpern’s argument that “capital has many guides”—rarely is it the “reason” or calculative “rationality” articulated by the historiography of postwar science.³³ The second reason is that the imaginative dimensions of corporate techniques are conjured through the day-to-day techniques.³⁴ That is to say that the Hudson Institute’s production of scenarios was a creative act; the scenario technique treated future situations as an imagined world resulting from the aggregate of a multitude of forces and actors. This type of thinking enabled early sociologists of science to do their epistemological work, as it enabled military and business strategists to make war and business strategy after the postwar

³² Media theorist Fred Turner distinguishes the New Left, the overtly political social movements that grew out of the civil rights and free speech movements in the 1960s, from the New Communalist, those who lived on communes or “saw the transformation of consciousness” as the route to American social transformation. Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*, 31-32.

³³ Halpern, *Beautiful Data: A History of Vision and Reason since 1945*, 33.

³⁴ Here I follow Joseph Masco and Michelle Murphy’s work on the imaginative dimensions of Cold War military and public policy strategies. On the affective and imaginative dimensions of military strategy from the Cold war to the War on Terror, see Masco, *The Theater of Operations: National Security Affect from the Cold War to the War on Terror*; on the calculative techniques of population as an aggregate of intangible forms, see Murphy, *The Economization of Life*.

period. Following Kahn's development of scenarios demonstrates how scenarios first became formalized and disseminated as an ideal heuristic approach for imaginative speculation that continues to circulate as a critical part of business school training and corporate strategy in the early twenty-first century.

Speculative techniques aimed at what could be known and what could be prepared for rose to new prominence in the postwar period.³⁵ Although engaging with the uncertainty of the future was not new, during the postwar period diverse fields attempting to improve complex decision-making by applying and expanding techniques from World War II surfaced—including operations research, systems analysis, and eventually, futurology.³⁶ This rise can be partially attributed to an upsurge in government funds at unique, interdisciplinary research institutions, like the military think tank the RAND Corporation.

Though the approaches and goals of these numerous advancements in military decision-making techniques differed, where they overlapped was in the debates concerning the proper role that the tools of science and technology could play in offering solutions to high-level problems. Operations research was one kind of military decision-making strategy that emerged during the interwar years in Britain to differentiate laboratory-based research and development from attempts to integrate technologies into aerial combat.³⁷ It was not until the mid-1950s that operations researchers “adopted”

³⁵ Andersson, “The Great Future Debate and the Struggle for the World.”

³⁶ On think tanks, see Paul Dickson, *Think Tanks*. These are what historian William Thomas calls “the sciences of policy,” see Thomas, *Rational Action*.

³⁷ The history of operations research is covered well by Thomas, *Rational Action*, 81-174.

mathematically-based approaches to support their recommendations.³⁸ Optimism accompanied the change in method, though many, including Charles Hitch, the head of the economics department at RAND Corporation between 1948-1961, asserted that operations research was at its best when applied to physical, “lower-level problems.”³⁹ During the postwar period, operations researcher mainly considered a set objective with specific criteria—for example, the optimal number of aircraft guns or ships necessary for an attack.

Systems analysis importantly differed from operations research. It was broader and more speculative, offering a degree of flexibility to analysts. Instead of focusing on one particular attack, systems analysts considered how to increase the number of attacks, and kinds of weapons used, on enemy targets over a period of one month.⁴⁰ Systems analysis became especially useful when there were no definite objectives or specific contexts or equipment, a situation common during the rapid technological advancements of World War II. With this broad scope and flexibility came more uncertainties, thus creating a considerable amount of scrutiny from strategists.⁴¹

Scenarios developed in a fringe field of systems analysis that associated practitioners hesitantly called “futurology” during the mid-1950s in the United States and Europe. Futurology began its academic career as a discipline that applied the tools of

³⁸ William Thomas argues that the scope of operations research narrowed as it “adopted” mathematical methods in an attempt to gain legitimacy, see for example, Thomas, *Rational Action*, 33-40.

³⁹ Charles Hitch, “Letters to the Editor: Operations Research and National Planning—A Dissent,” *Operations Research* 5, no. 5 (1 October 1957): 718.

⁴⁰ Kahn and Mann, “Techniques of Systems Analysis,” 7.

⁴¹ This criticism is well-known. See, for example, Thomas, *Rational Action*, 286.

systems analysis to problems of the distant future—often five, ten or even thirty years ahead. And, unlike the predominantly empirical emphasis of operations research and systems analysis, scenarios were principally qualitative and theoretical. Though in scenario analysts often positioned scientific credentials and empirical data as assets, scenarios were based on speculative, theoretical frameworks, particularly from sociology, as strategists attempted to self-consciously examine assumptions.

Kahn as Human Computer

It was Herman Kahn's reaction to what he saw as the dangers associated with complicated mathematical abstractions that encouraged him to turn away from increasingly sophisticated calculative aids. First hired as a human "computer," producing ballistic calculations manually, and then a leading expert in Monte Carlo simulations at RAND, Herman Kahn worked in a period marked by larger reservations toward automation in fields from operations research to systems analysis in the mid-1950s.

In the early postwar period, military strategists at the RAND Corporation overwhelmingly used high speed computers to aid future prediction. Thus, most histories of forecasting focus on RAND's statistical and calculative contributions to speculation.⁴²

⁴² The history of postwar computational forecasting will not be treated in depth here. Two histories that are drawn on in this dissertation are outlined in Jenny Andersson and Egle Rindzevičiūtė's *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future* (New York: Routledge, Taylor & Francis, 2015), 3; Jenny Andersson "The Political Life of Prediction. The Future as a Space of Scientific World Governance in the Cold War Era," *Les Cahiers Européens de Sciences Po*, no. 4 (2012); The larger history of quantification is treated in Theodore Porter, *Trust in Numbers* (Princeton: Princeton University Press, 1996).

For example, RAND strategists at first utilized human “computers” that calculated by hand on large worksheets. Later, the calculators used punched-cards and plugboards in order to calculate the optimal solutions to strategic warfare.⁴³

In 1947, when Herman Kahn was 25 years old, he was hired as a mathematical physicist at RAND. His specialty was Monte Carlo random sampling techniques, a “mainstay” in “analytic modeling” at the time.⁴⁴ By 1953, Kahn had become an expert in Monte Carlo. Kahn often described Monte Carlo calculations through a simplified example:

Suppose we have a simple game of solitaire and are interested in calculating the probability of winning the game. There are two ways to do this. The first is by exact combinatorial methods. We consider every possible shuffle as being equally likely, and simply count the number of different shuffles that will end in success. If we then divide this number of shuffles by the total number of possible shuffles, we have calculated the probability of winning. A solitaire game does not have to be very complicated before such a procedure would take more than a lifetime, even with high-speed computing machines. But there is a way to sidestep the combinatorial computation. It is not only easier, but it may be more pleasant also. We can simply play the game, say a thousand times...[or] trials could be performed on the high speed machine.⁴⁵

Monte Carlo used random sampling and algorithmic simulation to probabilistically decide on an optimal solution to physical problems with a range of possibilities.

Originally done manually, Kahn’s impressive accomplishment was to help to integrate RAND’s John von Neumann Numerical Integrator and Automatic Computer

⁴³ For an internal history of this at RAND, see Willis Ware, *RAND and the Information Evolution: A History in Essays and Vignettes*, (Santa Monica: Rand Corporation, 2008), 11-12.

⁴⁴ Ware, *RAND And the Information Evolution: A History in Essays and Vignettes*, 90.

⁴⁵ Kahn and Mann, “Techniques of Systems Analysis,” 48-49.

(JOHNNIAC) and Monte Carlo.⁴⁶ JOHNNIAC was operational between 1953 and 1966.⁴⁷ Hudson Institute strategist B. Bruce-Briggs acclaims Kahn for bringing Monte Carlo from “Neumann and Ulam” to a larger field of applied mathematics by introducing a range of mathematical shortcuts, including assistance by the use of RAND’s *A Million Random Digits with 100,000 Normal Deviates*.⁴⁸ Monte Carlo significantly shortened the time needed to conduct random sampling calculations.

For all the complicated computations, Kahn was all too aware that any misstep in assumptions of the foundational rules meant that the entire simulation would be misinformed. For decades, he was the expert on Monte Carlo, creating reams of paper calculating optimal situations according to probabilistic distribution. However, he was also attentive to how such calculations, while “simple in principle,” required a great deal of unaccounted-for assumptions. Kahn often expressed his hesitations with Monte Carlo: “In many cases it was necessary to idealize the problem so much to make it tractable to analysis that the resulting considered opinion was less valuable than almost any reasonable intuitive judgment which was based on an examination of the un-idealized problem.”⁴⁹ More than this, Kahn became troubled by the hegemony of calculative simulation: “It is to be feared that it [calculative models] may have become too popular. Many people got so excited about the possibilities that they went overboard and claimed

⁴⁶ Kahn and Mann, “Monte Carlo,” (Santa Monica: Rand Corporation, 1957); Herman Kahn, “Uses of Different Monte Carlo Sampling Techniques,” (Santa Monica: Rand Corporation, 1955).

⁴⁷ Ware, *RAND And the Information Evolution: A History in Essays and Vignettes*, 63.

⁴⁸ Barry Bruce-Briggs, *Supergenius: The Mega-Worlds of Herman Kahn* (Raleigh: Lulu Enterprise), 17-18.

⁴⁹ Kahn and Mann, “Techniques of Systems Analysis,” 48, 37.

entirely too much for the technique.”⁵⁰ While at first Kahn embraced the calculative prowess of early machines, he began to consider Monte Carlo “tedious” and unfit for the task of policy analysis.⁵¹ R. John Williams contends that this reaction was against complicated mechanical calculation—and not the computer per se; Monte Carlo simulations were only capable of pinpointing a singular solution.⁵²

Kahn and Mann captured these hesitations in a section of the 1957 RAND report *Military Planning in an Uncertain World* entitled “Ten Common Pitfalls.” Modelism—the overreliance on idealized models—was their primary concern.⁵³ It was not that Kahn and Mann entirely disapproved of technical tools. Instead, they were wary of analysts becoming overly “enamored of intellectual and mechanical gadgets, particularly more modern ones, such as high-speed computers, war gaming, information theory, linear and dynamic programming, differential analyzers, game theory, Monte Carlo, etc.”⁵⁴ To focus too much on technical tools, instead of “real problems” in the world with its “mathematically untidy questions,” meant that policy would be guided astray.⁵⁵

⁵⁰ Kahn and Mann, “Techniques of Systems Analysis,” 37.

⁵¹ Bruce-Briggs, *Supergenius: The Mega-Worlds of Herman Kahn*, 19; Also, footnote from R. John Williams, “World Futures,” 480.

⁵² R. John Williams’ larger argument is that the 1960s was a period wherein “secular prophecy” of multiple futures overshadowed prediction of singular, optimal futures. R. John Williams, “World Futures,” 479.

⁵³ Herman Kahn and Irwin Mann, “Ten Common Pitfalls,” (Santa Monica: Rand Corporation, 1957), 1; on the naturalization of modelling in economics, see Mary S. Morgan, *The World in the Model: How Economists Work and Think* (Cambridge: Cambridge University Press, 2012).

⁵⁴ Kahn and Mann, “Ten Common Pitfalls,” 3.

⁵⁵ Kahn and Mann, “Ten Common Pitfalls,” 3, 1.

It was not only Kahn and Mann that held these opinions. In a 1956 address to the Annual Meeting of the Operations Research Society of America, Columbia University professor B. O. Koopman cautioned researchers that there were limits to operations research.⁵⁶ In his comments to the address, Charles Hitch echoed Koopman, suggesting “mechantitis” and “authorititis,” which stemmed from policymakers’ overreliance on high-speed computers to set the parameters on social and political problems, were a real concern.⁵⁷ Even operations researchers were well-aware that many complex problems were not capable of being easily quantified.

In the Absence of Relevant Knowledge

During the 1960s, Hudson Institute analysts were intent on differentiating themselves from earlier policy techniques based arbitrarily on the experience of military generals, or worse, on the assumptions grounded in the kinds of unfounded calculative proficiency discussed above. As early as 1963, Hudson Institute asserted that scenario methods would be able to capture the assumptions accepted and unaccounted for by other methods:

⁵⁶ B. O. Koopman, “Fallacies in Operations Research,” *Operations Research* 4, no. 4 (1 August 1956): 423.

⁵⁷ Charles Hitch, “Comments by Charles Hitch” *Operations Research* 4, (1956): 426-430; Thomas, *Rational Action*, 270.

The kind of policy research we are concerned with here, then, emphasizes attempts to derive substitutes for relevant knowledge, experiment, judgment, perception, insight and intuition. It tends to rely heavily on such things as.. metaphors and historical analogues... scenarios... other uses of 'arbitrary' specifications.⁵⁸

It was not simply that scenarios generated intuition or creativity that guided the work of Hudson Institute. Scenarios served the dual task of expanding the imagination to capture, for example, all possible war measures and countermeasures, while aspiring towards an approach amenable to rational, structural stipulation. This is what the scenario approach offered: a capacity to develop general frameworks that could be continually revised in the absence of, in Kahn's words, "relevant knowledge, experience, perception, judgment, insight, and intuition."⁵⁹ Kahn imagined that scenarios techniques would enable analysts to bring imagination to bear systematically on "the interaction of complex and/or uncertain factors."⁶⁰

Kahn believed scenarios were best suited to reducing "carry-over thinking" that inevitably haunted research even "when it is clear to all the 1975 cannot be the same as 1945 or even 1960."⁶¹ Thus, "scenarios are one way to force oneself and others to plunge

⁵⁸Quoted in Sharon Ghamari-Tabrizi, "Simulating the Unthinkable: Gaming Future War in the 1950s and 1960s," *Social Studies of Science* 30, no. 2 (2000); from Herman Kahn, "The Alternative World Futures Approach" (Croton-on-Hudson: Hudson Institute, 1966): 170-71.

⁵⁹ Herman Kahn, "A Methodological Framework: The Alternative World Futures Approach," in Paul Dragos Aligica and Kenneth R. Weinstein, *The Essential Herman Kahn: In Defense of Thinking* (Lanham: Lexington Books, 2009), 185; Note the similarity to Forrester's Industrial Dynamics. William Thomas and Lambert Williams, "The Epistemologies of Non-Forecasting Simulations, Part I: Industrial Dynamics and Management Pedagogy at MIT."

⁶⁰ Kahn and Wiener, *The Year 2000*, 6.

⁶¹ Kahn, "The Alternative World Futures Approach."

into the unfamiliar and rapidly changing world of the present and of the future by dramatizing and illustrating the possibilities they focus on.”⁶² Scenarios also, “force the analyst to deal with details and dynamics which he might easily avoid treating if he restricted himself to abstract consideration.”⁶³ In other words, scenarios were an “antidote for concentrating exclusively on the forest and ignoring the trees: analysts who limit themselves to abstract generalizations may easily overlook crucial details and dynamics.”⁶⁴ At the same time, Kahn was aware of the dangers of thinking that scenarios were sufficient to understand “reality.” On this, Kahn warns: “a specific estimate, conjecture, or context, even if it is later shown to have serious defects, is often better than a deliberate blank which tends to stop thoughts and research.”⁶⁵

In 1966, Hudson Institute’s lecture-seminars began to feature a set of scenario charts mapping the possibilities for the next thirty-three years. One scenario, what Kahn called the “Standard World,” has gained the majority of the attention from scholars. Business journalist Art Kleiner has labelled this world as one of “worldwide peace and financial boom.”⁶⁶ The “Standard World” has been described by critical scholars as a delusion created out of technological optimism. The belief that technology could drive economic progress—and thus lead to worldwide prosperity— has been subjected to

⁶² Kahn, “The Alternative World Futures Approach.”

⁶³ Kahn, “The Alternative World Futures Approach.”

⁶⁴ Ayres, “Technological Forecasting and Long-Range Planning,” 146.

⁶⁵ Kahn, “The Alternative World Futures Approach.”

⁶⁶ Art Kleiner, *Age of Heretics: Heroes, Outlaws, and the Forerunners of Corporate Change*, (New York: Currency Doubleday, 1996), 130.

critiques of technological determinism since at least Thorstein Veblen. That is to say, the critiques of the pro-growth position of the “Standard World” connect to a much longer history of critical theories of technology.⁶⁷

The “Standard World” was based upon what the Hudson Institute identified as the important thirteen trends. These trends included, for example, the spread of secular humanism, rising technological and scientific innovations that could be integrated into institutional environments, and population growth. In this world, the scarcities of resources and poverty would be solved by technological ingenuity. In Kahn and Wiener’s dramatic articulation of the “Standard World” there are no mass crises: "The more desperate and seemingly eternal problems of human poverty will be solved" and "most misery will derive from the anxieties and ambiguities of wealth and luxury, not from physical suffering due to scarcities."⁶⁸

⁶⁷ For the quintessential example of this history and critique, see Merrit Roe Smith and Leo Marx, *Does Technology Drive History?: The Dilemma of Technological Determinism* (Cambridge: MIT Press, 1994).

⁶⁸ Kahn and Wiener, *The Year 2000*, xxi.

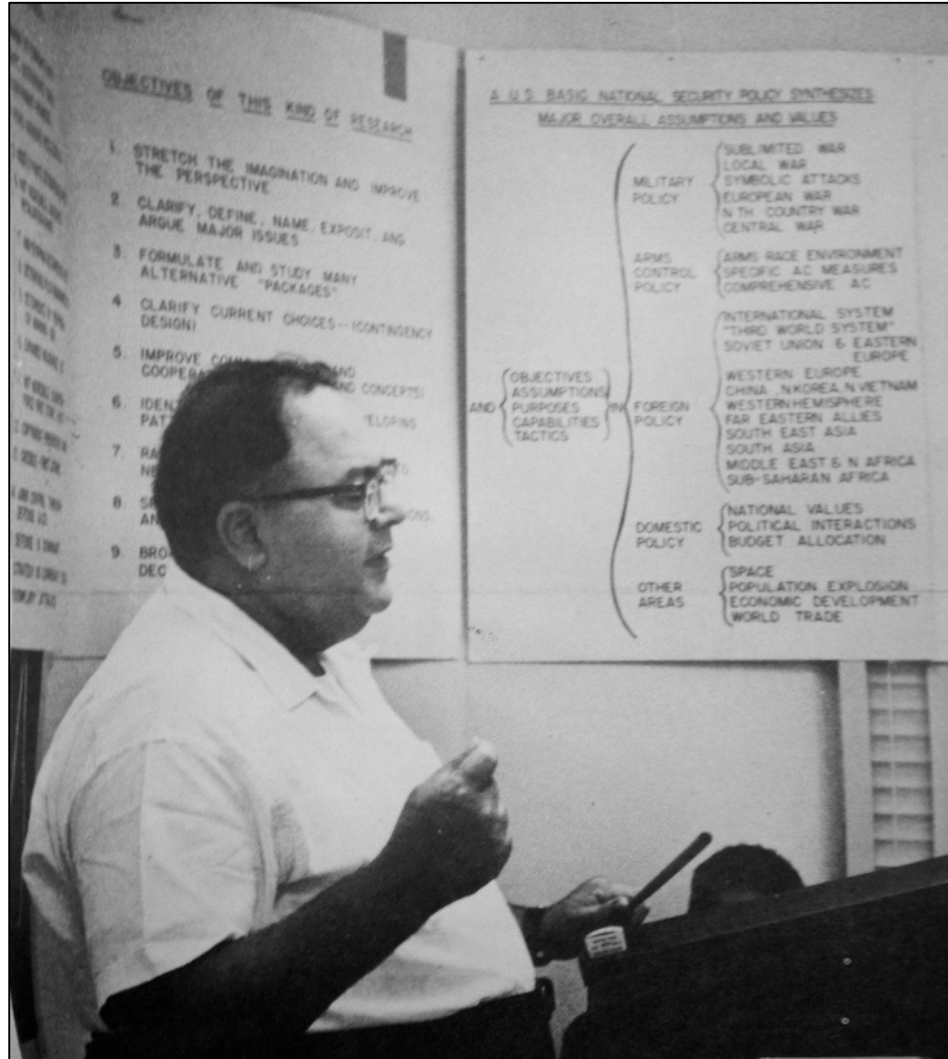


Figure 3. Herman Kahn. Arthur Herzog, “Report on a “Think Factory.””⁶⁹

The assumptions of the “Standard World” model examined in isolation provide grounds for critique. Social philosopher William Irwin Thompson best captures the thrust of the arguments against this world in his *At the Edge of History*, contending that Kahn’s projections were invested in the growth of the corporation and machine—with their

⁶⁹ Herzog, “Report on a “Think Factory.”” Hudson Institute Archive, National Defense University.

industrial metaphors—at the expense of the individual, society and the environment.⁷⁰

Elsewhere, Thompson claimed that Kahn and Hudson Institute, as members of a Western liberal humanist elite, were training world leaders at places like Harvard Business School to think that this version of increased enterprise —what Thompson calls an “irrational” investment in the “mythical claim”—was the only means of measuring progress.⁷¹

Generally speaking, I believe Thompson’s characterization to be true. When focusing solely on this “Standard World,” the critique that it secures the expansive futures of global capitalism and the unregulated expansion of technology by a selected group of business and intellectual leaders is not unfounded.⁷² The “Standard World” is one where capitalism triumphs over limitations of resources and overall increase in Gross National Product of major powers becomes a marker for prosperity. Taken at face value—and under the assumption that such a technique will lead to the emergence of this world—the framework of the “Standard World” is grounds enough for such criticism.

Much more interesting, I think, are the often-unacknowledged *sets* of alternative worlds presented by Hudson Institute. Hudson Institute’s “Standard World” was *always* accompanied by a series of “Canonical Variations.” These original alternative worlds were adjustments based upon three criteria: “more integrated,” more “inward-looking,”

⁷⁰ William Irwin Thompson, *At the Edge of History and Passages about Earth: A Double Book* (New York: Steiner Books, 1990), 142-151.

⁷¹ World Opinion Forum. *Margaret Mead, Herman Kahn, William Irwin Thompson - Nuclear Power. The Next Century*. Accessed 1 October 2015. <https://www.youtube.com/watch?v=1-QwGBDbd3M>.

⁷² See, for example, Susie O’Brien, ““We Thought the World Was Makeable”: Scenario Planning and Postcolonial Fiction,” *Globalizations* 13, no. 3 (3 May 2016).

or in greater “disarray.”⁷³ What if, for example, the world became politically and economically coordinated, but excluded the third world from having influence? What if the world became more progressive and pragmatic, and developed welfare programs? And, finally, what if NATO collapsed? Although they were assumed to be less likely, they were postulated with the stipulation that there were no factual bases for the future. “The most salient of the projects we can make is one that is “surprise-free,” Kahn admits, “nevertheless it would be very surprising if any thirty-three year period the real world did not produce many political and technological surprises.”⁷⁴ Kahn’s supposed faith in “rational science” is tempered by the acknowledgement that there is no relevant knowledge about how things will be, and thus, the “future worlds” are to be taken “mostly as heuristics” to “further discussion” and attempt to identify and make sense of heterogeneous “assumptions.”⁷⁵

For Kahn, scenarios were the central weapons in his assault on the “clumsiness of passionate thinking” that encouraged only optimism or pessimism from corporate policy to war-fighting strategies. Kahn positioned himself in contradistinction to “sloppy, emotional thinking,” claiming that he was against “ignorance,” and “against the whole cliché at the moment.”⁷⁶ As historian of science Elena Aronova pointed out, it was Bell’s “end of ideology” discussions that turned the social-economic and political studies of

⁷³ Kahn and Wiener, “The Next Thirty-Three Years: A Framework for Speculation,” 727-28.

⁷⁴ Kahn and Wiener, *The Year 2000*, 8.

⁷⁵ Kahn and Wiener, *The Year 2000*, 8.

⁷⁶ Joseph B. Treaster, “Herman Kahn Dies; Futurist and Thinker on Nuclear Strategy,” *The New York Times*, 8 July 1983, Obituaries. <http://www.nytimes.com/1983/07/08/obituaries/herman-kahn-dies-futurist-and-thinker-on-nuclear-strategy.html>.

science into a central topic of concern in cold war America, providing a pre-history of the discipline of science studies.⁷⁷ Kahn believed his future worlds—from “Standard World” and “Canonical Variations” – resisted simplistic views of socio-technical realms, including the inherent tensions and contradictions. Interestingly, sociologist Robert Merton’s paradigm provided just such the inspiration.

Kahn built on Merton’s “paradigm” while producing scenarios: he saw Merton’s paradigms as “more elaborate than a metaphor made explicit,” yet “less formal than an analytical model.”⁷⁸ Merton’s efforts to systemize qualitative sociological analysis through codification of ideas meant that strategists could potentially evaluate a range of assumptions simultaneously. Kahn used Mertonian paradigms as the building blocks of scenarios. By following the intellectual inspirations that guided the creation of scenarios instead of the specific scenarios themselves, I trace one connection between early aspirational methods from the sociology of science, one strand of science studies, and Herman Kahn’s futurology.

⁷⁷ Aronova, “The Conquest for Cultural Freedom, *Minerva*, and the Quest for Instituting “Science Studies” in the Age of the Cold War.” The “end of ideology” was, in Aronova’s words, “a normative position” used to reconcile the “*free market* (a cherished capitalist system) and *centralized planning* (firmly associated with Soviet economic system), in the political economy of the post-WWII world shaped by dramatically increased role of science and technology.” (309).

⁷⁸ Kahn and Wiener, *The Year 2000*, 403.

Paradigm for the Sociology of Strategy

Hudson Institute first referenced Robert K. Merton's term "paradigm" in a 1963 report on war strategies for the Department of Defense's Advanced Research Project Agency (ARPA). Starting in the 1940s, Merton began using the term "paradigm," to describe a technique that could systemize qualitative sociological analysis for cross comparison and provide theoretical rigour to social anthropologists. Robert K. Merton was a product of the sociological school of structural-functionalism that emerged from Harvard University's Sociology Department in the 1930s, a field most closely associated with the Talcott Parsons. Parson's functionalism—especially his focus on introducing theoretical meticulousness to sociology – inspired Merton even as he sought to differentiate himself from Parson's universalist social systems, instead opting for theories of "middle range."⁷⁹ Merton aimed to show how social and cultural factors (he called them "existential") shaped mental products in the articulation of ideal types. However, Merton differed from Parsons' stable systems of social order and dysfunction even as he sought to establish sociology as a proper science. In Merton's words: "the analytical paradigm identifies the basic assumptions, problems, concepts, and hypotheses incorporated in the sociological idea in order to generate researchable questions and to provide for continuities of

⁷⁹ For the most generous reading of Merton, see Steven Shapin, "Understanding the Merton Thesis," *Isis* 79, no. 4 (1988): 594–605; For a discussion of the mid-century emergence of Harvard University as an "interstitial academic space" made up of informal "clubs, discussion groups, societies, pedagogical programs, seminars, and marginal departments and schools," see Joel Isaac, *Working Knowledge*, (Cambridge: Harvard University Press, 2012), 60-62; on professional and epistemic norms of Harvard's sociology department, see Jamie Cohen-Cole, "Chapter 3: Interdisciplinarity as a Virtue," In *The Open Mind: Cold War Politics and the Sciences of Human Nature* (Chicago: University of Chicago Press, 2014).

theoretical and empirical inquiry.”⁸⁰ The Mertonian paradigm offered Kahn a “systematic and precise” approach to war strategy that highlighted methodological considerations over tacit assumptions.⁸¹ The problem for Kahn was that there were assumptions embedded within each disciplinary community of war strategists that were never explicitly stated. For Kahn, “paradigms” would enable war strategists to process large amounts of interconnected information streams from the different communities, adding scientific rigour and promoting abilities for systematic analysis. One of the major objectives of the original DARPA report was to “to create propaedeutic and heuristic methodologies.”⁸² This is something he derived directly from Merton’s 1949 sociological volume on *Social Theory and Social Structure*.⁸³

⁸⁰ Robert K. Merton, “A Life of Learning,” In *On Social Structure and Science* (Chicago: University of Chicago Press, 1996), 357.

⁸¹ Kahn, “A Paradigm for the 1965-1975 Debate,” 1; an attention to tacit knowledge, the unarticulated skills and embodied practices of scientific knowledge, was also important to the early history of science studies. See, for example, Harry Collins, “The TEA Set: Tacit Knowledge and Scientific Networks,” *Science Studies* 4 (1974): 165-86.

⁸² Kahn, “A Paradigm for the 1965-1975 Debate,” 61; the complete list of objectives includes: 1. To stimulate and stretch the imagination and improve the perspective; 2. To clarify, define, name, expound and argue major issues; 3. To design and study alternative policy “packages” and contexts; 4. To create propaedeutic and heuristic expositions, methodologies, paradigms, and frameworks; 5. To improve intellectual communication and cooperation, particularly by use of historical analogies, scenarios, metaphors, analytic models, precise concepts, and suitable language; 6. To increase the ability to identify new patterns and crises and to understand their character and significance; 7. To furnish specific knowledge and to generate and document conclusions, recommendations, and suggestions; 8. To clarify current realistic policy choices, with emphasis on those that retain efficiency and flexibility over a broad range of contingencies; 9. To improve the “administrative” ability of decision-makers and their staffs to react appropriately to the new and unfamiliar.” This list of objectives shaped Hudson Institute’s work for over a decade, and it changed little across reports funded by different agencies.

⁸³ It is unclear exactly how Kahn became attuned to Merton’s sociological work. However, Merton shared a department with sociologist and Hudson Institute interlocutor Daniel Bell, and Merton pursued research supported by mid-century corporate and foundation benefactors at the Bureau of Applied Social Research, the birthplace of the focus group, as a professor at Columbia University.

“Paradigms” also played an important role in the emergence of science studies. Although the term is most closely associated with the 1962 publication of Thomas Kuhn’s *The Structure of Scientific Revolutions*, it was originally used by Merton.⁸⁴ At its most basic, the Mertonian paradigm enabled the examination of normative science and thus emphasized the cognitive limitations (or assets) that impinged upon scientific knowledge.⁸⁵ Different from the Kuhnian paradigm, the Mertonian paradigm was less expansive, focusing on the “analytical observer” as opposed to the community being observed.⁸⁶ Historian of science Steven Shapin puts Merton’s claim this way: “the social dimension” of different communities of sociologists needed attention; it was the “legitimacy of individualist frameworks for interpreting scientific knowledge” that was Merton’s aim, rather than the “legitimacy of scientific knowledge.”⁸⁷ These paradigms

⁸⁴ There have been numerous interpretations of the Kuhnian and Mertonian paradigms, and this reflects divisions in the fields of the science studies and the history of science. For one interpretation, see Lorraine Daston, “History of Science and Science Studies,” *Critical Inquiry* 35, no. 4 (2009).

⁸⁵ Merton’s theories have received much criticism from sciences studies. These critiques are not unfounded, and they deserve attention: First, Merton was primarily interested in “externalist” accounts of science that defined the early sociology of science. He granted special status to scientific practices and scientific knowledge, leaving them “black boxed.” Instead, he was invested in examining the cognitive and social/cultural factors—the environment—that influenced the progress of science. Second, Merton was a functionalist, meaning that he was invested in “normal” science. “Normal” science was about the progress of science, and thus, focused on the things that potentially impinged upon it; Merton was not interested in challenging scientific knowledge. For a good summary of the critiques, see Karin Knorr-Cetina, “Review: Merton’s Sociology of Science: The First and the Last Sociology of Science?” *Contemporary Sociology* 20, no. 4 (1991): 522–26.

⁸⁶ Robert Merton, “Paradigms: The Codification of Social Theory,” In Robert K. Merton and Piotr Sztompka, *On Social Structure and Science* (Chicago: University of Chicago Press, 1996), 61.

⁸⁷ Steven Shapin, “Here and Everywhere: Sociology of Scientific Knowledge,” *Annual Review of Sociology* 21, no. 1 (August 1995), 300.

came in the form of ideal types for particular communities—a prime example is the Mertonian ethos of normative science.⁸⁸

In one 1963 Hudson Institute report to ARPA, partially a lengthy justification as to why analysts needed abstract, theoretical guidance, Kahn quotes Merton at length. Articulating future scenarios as paradigms happened before Hudson Institute's transitioned from defense-related scenarios to business and social policy analysis. One of the "main objectives" in thinking about future wars was to create "a structured set of explicit assumptions, definitions, typologies, conjectures, analyses, and questions."⁸⁹ Kahn looked to Robert Merton as a guide, quoting his *Social Theory and Social Structure* at length. Kahn cited Merton's outline of paradigms verbatim not only in his Hudson Institute research report "A Paradigm for the 1965-1975 Debate," but also in his book written along with fellow Hudson Institute analyst Anthony Wiener, *The Year 2000*.⁹⁰

In these pages, Merton argued that paradigms had five "interrelated functions":

- 1.) Paradigms were notational. In this, they enabled sociologists to simultaneously inspect their analyses and understandings, a task made difficult when concepts and assumptions were implicit.
- 2.) Paradigms made assumptions explicit. Each assumption was to be stated explicitly within the paradigms.
- 3.) Paradigms furthered knowledge.

⁸⁸ In Merton's words: "Four sets of institutional imperatives—universalism, communism, disinterestedness, organized skepticism—are taken to compromise the ethos of modern science," Robert Merton, "The Normative Structure of Science," In *The Sociology of Science: Theoretical and Empirical Investigations* (Chicago: University of Chicago Press, 1973).

⁸⁹ Kahn, "A Paradigm for the 1965-1975 Debate," 68; Repeated verbatim in Kahn and Wiener, *The Year 2000*, 403.

⁹⁰ Merton, *Social Theory and Social Structure*, 12-16; In Kahn, "A Paradigm for the 1965-1975 Debate," 68-70; Repeated almost verbatim in Kahn and Wiener, *The Year 2000*, 404-405.

Merton believed that sociologists could build off each other's theoretical understandings if they were made explicit, an idea that Kahn wanted to extend to analysts. 4.) Paradigms aided critical examination. Merton urged that by explicitly outlining theories, "empirical and theoretical"⁹¹ problems would be more easily identified. And, 5.) Paradigms brought the rigour of quantitative procedures to qualitative analysis. Merton claimed paradigms would bring forward the implicit analytical concepts of qualitative analysis that were thought "reside in a private world inhabited exclusively by penetrating but unfathomable insights."⁹² This would further knowledge by enabling reproducibility.

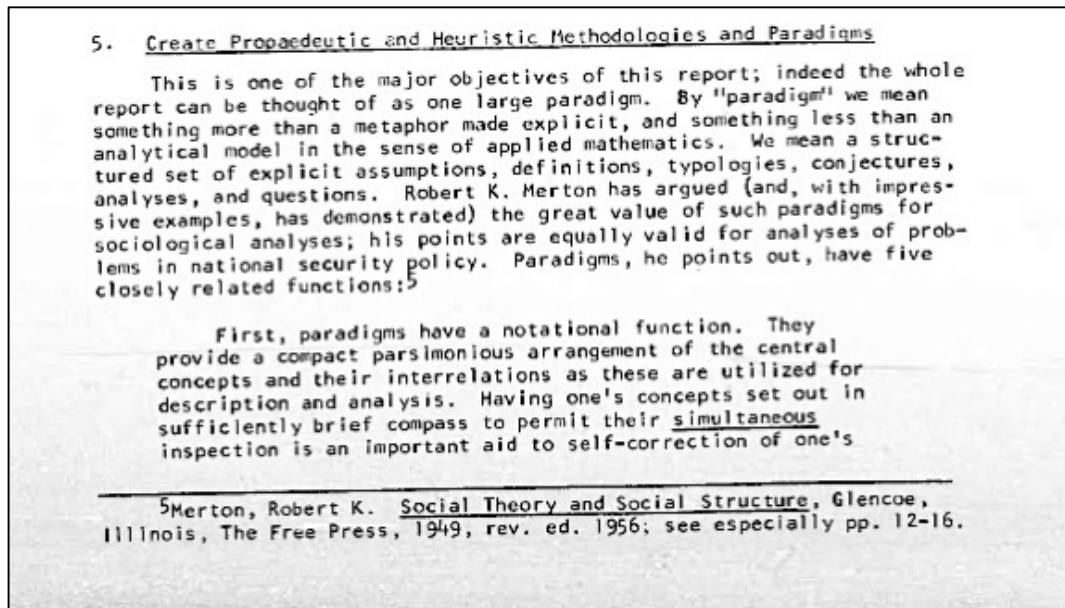


Figure 4. The Interrelated Functions of Robert Merton's Paradigms in Herman Kahn's "A Paradigm for the 1965-1975 Debate."⁹³

⁹¹ Merton quoted in Kahn, "A Paradigm for the 1965-1975 Debate," 70.

⁹² Merton quoted in Kahn, "A Paradigm for the 1965-1975 Debate," 70.

⁹³ Kahn, "A Paradigm for the 1965-1975 Debate," 68-70.

Here were the goals of scenarios, quoted directly from Merton, as Kahn saw them in 1967. These were goals that Kahn and associated repeated verbatim in other reports. For social scientists, policy analysts and corporate executives, Merton's paradigms served as a sociological and scientific technique that proved flexible enough to transcend ideological constraints—it was both 'rational' and 'dispassionate'. Kahn suggested that Merton's "paradigms" were ideal as they were "more than a metaphor in attempting to be relevant and rigorous" and "less than a model in its definiteness, preciseness and analyzability."⁹⁴ Merton's paradigm provided Herman Kahn with a generalizable sociological framework with which to build scenarios.

The Paradigmatic Scenario

To grasp the crucial features of scenarios, one cannot look only to Kahn's many publications or the content of any one scenario. His lectures were performative, a jumble of jokes, storytelling and 'rational analysis' complete with provocative statements, sprawling charts, odd puns, and catch phrases.⁹⁵ During his lectures, Kahn armed himself with nothing more than two remote controlled Kodak carousel projectors, two presentation screens, and hundreds of slides filled with charts of future plausibilities. Historian Sharon Ghamari-Tabrizi suggests that Herman Kahn gained "epistemic

⁹⁴ Kahn, "A Paradigm for the 1965-1975 Debate," i.

⁹⁵ William McWhirter, "I am one of the 10 most famous obscure Americans," *Life*, 6 December 1968.

authority” through his aesthetic and avant-garde style, a feature of RAND Corporation in the postwar period.⁹⁶ It was through the free form, “open form” style of the presentations and the “zig-zaggery of fragmentary alternatives” in the graphs and columns that the inherent uncertainties, and the “absence of consensus” regarding the future, could come to light.⁹⁷

Kahn’s presentations, and the books and reports that accompany them, evade simple categorization. One Hudson Institute report entitled "Notes on the US Political/Values/Morale Milieu in the 1970s" begins with a self-conscious note of warning: "Readers are cautioned that items on the charts reproduced here may be unintelligible or directly misleading if they are interpreted outside the context of the talk they are designed to accompany. (Some have been included ironically, in order to raise questions, and in order to be controverted by the speaker...)." ⁹⁸ Kahn’s ideas, however inchoate in his scenario routines, became cemented in the transcripts that were transformed by Kahn’s secretarial staff into the fodder for Kahn’s published texts. He did not like to write. Kahn had no reservations about reusing materials and slides over and over: these “routines,” as Kostelanetz called them, were often verbatim anecdotes, arguments and frameworks from previous work, scenarios included.⁹⁹

⁹⁶ Ghamari-Tabrizi, “Chapter 2: The Cold War Avant-Garde at RAND,” *The Worlds of Herman Kahn*.

⁹⁷ Ghamari-Tabrizi, “Chapter 5: How to Build a World with Artful Intuition,” *The Worlds of Herman Kahn*, 129-130.

⁹⁸ Herman Kahn, “Notes on the US Political/Values/Morale Milieu in the 1970s,” Hudson Institute Archives, National Defense University.

⁹⁹ Kostelanetz, “One-Man Think Tank.”

Most historical accounts of Kahn's lectures reference to his overwhelming stature, his intellectual prowess, his at times incoherent and contradictory methods of communications, and his sweatiness.¹⁰⁰ He moved deftly from technological innovations he thought likely by the twenty-first century—these included artificial moons lighting large areas, weather control, automatic grocery stores, superconnectivity, and programmed dreams—to jokes about accessing inner space through mystic or drug-induced experimentation.¹⁰¹ Whether loved or hated, no one could disagree that he was captivating, even if he could be overly pugnacious.

In 1963, Hudson Institute first suggested that conjuring “alternative future worlds” was a viable war strategy in a report for Advanced Research Project Agency for the Department of Defense: “By constructing a series of named worlds and more or less consistently treating the factors involved in a comparable fashion, we may both be able to understand each one separately better, and by making arguments clearer lead to more emphasis on the more important cases and situations.”¹⁰² It was neither a particular future situation they were interested in, nor a set of predicted futures that they sought. The Hudson Institute focused on the methodological considerations involved in conjuring alternative worlds. The instructions were to categorize important themes, such as

¹⁰⁰ See, for example, Ghamari-Tabrizi, *The Worlds of Herman Kahn*, 203-204.

¹⁰¹ Kahn and Wiener, “One hundred technical innovations very likely in the last third of the twentieth century,” *The Year 2000*, 51-55; Kahn did not have empathetic feelings towards the mystical and spiritual exploration of “inner space.” These movements make me “totally cold,” he once said in an NPR interview with journalist Patricia Marx, *Herman Kahn*, 1960. http://www.wnyc.org/story/hermankahn/?utm_source=sharedUrl&utm_medium=metatag&utm_campaign=sharedUrl.

¹⁰² ARPA (later renamed to DARPA) was established in 1958 with a mission to advance the American military's technical prowess. Hudson Institute was awarded a contract to study “the changing international security environment” in 1962; it was renewed annually until 1972. Pickett “A History of Hudson Institute,” 8; Kahn, “A Paradigm for the 1965-1975 Debate,” 81.

political factors and military factors, and then create related lists of hypothetical variables within each theme. For example, possible political factors of the 1970s might include: “population explosion; nuclear stalemates; small world; frustrated expectations; envy, racism, nationalism; ban-the-bomb movements; West has Ancien Régime morale; social order vs. social justice.”¹⁰³

The report states directly the appeal of this speculative approach and the methodological objective for these speculative future environments: “Imagination has always been one of the principle means for dealing in various ways with the future, and the scenario is simply one of many devices useful in stimulating and disciplining the imagination.”¹⁰⁴ By conjuring alternative futures, Hudson Institute pulled together the seemingly contradictory techniques of intuition and rationality. In his widely popular 1969 study “Technological Forecasting and Long-Range Planning,” Hudson Institute contractor Robert Ayres positioned scenarios as a more evolved evaluation method of future environments: “although intuition is an undisciplined and unreliable form of cognition, it is not—as some would have it—the antithesis of rational analysis, nor should we imagine that intuition cannot be improved by the application of system and order.”¹⁰⁵

The report instructs analysts how to craft the worlds with the help of their imagination, while admitting that the distinctions between the approaches were parsed

¹⁰³ Kahn, “A Paradigm for the 1965-1975 Debate,” 85.

¹⁰⁴ Kahn, “A Paradigm for the 1965-1975 Debate,” 79.

¹⁰⁵ Ayres, “Technological Forecasting and Long-Range Planning, 143.

“arbitrarily.”¹⁰⁶ The alternative futures conjured in response to “What if?” could be extrapolated through a variety of methods. One commonplace method was the use of “simple extrapolation” whereby the “underlying supposition” is that the future environment does not change from current trends.¹⁰⁷ For example, one way to construct scenarios was by identifying potential future problems, like overpopulation and mass starvation, by projecting population and food production estimates. Other approaches included synthetic (start with actors and situations, looks for environment); morphological (begin with environment, look for actors and situations)...syncretic (start with desired future, work backwards); intuitive-empirical (like extrapolative technique, “only more concrete”); and abstract-analytic (make abstract model, then use variables to change model).¹⁰⁸ Kahn generally opposed the extrapolation approach, as the “if” in the “What if?” often involved “discontinuous” and “qualitative” changes of several forces simultaneously.¹⁰⁹

¹⁰⁶ Kahn, “A Paradigm for the 1965-1975 Debate,” 82.

¹⁰⁷ Ayres, “Technological Forecasting and Long-Range Planning, 35.

¹⁰⁸ Kahn, “A Paradigm for the 1965-1975 Debate,” 82-83.

¹⁰⁹ Ayres, “Technological Forecasting and Long-Range Planning,

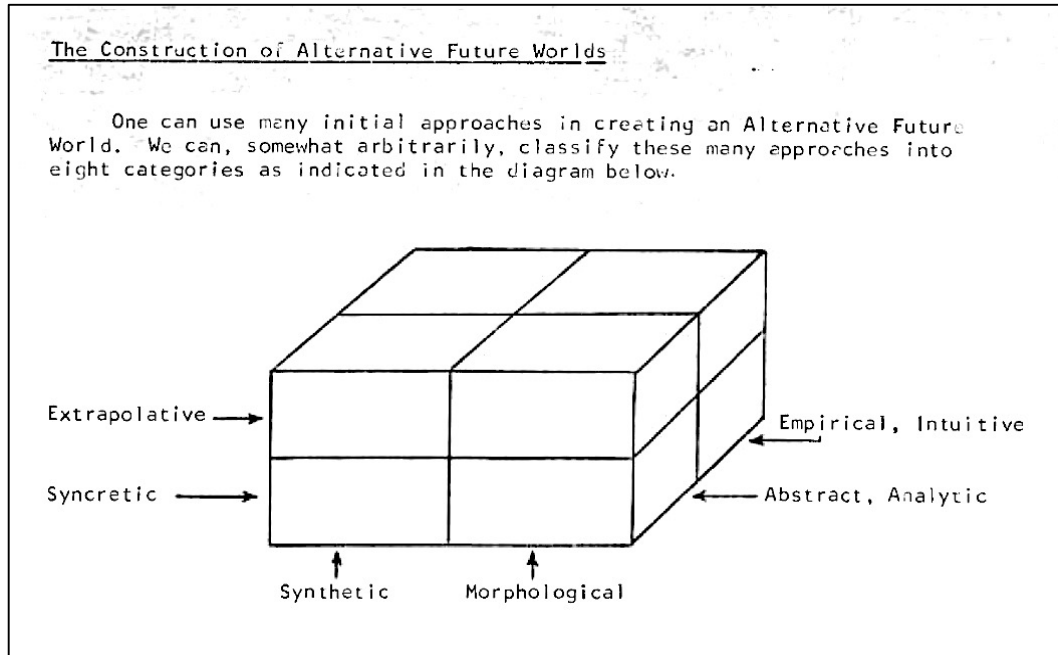


Figure 5. “The Construction of Alternative Future Worlds,” Herman Kahn.¹¹⁰

To put it a different way, making scenarios was an attempt to generate and systematically order a complicated array of factors—be they social, technological, economic and political— whose discontinuous change might affect the future.¹¹¹ The inventive move in Hudson’s scenario approach to planning was to suggest that future plausibility could be broken down into an array of variables, especially political and social forces, that could then be inverted, manipulated, extrapolated or combined imaginatively. It was not a technical revolution: there was neither an optimal future equation nor a refined calculative prediction. Following a trend emerging in sociological

¹¹⁰ Kahn. “A Paradigm for the 1965-1975 Debate,” 82. Hudson Institute Archive, National Defense University.

¹¹¹ Original alternative futures were differentiated by Greek letters as opposed to names. Each world denoted a variation on a particular theme, for example: Apha-1; Alpha 1-6 would be variations on “Mostly Peaceful and Prosperous” while Beta 1-5 were variations on “Many Structural Stresses.” Kahn, “A Paradigm for the 1965-1975 Debate,” 89.

thought best captured by Daniel Bell's "end of ideology," the Hudson Institute sought to rise above the ideological fray by rejecting any "ideology of romantic protest against contemporary life."¹¹² It was a conceptual shift in strategy, one focused primarily on systematic speculation that took seriously the tensions and contradictions between groups of individuals in the world. "I am not here to discuss substantive problems," once Kahn told seminar participants, "but to stimulate your minds. I want to be able to shock (you)."¹¹³

The second crucial methodological aspect of Hudson Institute's scenarios was the environment within which Kahn and associates articulated them. Hudson Institute was established during the financial and intellectual heyday for postwar experts on a scenic campus in Croton-on-Hudson; located on the site of a former mental institution, it was intentionally isolated from Washington and New York business as dispassion was one of Hudson's many self-proclaimed qualities. An additional component of the technique was Hudson Institute's lecture-seminars on an annual theme, a common executive training technique that rose during the postwar period. As the attendance expanded from military generals to corporate leaders, so too did the ambition of the Hudson Institute. The 1965 theme was a modest look at "The Decade Ahead"; by 1968, Hudson Institute was speculating on "The Next Thirty-Three Years." Most of the lecture-seminars happened either at the Hudson Institute, or the Sterling Forest Onchiota Conference Center in upstate New York. The lecture-seminar was a business retreat, one where top executives and military generals could be sequestered to listen to Kahn for days at a time.

¹¹² Daniel Bell, *The End of Ideology: On the Exhaustion of Political Ideas in the Fifties*, (Cambridge: Harvard University Press, 1962), 38. The "end of ideology"

¹¹³ "Strategie: Duell im Dunkel," 1967, *Der Spiegel*.

Conversations overflowed from the seminars into the hikes and the elaborate meals supplied with copious amounts of alcohol.¹¹⁴ The Hudson brochure described the cottage-like buildings as a campus and the face-to-face interactions of the participants.¹¹⁵

The Year 2000

While Herman Kahn was already well-known for his thinking on thermonuclear war in the early 1960s—it was not until the publication of *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* with Anthony Wiener that “alternative worlds” became an important point of consideration for multinational corporations. It began when, in 1965, Herman Kahn was invited by the American Academy of Arts and Sciences to join the Commission on the Year 2000. Headed by sociologist Daniel Bell – whose anti-ideological pluralism gained him both praise and criticism— the commission, made up mostly of academics, sought to think “consciously” and “rationally” about the future simultaneously.¹¹⁶ In the memorandum to the Commission,

¹¹⁴ Note the similarity here to the virtues of 1960s academic conferences described by Cohen-Cole, Chapter 4: “The Academy as Model America,” *The Open Mind*.

¹¹⁵ This is to say that as much as the scenario process became the focus, so too did charisma and exuberance become a part of Hudson’s scenarios. “Charismatic authority has recently gained attention in science studies, most notably in historian of science Steven Shapin’s *The Scientific Life: A Moral History of A Late Modern Vocation*. Shapin works to contextualize and legitimate the “charismatic authority” needed in these future shaping “risk taker[s],” of the late modern period (267, 210). He argues that “trust, familiarity, and personal virtue” are essential to analysts looking towards the future (3). These virtues mobilize from the “radical normative uncertainties” of late modern technoscience that plague the “people who speak on behalf of nature, technology, and the future” (312). Shapin, *The Scientific Life: A Moral History of A Late Modern Vocation*. For more on charisma in the rise of corporate scenarios methodologies, see Chapter 4.

¹¹⁶ Bell, *The End of Ideology*.

Bell identifies the motivation for convening: it was an awareness that there were “no adequate mechanisms to anticipate, plan for, guide, or “invent” the future” combined with the overwhelming nature of the “fractious problems (Negro rights, poverty, pollution, urban sprawl...)” that have been dealt with in a “piecemeal fashion.”¹¹⁷

Joining the Commission on the Year 2000 was a large break for the Hudson Institute. As early as 1965, Hudson Institute annual reports suggested that they were looking for an appropriate venue to expand their analysis from defense strategy to large questions related to economic, political and social transformations.¹¹⁸ The commission’s initial publication, a 1967 issue of *Daedalus*, entitled “Toward the Year 2000: Work in Progress,” was one of the first of its kind to bring together academics to think about the longer-term future. Questions of value changes and scale changes guided the sociological postulates of the commission.¹¹⁹ These included: 1. The idea that a “post-industrial society” was emerging that changed the form of economic exchange from industrial era goods-production to services sectors that relied heavily upon imaginaries regarding the rising abilities of technology and information and its relationship to knowledge production; 2. A change in the “character of technology” from a mechanical process to an intellectual process that accompanied the rise in software and programming; and, 3.

¹¹⁷ Preliminary Memorandum to the Members of the Commission on the Year 2000, in Bell, *Toward the Year 2000: Work in Progress*, 17.

¹¹⁸ Hudson Institute, “Annual report to members, 1965.” Hudson Institute Archive, National Defense University.

¹¹⁹ Daniel Bell’s introduction to the Commission’s publication, *Toward the Year 2000*, began their investigation by declaring that corporations and governments were overwhelmed by a number of factious problems like “negro rights, poverty, pollution, urban sprawl, and so on...” Daniel Bell, Stephen Richards Graubard, and American Academy of Arts and Sciences Commission on the Year 2000, *Toward the Year 2000: Work in Progress* (Cambridge: MIT Press, 1969), 17.

Social and philosophical changes that characterized the 1960s.¹²⁰ The work of the commission coincided with many other organizations exploring the future at the same moment. Two of the most notable were the Futuribles project on French public policy in Paris that was funded by the Ford Foundation and headed by Bertrand De Jouvenel beginning in 1960, and the former RAND Corporation mathematician Olaf Helmer's Institute for the Future established in 1968 in Connecticut.¹²¹ Daniel Bell began his foray into studying the future after he attended the 1963 Futuribles conference in Paris where he produced his popular paper, "Twelve Modes of Prediction—a Preliminary Sorting of Approaches in the Social Sciences" on the problems with prediction in the social sciences.¹²²

After the issue of *Daedalus*, the Commission funded Hudson Institute to produce scenarios that were hastily put together and published as *The Year 2000*. It became an unintentional bestseller, officially inaugurating long-term thinking as a viable business strategy. This is how the "Standard World" and "Canonical Variations" scenarios gained traction in the business world. Kahn and the Hudson Institute made a list of thirteen trends that they believed had been continuing for decades, in the model of the Mertonian

¹²⁰ Bell et al., *Toward the Year 2000: Work in Progress*, xiv-xv.

¹²¹ Andersson, "The great future debate and the struggle for the world," 1417-1419. On the "Futuribles" project and Bertrand de Jouvenel, see Robert Colquhoun, "The art of social conjecture: remembering Bertrand de Jouvenel"; On Olaf Helmer and the Institute for the Future, see

¹²² Robert Colquhoun, "The Art of Social Conjecture: Remembering Bertrand de Jouvenel," 28; Daniel Bell, "Twelve Modes of Prediction – a Preliminary Sorting of Approaches in the Social Sciences," *Daedalus* 93: 845-80.

paradigm. It was the methodological considerations of the “Standard World” and “Canonical Variation” that Hudson Institute offered in their lecture-seminars.

Kahn and Wiener suggested that next thirty-three years would likely see increases in standards of living worldwide and economic growth, essentially. Poverty, pollution and famine would end, and dwindling resources would be turned around due to new knowledge in science and technology. They produced hundreds in-line with this "surprise-free" future, outlining the optimistic scenarios of worldwide economic growth and technological expansion.¹²³ Corporations were intrigued, and were quick to invest in Kahn’s scenario process: it promised ways to cope with the technological and economic changes of post-industrial society that was different from the suggestions coming from the Club of Rome.¹²⁴

Kahn and Wiener positioned *The Year 2000* scenarios in contradistinction to less optimistic future-oriented projects, like the Club of Rome’s. The Club of Rome emerged after a meeting of bureaucrats, primarily from the Organization for Economic Cooperation and Development’s (OECD) Committee for Science Policy, at the Agnelli Foundation at the Accademia dei Lincei in Rome in 1968.¹²⁵ The Club of Rome, made up of a diverse group of intellectuals, commissioned a report on the future problems of

¹²³ This is not to say that there was not considerable skepticism regarding the usefulness of the future-oriented approach. In 1967, seven of the eleven contracts for the Office of Civil Defense undertaken by Hudson Institute produced findings and reports that were deemed "less useful than had been expected, or required major revisions," McWhirter, "I am one of the 10 most famous obscure Americans," 113.

¹²⁴ Kleiner, *The Age of Heretics*, 251. See Chapter 3 for a more on the Club of Rome.

¹²⁵ Matthias Schmelzer has recently made clear that the OECD has been crucial, and largely neglected, in the history of the Club of Rome. For more on this debate, see Chapter 3. Matthias Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm* (Cambridge: Cambridge University Press, 2016).

mankind. Italian industrialist, former Fiat executive, and anti-fascist Aurelio Peccei, the founder of the group, was concerned that the future was threatened by problems of pollution, scarcity of resources, and population growth, on a scale and complexity too large for an individual to manage.¹²⁶ It was the crisis of crises, the problem of mankind, "le problème". The data from the report came from MIT systems scientist Jay Forrester's world dynamics computer model, an outcome of his Systems Dynamics approach from the 1950s and 60s.¹²⁷ The Club of Rome commissioned Forrester to develop five world systems simulations. According to *The Limits to Growth*, the 1972 report on the simulation outcomes, there was a fundamental incompatibility between growth of the population and production and the limits of natural resources and the absorption of pollution in the atmosphere.¹²⁸ It was not so much that Kahn and Wiener believed the Club of Rome reports to be wrong, or that the idea of limits was entirely misguided. Instead, what bothered them was the "crash and burn" computer model provided by Forrester, did not account for "potentials for innovation," and the lack of optimism might mean a loss of aspirations.¹²⁹

¹²⁶ Elodie Blanchard, "Technoscientific Cornucopian Futures versus Doomsday Futures: The World Models and The Limits to Growth," In *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future* (New York: Routledge, 2015): 94; See also Peter Moll, *From Scarcity to Sustainability. Futures Studies and the Environment: The Role of the Club of Rome* (Frankfurt a.M.: Peter Lang, 1991).

¹²⁷ Thomas and Williams, "The epistemologies of non-forecasting simulations, part I: industrial dynamics and management pedagogy at MIT"; Edwards, *The Closed World*.

¹²⁸ Blanchard, "Technoscientific Cornucopian Futures versus Doomsday Futures," 92.

¹²⁹ Kleiner, *The Age of Heretics*, 250.

At the turn of the 1970s, Hudson Institute expanded their scope, building on the unexpected popularity of *The Year 2000* in the business world. The scenario methodology was well-received by corporate leaders, anxious about the major social transformations and technological disruptions.¹³⁰ After the establishment of the Corporate Environment Program (CEP) in 1970, Hudson Institute produced essays, papers, chartbooks, and organized meetings and seminars in the United States, Europe, and Japan on scenario methodologies.¹³¹ Executives from IBM, Coca-Cola, General Motors, and Royal/Dutch Shell paid heavily to be briefed by Kahn on his optimism for economic growth and prosperity, with caveats.



**Figure 6. “Corporate Strategy in the Seventies,”
with Herman Kahn, Daniel Bell, and Anthony Wiener.¹³²**

¹³⁰ Pickett “A History of Hudson Institute,” 15.

¹³¹ Pickett “A History of Hudson Institute,” 16.

¹³² Undated. Source: Hudson Institute Archive, National Defense University.

It was at the Hudson Institute lecture-seminars that Shell planners, like Ted Newland and Pierre Wack, first encountered scenario planning.¹³³ Kahn's economic optimism and epistemological concerns were a good match for businessmen from multinational corporations like Newland: themes of economic growth and technological innovation guided the "Standard World" and, as Art Kleiner has pointed out, "corporate imaginaries."¹³⁴ Financed by 100 corporations, including General Electric, Mitsubishi, Royal Dutch/Shell, Time, Volvo and Xerox, the scenarios from the CEP ironically began to postulate more straight-line economic growth and prosperity, and less of the Faustian nuance of the earlier Year 2000 reports.¹³⁵ At the height of Hudson's prominence in the field of futurology in the 1970s, there were offices in Tokyo, Paris, and Montreal.¹³⁶

Hudson Institute's scenario techniques emerged from a sense that the future corporate environment, a complex dynamic of social, political, and technological forces, was incalculable; this understanding challenges conventional assumptions in the history of science that pivot on the importance of calculative strategies and technical capacities in uncertain conditions. The histories have examined the postwar efforts to quantify complex social and political phenomena as simplified equations in fields such as operations research. Although systems analysis and computer modeling played important

¹³³ Kleiner, *The Age of Heretics*, 131; On Shell Group Planning's development of scenario planning, see Chapter 4.

¹³⁴ Kleiner, *The Age of Heretics*, 251.

¹³⁵ See, for example, Herman Kahn and B. Bruce-Briggs, *Things to Come: Thinking about the Seventies and Eighties* (London: McMillan, 1972).

¹³⁶ Picket "A History of Hudson Institute," 17.

roles in developing corporate strategies, the critiques and limits of such models, also existed.

Hudson Institute's scenario methods, I suggest, were a kind of speculative technique that brought together the virtues of the imaginative and rational to bear on the unknowable character of the future. Hudson Institute's scenarios were multiple narrative articulation of "what if?" that took shape through Kahn's lengthy, free form presentations in isolated executive retreats common to intellectual discussion in the postwar period. Specific to the latter half of the twentieth century, Hudson Institute's scenario methods expanded from problems of national defense to larger concern about future economic, social, political, and technological changes beginning in the mid-1960s through the Hudson Institute's *The Year 2000*, and eventually, the Corporate Environment Program. Secondly, I campaign for a more complex portrait of Cold War rationality by tracing the way that sociologist of science Robert Merton's paradigm guided the creation of scenario methods. Hudson Institute's dissemination of scenario methodologies from military strategy marked a significant moment in the transformation of corporate planning efforts in the 1970s. After Hudson Institute's Corporate Environment Program, other consulting firms and corporations began developing their own interpretation of the scenario methodology. One alternative development of corporate scenario methods was at Stanford Research Institute, a subject I will turn to next.

CHAPTER 3:

THE TRANSCENDENTAL SCENARIO

Changing our values and premises is not just a good thing—it is a necessity.
-Willis W. Harman¹

The various aspects of the world macro-problem are appearing more and more like
surface manifestations of a pathogenic condition lying beneath the surface.
-Willis W. Harman²

A New Copernican Revolution?

In a 1969 article for *Stanford Today* entitled “The New Copernican Revolution,” electrical engineering professor turned policy analyst Willis Harman boldly claimed that mounting scientific evidence supported the coming of a “New Transcendentalism.”

Much like its nineteenth-century predecessor, Harman’s transcendentalism was a spiritual rebellion; this time, the visionary idealism aimed at a misguided “mechanistic and economic image of man” and “technocratic image” of American society.³ Evidence

¹ Willis Harman, "Alternative Futures and Educational Policy," Educational Policy Research Center (Menlo Park: Stanford Research Institute, 1970), 10.

² Harman, “Alternative Futures and Education Policy,” 8.

³ Harman’s transcendentalism referenced a diverse collection of nineteenth century American thinkers that originally emerged as a rebellion against rationalism within the Unitarian Church.

on altered states of consciousness from psychedelic researchers to clinical psychologists pushed Harman to search for an image of man capable of apprehending the mystical dimensions of the universe; Harman argued that once institutions accepted the transcendental image, they could shift to encourage personal growth, and enrich the American nation.⁴ At the core of Harman's alternative futures research at Stanford Research Institute (known as SRI International in 1977) was a quest to develop business and policy planning tools to enable such a transformation; this was the case when he started the SRI-based U.S Office of Health, Education and Welfare funded Educational Policy Research Center (EPRC) in 1967, and it continued in the Charles F. Kettering Foundation funded studies at SRI's Center for the Study of Social Policy in 1972.⁵

Inspired by German romanticism, transcendentalists sought a more personal and lively experience of Christianity. It was more than the natural philosophies of Ralph Waldo Emerson and Henry David Thoreau, and their pursuit of individual meaning, as popular imagination would have it. Between 1830 and 1850, the transcendentalists were an influential intellectual group pushing education reform, working to abolish slavery, and demanding emancipation for subjugated groups, including women, labourers, and the poor. Historian Philip Gura describes the transcendentalism as primarily as “a way of perceiving the world” centered on “individual consciousness” as opposed to “external fact” (8). However, much like Harman, there was considerable disagreements as to what this kind of thinking would mean, as to what the proper balance was between individualism and community, and as to exactly what universalist principles were in fact universal. Philip F. Gura, *American Transcendentalism: A History* (London, Macmillan, 2007); Also, Chris Jennings, *Paradise Now: The Story of American Utopianism* (New York, Random House, 2016), 189-202; Willis Harman, “The New Copernican Revolution,” *Journal of Humanistic Psychology* 9, no. 2 (1969): 132.

⁴ Willis W. Harman, “The Great Legitimacy Challenge—A Note on Interpreting the Present and Assessing the Future,” (speech delivered in Texas in October 1975): 29.

⁵ There were two Educational Policy Research Center launched in 1967. In addition to the one at SRI, there was another at Syracuse University. Interestingly, the Syracuse University center contracted to Herman Kahn at the Hudson Institute and the Institute for the Future, although the Hudson Institute was turned down for the original contract. Oliver W. Markley and Willis W. Harman (editors), *Changing Images of Man* (Oxford: Pergamon Press, 1982): xvii; See also, Organization for Economic Cooperation and Development, *Alternative Educational Futures in the United States and Europe: Methods, Issues and Policy Relevance* (Paris: OECD, 1970): 61-66, 71-74; Donald L. Nielson, *A Heritage of Innovation: SRI's First Half Century* (Menlo Park: SRI International, 2004).

Although not originally a corporate planning project, the SRI's alternative futures had a significant impact on corporate planning as corporations adopted SRI scenario methods.

This chapter examines the development of alternative futures by Willis Harman and associates at Stanford Research Institute starting in 1967. Specifically, it looks at the way that corporate scenario planning at SRI emerged from Harman's alternative futures research, which drew diverse countercultural mystical and psychedelic epistemologies together with rationalist mathematical engineering and military contingency methods typically associated with corporate planning. In doing so, the chapter puts forward two arguments, one central to the development of the larger dissertation on the history of corporate scenario planning, the other a modest disciplinary claim in conversation with the field of science studies. First, the chapter contends that corporate scenario planning constitutes a more extensive gathering of genealogies, including LSD experimentation, Gestalt holism, and "Eastern" philosophy, than are typically associated with mid-to-late twentieth century corporate techniques.⁶ In this, SRI's scenario techniques provides an example of the way the rationalities of mid-to-late twentieth century corporate strategies were created through diverse and contradictory genealogies that exceed the conventional understanding of Cold War rationality in the history of science. Secondly, corporate

⁶ I aim to add to the arguments from historians of psychology, like Nadine Weidman, regarding the importance of humanistic psychology's theories of human nature that appealed to countercultures and 'the Establishment.' Though the aims of countercultures and corporations were different, both were drawn to the legitimacy of the study of values and subjective experience. Nadine Weidman, "Between the Counterculture and the Corporation: Abraham Maslow and Humanistic Psychology in the 1960s," In *Groovy Science: The Counter-Cultures and Scientific Life, 1955-1975*, ed. David Kaiser and W. Patrick McCray (Chicago: University of Chicago Press, 2016), 109-134. Additionally, I build from critical scholar R. John Williams' contention that "cybernetic zen" is a powerful twentieth century corporate epistemology that joins together technological innovation and organic thinking of "Eastern" philosophy, promising enlightenment. R. John Williams, "Technê-Zen and the Spiritual Quality of Global Capitalism," *Critical Inquiry* 37, no. 1 (Autumn 2011): 17-70.

scenario planning developed in conversations with postwar critiques of science and technology, epistemologies that animated the early history of science studies as well as business strategy. That is, business leaders and bureaucrats engaged with critiques of technoscience as they were grappling with the unintended consequences of industrialization beginning in the late 1960s. In making this claim, the chapter suggests a more entangled and complex portrait of the legacies of the science studies discipline.⁷

The conceptual foundation of SRI's alternative future research emphasized the importance of changes in traditional values, echoing many strands of 1960s countercultures' self-expression and quest of personal growth and the New Left's critiques of bureaucracy and technocracy.⁸ SRI was indebted to Hudson Institute's synoptic alternative futures methodology and provocative narration of alternatives described in the last chapter. However, SRI disagreed with the conceptual foundations of Hudson Institute's alternative futures. Harman's critique centered on Hudson Institute's "Standard World" scenario, which proposed technological ingenuity could alleviate resource scarcity and inequalities. For Harman, the successful realization of the

⁷ I follow historians of science Elena Aronova and Simone Turchetti argument that there is a gap in our knowledge about the origins and development of the field of science studies, and its relationship to Cold War politics and expertise, a conception they seek to complicate. Elena Aronova and Simone Turchetti, eds., *Science Studies during the Cold War and Beyond* (Palgrave Studies in the History of Science and Technology, 2016).

⁸It is important to note the large body of literature dedicated to the distinctions and relationship between the New Left and countercultural movements. In simple terms, the New Left grew out of civil rights and Free Speech Movement, whereas the countercultural movements turned inward in contrast to the outward political focus of the New Left. See Rossinow, "The New Left in the Counterculture: Hypotheses and Evidence," *Radical History Review* 1997, no. 67 (1997): 79-120. Historian Fred Turner writes what distinguished the youth of the 1960s in the United States in distinct social movements. While the New Left grew out of civil rights and Free Speech Movement, the second was more internally than politically focussed. Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2010), 31-32.

“Standard World” scenario was bound to unintended consequences of “uncontrolled technology application and industrial development,” including pollution, environmental degradation, and ecological imbalance.⁹ Harman stressed that the question analysts must have when crafting alternative futures was not how to devise planning tools to properly harness technology, but rather to decide “whether the operative values which served so well in the development of modern technology are basically capable of handling its humane application.”¹⁰ That is, Harman did not trust that new technologies would enact effective revolutionary changes in society. This concern, which Harman aggressively reiterated in his SRI policy reports, critiqued existing methods more than offered solutions: “If such a revolutionary societal transformation were in process” he wrote, “would our methods of futures research discern this fact? Or...does most of our methodology subtly include prejudices that would be unable to acknowledge indications of change?”¹¹

Harman recognized that the United States faced numerous problems at the end the 1960s that technological innovations would not solve. As Cyrus Mody, Matthew Wisnioski, and other historians of science and technology have acknowledged, critiques of technology— that argued American technology was technocratic, elitist, and in the service of the military— proliferated in American institutions in the late 1960s.¹² Student

⁹ Willis Harman, “Context for Education in the Seventies,” Education Policy Research Center (Menlo Park: Stanford Research Institute, 1970), 2.

¹⁰ Harman, “Context for Education in the Seventies,” 2.

¹¹ Harman, “The Great Legitimacy Challenge—A Note on Interpreting the Present and Assessing the Future,” 23

¹² Matthew Wisnioski, *Engineers for Change: Competing Visions of Technology in 1960s America* (Cambridge: MIT Press, 2012); Cyrus CM Mody, "Santa Barbara Physicists in the

activists, as well as scientists housed in prestigious engineering and physical science departments, questioned the proper application of science in society.¹³ Thus, Harman was as much an instigator as he was a part of the wider cultural and scientific shifts in the mid-to-late 1960s, including postwar critiques of science and technology from public intellectuals like Jacques Ellul and Lewis Mumford, student protests against the Vietnam War, and the institutional and economic realities of physical science and engineering departments that sought funding sources after they lost their massive federal defense contracts.¹⁴

Bureaucratic solutions, Harman argued, would also be unable to resolve these contemporary troubles: “The nation is beset by numerous social problems which we point to with the terms of poverty, crime, racial discrimination, civil disorder, unemployment, pollution, and the like”; however, dealing with these problems “straightforwardly” through civil-rights legislation, minimum wage laws and welfare payments, urban-renewal problems, and protest, would fail, as they were “piecemeal”

Vietnam Era," in *Groovy Science: The Counter-Cultures and Scientific Life, 1955-1975*, ed. Cyrus CM Mody, David Kaiser, and W. Patrick McCray (Chicago: University of Chicago Press, 2016), 70-107.

¹³ Matthew Wisnioski, “Inside ‘the System’: Engineers, Scientists, and the Boundaries of Social Protest in the Long 1960s,” *History and Technology* 19 (2003): 313-33; Cyrus CM Mody, “How I learned to stop worrying and love the bomb, the nuclear reactor, the computer, ham radio, and recombinant DNA,” *Historical Studies in the Natural Sciences* 38, no. 3 (2008): 460.

¹⁴ Cyrus Mody argues that it was the economic realities of the Vietnam War that forced physics departments, like the one at UC Santa Barbara, to diversify their options, pursue interdisciplinary ventures, and develop civilian environmental applications and parapsychology. Mody, “Santa Barbara Physicists in the Vietnam Era.” Lewis Mumford, *The Myth of the Machine* (New York: Harcourt Brace Jovanovich, 1970); Jacques Ellul, *The Technological Society* (New York: Knopf, 1964). For the impact these developments had on the behavioral sciences and their social technologies in consumer culture and counterculture, see Alexandra Rutherford, “B.F. Skinner’s Technology of Behavior in American life: From Consumer Culture to Counterculture,” *The History of the Behavioral Sciences* Volume 39, Issue 1 (Winter 2003): 1-23.

approaches.¹⁵ These piecemeal solutions did not address what Harman saw as the underlying causes of national breakdown: misguided beliefs, values, and attitudes.¹⁶ Thus, “second level” planning solutions aimed at changing institutional structures bothered Harman; Harman instead targeted “third level” cultural assumptions and values that risked sabotaging institutional changes.¹⁷ For example, as Harman put it in 1968: “Combatting pollution of the environment is seen less as a matter of devising more perfect regulatory measures and more as a task of fostering wholesome relationships between man and nature.”¹⁸

The problems associated with modernization—what bureaucrats and academics began referring to as the “problems of modern society” in the late 1960s—preoccupied the SRI group’s alternative futures research.¹⁹ Although criticisms of modernization have a much longer history, the specific idea of “the problem of modern society” developed within an informal group of elite, all-male scientists, industrialists and bureaucrats

¹⁵ Willis Harman, “Education Policy Research—Toward a Unifying Focus,” Educational Policy Research Center (Menlo Park: Stanford Research Institute, 1968): 3.

¹⁶ Harman, “The New Copernican Revolution,” 5; historian of psychology Ellen Herman argued that by 1970, psychological expertise had transformed understanding of social problems, and their solutions, in the psychological terms of beliefs and attitudes. In her words, “The core imperatives of humanistic theory— to grow, to become, and to realize full human potential— were nothing less than democratic blueprints grafted onto the map of human subjectivity,” Ellen Herman, *The Romance of American Psychology: Political Culture in the Age of Experts* (Berkeley: University of California Press, 1996), 265.

¹⁷ Harman, “Education Policy Research—Toward a Unifying Focus,” 3-4.

¹⁸ Harman, “Education Policy Research—Toward a Unifying Focus,” 4.

¹⁹ For a discussion of “the problems of modern society” at OECD, see Matthias Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm*, Cambridge University Press, 2016, 239-244. Where I depart from Schmelzer is in the way that he deploys the Kuhnian paradigm as theoretical support for his argument. Differently, this chapter treats Kuhn’s work as a primary source.

connected to the OECD Committee on Science and Technology Policy, and specifically to its director Alexander King.²⁰ As historian of economics Matthias Schmelzer has shown, the OECD, and the lively debates concerning the negative effects of modernization, was the “cradle” of the Club of Rome.²¹ These debates emerged as business leaders and bureaucrats struggled to account for the unintended consequences of industrialization and modernization.

Although there is extensive scholarly inquiry on the Club of Rome, most of the research focuses on the widely popular 1972 report *Limits to Growth* and the Industrial Dynamics computer simulations of MIT systems scientist Jay W. Forrester.²² However, historians have largely neglected the fact that the debates about environmental limits preceded the computer simulations, and began within business and bureaucratic intellectual circles. Though not the predominating narrative inside bureaucratic institutions, debates about the negative ecological impacts of economic growth nonetheless rose in the 1960s, only to fall out of fashion by the stagflation and economic

²⁰ Matthias Schmelzer, "The crisis before the crisis: the ‘problems of modern society’ and the OECD, 1968–74," *European Review of History: Revue europeenne d'histoire* 19, no. 6 (2012): 1005.

²¹ Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm*, 246. For more on the Club of Rome, see Chapter 2.

²² See, for example, Paul N. Edwards “Global Comprehensive Models in Politics and Policymaking.” *Climatic Change* 32 (1996):149–161; Paul N. Edwards, “The World in a Machine: Origins and Impacts of Early Computerized Global Systems Models,” In *Systems, Experts, and Computers: The Systems Approach to Management and Engineering, World War II and After*, edited by Thomas P. Hughes and Agatha C. Hughes (Cambridge: MIT Press, 2000): 221–253; Elodie Blanchard, “Technoscientific cornucopian futures,” In Andersson, Jenny and Egle Rindzevičiūtė (Editors), *The Struggle for the Long-Term in Transnational Science and Politics: Forging the Future* (New York: Routledge, 2015): 92-111.

turmoil of the 1970s.²³ For example, King's OECD Committee on Science and Technology Policy, of which Harman was involved, debated the merits of economic growth as a marker for progress because this growth depended on limited natural resources with significant ecological costs.²⁴

Harman built from the OECD's work, appropriating Italian industrialist, and future Club of Rome president, Aurelio Peccei's phrase "the world macroproblem," in his policy documents.²⁵ Though Peccei diffusely defined the world macroproblem, the expression generally referenced the interconnected issues of technological misuse and threats, poverty, overpopulation, and environmental degradation.²⁶ Through the framework of "the world macroproblem," SRI's scenarios consolidated the dispersed problems of planetary limits, the increasing discontents about rising economic disparities and other inequalities, and the disruptive capabilities of 'non-industrialized' nations.

²³ Schmelzer, "The crisis before the crisis: the 'problems of modern society' and the OECD, 1968–74," 1000; Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm*. On economic turmoil's impact on 1970s scenarios, see chapter 5.

²⁴ Schmelzer, "The crisis before the crisis: the 'problems of modern society' and the OECD, 1968–74," 1002.

²⁵ Aurelio Peccei's *The Chasm Ahead* (1969) is a bizarre text on the growing technological disparities between North America and Europe. Peccei defines this gap as "between the GM age and the IBM age" (64). Peccei also proposes a multi-national sponsored study on systematic, long-term planning called "Project 1969" that would integrate both 'mankind' and 'his environment'; See also, Aurelio Peccei, *One Hundred Pages for the Future: Reflections of the President of the Club of Rome* (Oxford: Pergamon Press, 1981).

²⁶ In one EPRC report, Harman put it this way: The macro-problem "is the composite of all the problems that have been brought about by a combination of rampant technological application and industrial development, together with high population levels." Indirectly aiming at the Hudson Institute, Harman was weary that "even among the informed" there would be a tendency to trust that "new technological breakthroughs will be achieved that will enable us to control pollution" and "technological breakthroughs in contraception will take care of the population explosion" and, even more relevant, that "the right programs for urban problems will begin to reduce the severity of the problems of racism in the nation," Harman, "Alternative Futures and Educational Policy," 6-7.

Harman, borrowing from familiar technological critiques of the era, and in a 1972 address to the White House, declared: “the industrial era, which can be thought of as (in historical terms) a gigantic unprecedented step toward new possibilities for man, has been based in a paradigm which, however well suited to that step, seems now fundamentally inappropriate to the task of constructing a humane world on the base of those technological accomplishments.”²⁷

By 1970, the optimistic alternative futures of the Hudson Institute—and the economic growth and technological innovations they assumed could absolve limits—became a point of contention in long range planning discussions.²⁸ The shortcomings of industrial-era metaphors that brought about growth-and-consumption ethics, “predict-and-control oriented” values, and limited models of economically-motivated people, interested not only Harman and his SRI associates, especially Oliver M. Markley and Duane Elign; they also commanded attention from United States government and multinational corporations trying to understand the implication for the future in a period marked by limits.²⁹ While Hudson Institute’s Standard World scenarios have received considerable historical recognition, SRI’s alternative future trees have been lost from the

²⁷ Willis Harman, “Planning Amid Forces for Institutional Change,” *Educational Policy Research Center*, (Menlo Park: Stanford Research Institute, 1971), 9.

²⁸ The three best-selling books that framed the limits debate were The Club of Rome’s *The Limits to Growth* (1972), Paul Ehrlich’s *The Population Bomb* (1968), and Barry Commoner’s *The Closing Circle* (1971). Later counterarguments included Herman Kahn’s and Julian Simon’s *The Resourceful Earth: A Response to Global 2000* (1984). Popular journal articles on the topic were also formative. See, for example, Edward Jay Epstein, “Good News from Mr. Bad News,” *New York Magazine*, 9 August 1976, 35-42.

²⁹ See, for example, White House Conference on the Industrial World Ahead, “A Look at Business in 1990,” Washington, D.C., February 7-9, 1972 (November 1972); Willis Harman, *An Incomplete Guide to the Future*, New York: W. W. Norton & Company, 1976, 32; OECD, *Science, Growth and Society, Report on the Secretary-General’s Ad Hoc Group on New Concepts of Science Policy* (Paris: OECD, 1971).

historical record. Revisiting these lost alternative future trees reveals a more heterogeneous array of genealogies gathered in scenario planning methodologies.

The construction of multiple “alternative future histories” pioneered by the Hudson Institute became the basis for Harman’s research at Stanford Research Institute.³⁰ Different from Hudson Institute’s optimism about the ability of technology to surpass limits, the SRI group saw adhering to those limits as the predominant concern of the long-term future. However, both sought alternative futures because they believed the future to be generally uncertain; both shared a diagnosis that the current planning systems, like technological forecasting, were based upon naively assumed values and premises that demanded reexamination. Both believed that future environments could be imagined by parsing and manipulating an array of variables, certain and uncertain. The SRI group developed its own approach for generating those variables and for relating different alternative futures based upon limits and contingencies, reconstituting the boundaries of plausible alternative futures left out by Hudson Institute.³¹

Other bureaucrats and academics that were interested in the world macroproblem, like the Club of Rome, eventually looked to systems-based computer analyses and global modelling to generate debate.³² In contrast, and like the Hudson Institute, the SRI group

³⁰ By 1970, it was common knowledge that “it is impossible to predict a single most probable course of evolution for the world or for any significant part of its human component.” Like Hudson Institute, Harman sought “a useful set of bracketing descriptions of what may come to be must be schematically commensurate with what actually will emerge. That is, each projected alternative must be (insofar as imagination and skill can make it so) an internally consistent whole.” Harman, “Alternative Futures and Education Policy,” 1.

³¹ See, for example, the Lewinian-inspired field sector map, Figure 6. “Lewinian Social Field Map” from this chapter.

³² The history of the Club of Rome is covered in Peter Moll, *From Scarcity to Sustainability: Futures Studies and the Environment: The Role of the Club of Rome* (Frankfurt: Peter Lang, 1991), especially Chapter 1-2; William Thomas and Lambert Williams have argued that

used the narrative-based technique that schematized multiple futures. Yet, distinct from the Hudson Institute, the SRI group focused heavily on changing humanistic values. This chapter examines how the imaginative thinking of the SRI team combined intellectual resources including the social field theory of Gestalt psychologist Kurt Lewin, contingency analysis from RAND, and “relaxation techniques” from mathematical engineering to build their scenario techniques imagining the outcomes of a large-scale paradigm shifts in values and beliefs.

Beginning with Harman’s background in psychedelic research and humanistic psychology while an engineering professor at Stanford University, this chapter shows how the scenario techniques at SRI drew together countercultural mystical and psychedelic epistemologies with rationalist engineering approaches more commonly associated with corporate planning. Just as the transcendental scenarios of Harman’s team gain popularity, however, changing goals at SRI, and the recessions and stagflation leading to the redirection of long-term planning efforts at SRI, halted Harman’s alternative futures research. To conclude, the chapter describes how the transcendental scenarios were nonetheless methodologically connected to epistemologies central to the origins of science studies, as well as larger efforts to develop alternative expertise on ways to analyze values in the external business environment. A diluted version of this approach would then go on to influence marketing and consulting efforts at SRI and

computer simulations, like Forrester’s Industrial Dynamics simulations, were actually meant to be heuristics. They argue that science studies scholars have generally misunderstood the Industrial Dynamics as a command-and-control technology to manage complicated urban development and economic growth. Lambert Williams and William Thomas, “The Epistemologies of Non-Forecasting Simulations, Part I: Industrial Dynamics and Management Pedagogy at MIT”, *Science in Context* 22, no. 02 (June 2009): 248.

subsequent corporate scenario planning efforts in the mid-1970s to different effects, as the next chapter will show.

Willis Harman and the Changing Times at Stanford

Willis W. Harman began his career as an electrical engineering professor at Stanford University in 1952, following the completion of his PhD on radio vacuum tubes. Like some other engineering professors disaffected by technology during this period in Silicon Valley, he became involved in the Sequoia Seminars, originally a Christian gospel group that evolved into a mystical movement.³³ The Sequoia Seminars, started by mechanical engineer and Stanford University law professor Harry Rathbun and his wife Emilia in 1946, blended the Rathbun's passion for studying the Christian gospels with the psychological teachings of Carl Jung and the evolutionary philosophies of British philosopher and parapsychologist Gerald Heard.³⁴ During the seminars, participants studied mysticism, psychic phenomenon, meditation and self-understanding, and grappled with critiques of the secular "mechanistic worldviews" provided by

³³ For the experience of AMPEX engineer and psychedelics researcher Myron Stollaroff and his relationship to the Sequoia Group, see Peter Sachs Collopy, "The Revolution Will Not Be Videotaped: Making a Technology of Consciousness in the Long 1960s" (PhD dissertation, University of Pennsylvania, 2015), 103-119.

³⁴ Steven M. Gelber, "Sequoia Seminar: The Sources of Religious Sectarianism," *California History* 69, no. 1 (1990): 40. On the Sequoia Seminars, see Steven M. Gelber, "Sequoia Seminar: The Sources of Religious Sectarianism"; Steven M. Gelber and Martin L. Cook, *Saving the Earth: The History of a Middle-Class Millenarian Movement* (Berkeley: University of California Press, 1990), 84-87; Myron Stolaroff, *Thanatos to Eros: Thirty-Five Years of Psychedelic Exploration*, (Thaneros Press, 1994): 24-25; John Markoff, *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (New York: Penguin, 2005).

engineering as well as Freud's psychoanalysis and Watson's behaviourism.³⁵ The Sequoia Seminars followed a longer mystical and spiritual tradition that accompanied the physical sciences since at least the nineteenth century.³⁶

Before the Sequoia Seminars, Harman identified as a 'rationally-minded' engineering professor. He fought in WW2 and built his family in the culture of Californian postwar engineering. Harman's personal transformation in consciousness began with his first experience with LSD at the Sequoia Seminars in 1956.³⁷ It changed the course of his career at Stanford University and circuitously led him to alternative futures research at Stanford Research Institute. Starting in 1961, he became an affiliated researcher at the psychedelics research agency the International Foundation for Advanced Study (IFAS) founded by fellow Sequoia Seminar participant Myron

³⁵ The seminar techniques were experiential in aim, and would later be recognized as EST. Many of the original Sequoia Seminar members would take leading roles in the humanistic psychology movement, including Willis Harman, Gelber and Cook, *Saving the Earth: The History of a Middle-Class Millenarian Movement*, 82-84. This critique—a quest toward the philosophical and theological in the face of increasing positivism – is also central to the beginnings of humanistic psychology. On humanistic psychology, see Jessica Grogan, *Encountering America: Humanistic Psychology, Sixties Culture and the Shaping of the Modern Self* (New York: Harpers Perennial, 2013) and Roy Jose DeCarvalho, *The Founders of Humanistic Psychology* (Westport: Praeger Publishers, 1991).

³⁶ See, for example, John Tresch, *The Romantic Machine: Utopian Science and Technology after Napoleon* (Chicago: University of Chicago Press, 2012).

³⁷ His first trip happened within a smaller group of Sequoia Seminar participants made up of engineers and their wives. The drug came into the seminar by AMPEX engineer Myron Stolaroff—who had connected with Al Hubbard's Vancouver clinic, The Commission for the Study of Creative Imagination. Members included the Saskatchewan researchers, as well as Aldous Huxley and Gerald Heard. Al Hubbard started his clinic after visiting the Weyburn Saskatchewan clinic. Erika Dyck, *Psychedelic Psychiatry: LSD from Clinic to Campus* (Baltimore: JHU Press, 2010), 97. The format of the LSD sessions was formal: "One Monday night a member of the group would take LSD," "and the rest of us would support him or her. The following Monday night the subject would share in detail his/her experience, and the following week we would proceed to the next member." Harman, Personal Note, undated. On the LSD group at the Sequoia Seminars, see Sachs Collopy, "The Revolution Will Not be Videotaped," 118.

Stolaroff.³⁸ By 1962, Harman had developed a cult following at Stanford University due to his elective course on human potential in the engineering department.³⁹ It introduced students to what at the time were completely radical ideas about the expansive nature of reality through the discussion of scientific studies in quantum mechanics, ESP, and psychokinesis. Harman's scientific credentials gave his non-traditional research and intellectual experimentation credibility, and his course inspired a generation of business and engineering students, as well as psychology majors.⁴⁰

During Harman's tenure at IFAS, he came to believe that the "mind-expanding" potentials of consciousness, aided by tools like psychedelic agents, could help solve the

³⁸ Before being outlawed by the United States Food and Drug Administration in 1966, psychedelic researchers sought to explore the use of psychedelic agents, like LSD, to aid addiction treatment and psychotherapy, mimic psychosis, and enhance creativity and spiritual growth. Historian of psychology Erika Dyck has traced the history of medical LSD research of psychiatrists Humphry Osmond and Abram Hoffer in Weyburn, Saskatchewan starting in the 1950s. She offers an account that differs from the drug's history as a tool for military interrogation or cultural rebellion. She stresses that the experiments were not "marginal, unethical, or unprofessional, even by contemporary standards." Dyck, *Psychedelic Psychiatry*, 2. Continuing in this tradition, fellow Sequoia Seminar participant Myron Stolaroff, opened IFAS in Menlo Park. Harman was a member of the research team organized under medical direction of psychiatrist Dr. Charles Savage from the National Institute of Mental Health. At IFAS, they worked with the research protocols from the reputable Saskatchewan clinic and reported their use to the government agencies they were working with regularly. They sought to use LSD as a tool for harnessing creativity and solving complex problems. They focused specifically on studying the use of LSD in scientific-and-engineering minded people to examine its effects on their creative problem solving and perspectives on the nature of reality. It was at a moment that a larger network of researchers sought legitimacy for psychedelic studies, and there was an influx of governmental and medical funding for the studies, that would quickly evaporate in 1966 with increasing psychedelic drug abuse. Their publications were numerous, including: Sherwood et. al, "The Psychedelic Experience—A New Concept in Psychotherapy," 1962; On the Saskatchewan clinic, see Dyck, *Psychedelic Psychiatry*.

³⁹ In 1962, Harman was one of the only professors at Stanford University connected to the rising humanistic psychology movement. Fran and David Korten, personal communication.

⁴⁰ At the end of the seminar, where they studied Eastern philosophy and metaphysics, Harman offered students the chance to take LSD with IFAS for the cost of 500 dollars. Korten, personal communication.

complex problems facing the United States.⁴¹ The peer-reviewed IFAS studies reveal the expansiveness of his visions. IFAS's first publication "The Psychedelic Experience—A New Concept in Psychotherapy" from 1962 for example, includes an appendix, entitled "The Seeming Universality of Perception in the Psychedelic Experience," in which Harman discusses how changes in perception produced by psychedelics could be explained through the holism of the perennial philosophy articulated by British writer and philosopher Aldous Huxley in the bestseller *The Perennial Philosophy* (1945).⁴² Mistakenly attributed by Huxley to the philosopher and polymath Gottfried Leibniz, the perennial philosophy (*philosophia perrrenis*) referred to a "metaphysic that recognizes a divine Reality substantial to the world of things and lives and minds."⁴³ In other words,

⁴¹ IFAS frames the psychedelic experience in the terms of British writer and philosopher Aldous Huxley's first, well-publicized, trip on mescaline. For Huxley, taking the drug "allowed him to reflect on both simple and complex matters from a clear perspective so that he was abler to contemplate the deeper and subjective meaning of life." Huxley frames hallucinogens as a way to open the mind's "reductive valve": thus, allowing one to experience the world unfiltered and uninhibited. As Huxley writes, "Most people, most of the time, know only what comes through the reducing valve and is consecrated as genuinely real by the local language. Certain persons, however, seem to be born with a kind of by-pass that circumvents the reducing valve. In others temporary bypasses may be acquired either spontaneously, or as the result of deliberate "spiritual exercises," ... or by means of drugs." Aldous Huxley, *Doors of Perception* (London: Chatto and Windus, 1954): 22. Huxley describes how mescaline shook him "out of the ruts of ordinary perception" to see the relationship of his inner and outer worlds: as they are apprehended, directly and unconditionally." Huxley, *Doors of Perception*, 22.

⁴² The researchers provided a massive 100-200 mg dose of LSD with an additional 200 to 400 mg of mescaline to produce a personal transformation—i.e. to have the subject discover the infiniteness of his own being, something like the peak experiences studied by Maslow. Following the guideline on the "set and setting" from medical research protocols from Weyburn, Saskatchewan the sessions were held after preparatory therapy session and in a, "tastefully furnished room" with a tape recorder, record player, and "various carefully chosen works of art." Sherwood et. al, "The Psychedelic Experience—A New Concept in Psychotherapy," *Journal of Neuropsychiatry* 4 (1962): 73.

⁴³ Jeffrey Kripal notes that "perennial philosophy" probably came from Renaissance philosopher Marsilio Ficino. Jeffrey Kripal, *Esalen: America and the Religion of No Religion* (Chicago: University of Chicago Press, 2007): 481. From Aldous Huxley, *The Perennial Philosophy* (New York: Harpers & Brothers, 1945):12.

there was an evolved absolute reality that only few could access. In Harman's terms, and the way it was taken up by psychedelic researchers and the Americans humanistic psychologists, it was a way of conceptualizing "an image of man as part of a Whole, potentially capable of an awareness transcending ordinary awareness."⁴⁴

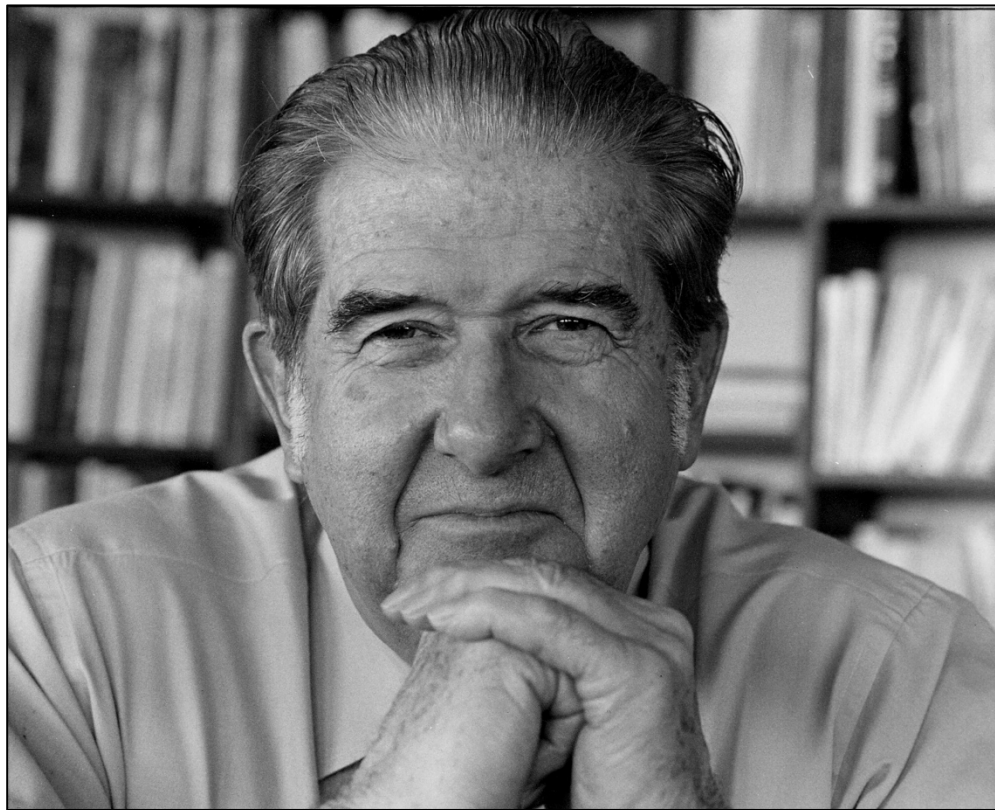


Figure 7. Willis W. Harman.⁴⁵

⁴⁴ Willis Harman, "Policies for National Reunification," *The Journal of Creative Behavior* 4, no. 4 (1970): 287-88.

⁴⁵ Special Collections, Stanford University.

Harman recognized that uniting under the goals and principles of perennial philosophy would enable a view of “man” as “part of Nature,” an obligatory requirement for “resolving the planet’s ecological problems.”⁴⁶ This followed Harman’s bold proclamation that the entire conceptual premise of industrialized American society caused the world’s seemingly unsolvable problems. Harman’s commitment to Huxley’s perennial philosophy assumed that there was a ‘true’ essence within that could be accessed with tools, like psychedelics. Christian mysticism, Zen Buddhism—or, as is the case for Harman, psychedelic agents—could induce experiences where an individual was capable of understanding the relationship of themselves to the universe. In Huxley’s language, psychedelic chemicals enabled one to transition from a “close belief-disbelief system” to an “open, healthy belief system.”⁴⁷ Certainly, the relativism of the perennial philosophy can also be found in humanistic psychology’s “religion of no religion,” what Jeffrey Kripal, in his portrait of Esalen Institute, has described as “creatively suspended between the revelations of the religions and the democratic, pluralistic and scientific revolutions of modernity.”⁴⁸

Harman echoed many of the postulates contained in IFAS’s early psychedelic research in his subsequent alternative futures research at Stanford Research Institute. He left IFAS in 1966 when the FDA halted further research on LSD medical experimentation. IFAS was forced to return the remaining funds and close the doors of the research center. In 1967, Harman left his position as a professor of engineering-

⁴⁶ Harman, “Policies for National Reunification,” 288.

⁴⁷ Sherwood et. al, “The Psychedelic Experience—A New Concept in Psychotherapy,” 79.

⁴⁸ Kripal, *Esalen: America and the Religion of No Religion*, 23.

economic systems at Stanford University and began working with Stanford Research Institute, as the Vietnam War was draining military budgets, forcing the academic-industrial think tank to diversify their long-range planning operations, in order to capture a larger market share in the business sector.⁴⁹

Harman joined Stanford Research Institute to direct the Education Policy Research Center on a contract sponsored by the Department of Education, to create policy solutions for education and society in the United States into the 1990s. Originally, Harman was recruited to do “technological forecasting,” the briefly popular social scientific practice of identifying the social and political implications of technological tools.⁵⁰ Many of his researchers at the new center were former students from his human potential seminars. The Education Policy Research Center had two objectives: 1. To determine how education can be best employed to prepare citizens for the evolving future, and 2. To determine how education can be employed to “design” the kinds of future policy makers desired.⁵¹ Though these objectives did not differ dramatically from the aims of the disciplines of engineering in the latter half of the twentieth century, for

⁴⁹ Kleiner, *The Age of Heretics*, 168; Cyrus Mody also discusses the funding trends that redirected many physicists into environmental and more pragmatic applications of physical sciences. Mody, “Santa Barbara Physicists in the Vietnam Era,” 74.

⁵⁰ Different from scenario writing and alternative futures, technological forecasting is a quantitative, probabilistic assessment of the likelihood of future technologies “with relatively high confidence” (15). Technological forecasting emerged as a “management discipline” around 1960. Though, developments began in the mid-1940s as a way to “attain “informed judgement” through systematic and comprehensive evaluation” (17). The most comprehensive account of technological forecasting is by OECD’s Erich Jantsch, the 1967 state-of-the-art study *Technological Forecasting in Perspective* commissioned by Alexander King, the report influenced the direct of planners until the 1970s. Erich Jantsch, *Technological Forecasting in Perspective* (Paris: OECD, 1967).; See also, Kleiner, *The Age of Heretics*, 197-198.

⁵¹ Harman, “Alternative Futures and Education Policy.”

Harman these aims meant nothing short of an entire reformulation of the conceptual premise of modern society.

Harman stressed that the industrial era lacked appropriate values to counter the effects of increasing centralization and concentration of power and unequal distribution of wealth. At a presentation on “Planning in the Seventies” sponsored by the American Society for Public Administration in 1971, Harman argued: “what was not clearly understood in 1960 and is more apparent now, is that a fundamental incompatibility exists between these aims [for example, to decrease inequality and enable self-fulfillment] and the dominant paradigm of the industrial state.”⁵² Looking back on Harman’s vision now, it is unthinkable that a government-sponsored policy outfit would be selected to offer such unconventional views for the future of the United States. Yet, this is exactly what happened at SRI in the 1970s. It is difficult to pinpoint whether cultural and social crisis, pragmatic budgetary diversification, or revolutionary fervor led to the sponsoring of the project. However, it was likely to be a mix of all of the above.

The late 1960s was a period of change for Stanford Research Institute. Following the student protests of 1968 against the increase in military-sponsored research and development at SRI, Stanford University divested from the organization in 1970.⁵³

Although it became enmeshed in federal government contracts—including the Vietnam

⁵² Harman, “Planning Amid Forces for Institutional Change,” 9; I thank financial historian Justin Douglas for pointing me to the larger critiques of economic growth from American economists in the 1950s. See, for example: John Kenneth Galbraith, *The Affluent Society* (New York: Houghton Mifflin, 1958).

⁵³In 1977, Stanford Research Institute became SRI International, and many members from Stanford University continued to work with the numerous projects of the institute.

and Korean Wars—federal contract work was not the original goal.⁵⁴ Stanford Research Institute was a non-profit research institution founded by the trustees of Stanford University and a group of West Coast industrialist in 1946 united in an effort toward “economic progress, and strengthening of private business on an international scale.”⁵⁵ Stanford University received a portion of the profits, and Stanford Research Institute accessed the scientists and engineers from Stanford University. As an SRI Committee Report from 1969 put it, SRI was crucial for “providing valuable service to business on the West Coast.”⁵⁶ This was a good fit for Harman, as he considered business organizations to be an important site for intellectual freedom and self-discovery.⁵⁷ Like

⁵⁴ As Rebecca Lowen has noted, there is very little written about SRI. Partially this is because SRI International has not opened their archives for scholars. For an internal history of the organization, see the two volume, “boosterish” history by Weldon B. Gibson, *SRI: The Founding Years* (Los Altos, CA: Publishing Services Center, 1980) and *SRI: The Take-Off Days Years* (Los Altos, CA: Publishing Services Center, 1986). Also: Rebecca Lowen, *Creating the Cold War University: The Transformation of Stanford* (Berkeley: University of California Press, 1997).; Rebecca Lowen, “Stanford Research Institute,” in Marc Rothenberg, ed. *The History of Science in the United States: An Encyclopedia*, Vol. 842, (New York: Taylor & Francis, 2001), 538.

⁵⁵ SRI-International Journal, Number 11, 1969.

⁵⁶ SRI Committee Report, printed in *The Stanford Daily*, 15 April 1969; Lowen, *Creating the Cold War University: The Transformation of Stanford*.

⁵⁷ “Business has a special role in this transition period,” wrote Willis Harman in “Rethinking the Human Spirit,” a talk for the countercultural business group, World Business Academy. “For one thing, business is a commanding presence simply in terms of the effect its activities will have on the future, for good or ill. Secondly, the business corporation is perhaps the most flexible organization ever invented for responding promptly to changes in the environment, once they are seen. Thirdly, in recent years, business has attracted many of the very best people and put them in top management positions. A lot of these executives can see clearly the necessity for fundamental change, even though they may not see for the moment just how their organizations should respond. Willis W. Harman, “Rethinking the Human Spirit,” World Business Academy. He was also involved in the February 1972 conference at a White House Conference on the Industrial World Ahead presided over by President Nixon. Harman was interested in “inclusive growth”—which is to say that growth is important, but that it should include other indicators of wellbeing outside of GDP— something that has become a topic of interest in the contemporary at the OECD. See, for example, OECD, *Economic Policy Reforms 2017: Going for Growth* (Paris: OECD, 2017). Harman trusted that one must look inward in order to transform society—much like countercultural icon Theodore Rozsak proclaimed in his iconic *The Making of a*

Hudson Institute, by the mid-1960s, SRI consisted of a diverse network of international offices and laboratories, including centres in Washington, D.C. and New York, Switzerland and Tokyo, as well as representatives in Toronto and Milan.⁵⁸ When Harman started at Stanford Research Institute, the center was housed on the Stanford University Campus. This meant that there was an intermixing of countercultural intellectual activities and business ventures.⁵⁹

Consequently, it was by highlighting the importance of change in belief systems, including the ecological, spiritual, social and psychological, that SRI secured their first contract on alternative futures for the United States Department of Health, Education and Welfare. In their first research notes from 1967, entitled “Belief Systems, Scientific Findings, and Educational Policy,” Harman and his futures group underlined postulates from his earlier IFAS research, including that there was:

Counterculture (1969)—but Harman did not condone dropping out. Kleiner, *The Age of Heretics*, 285. In an interview with Kleiner, Harman stated: "Some people really drop out and totally change the outward form of their lives. I eventually concluded that right living, for me, means being in the establishment, being more or less acceptable to it. But by no means would I be of it. My destiny seems to be to help it to change."

⁵⁸ Though it is difficult to access corporate documents detailing the organizational layout, research reports list the regional offices. See, for example, the Advanced Research Project Agency sponsored report, Russell F. Rhyne, “The Strategic Setting for Conflict in South Thailand,” (Menlo Park: Stanford Research Institute, 1965), 51.

⁵⁹ As historians of science have recently shown, the understudied period of the “long 1960s” was a time of change that stretched beyond social and cultural movements to science and technology as well. David Kaiser and Patrick McCray’s anthology *Groovy Science* (2016), for example, identifies shifts in science and technology practices in relationship to countercultural movements. Importantly, this work collapses the division between countercultural movements—assumed to be against rationality and technocracy—and scientific experimentation. While meticulous when it comes to the nuances in the different strands of counterculture and science, however, these efforts are one-dimensional when it comes to business, relying on a simplified narrative of commodification laid out by Thomas Frank’s analysis of 1970s advertising in *The Conquest of Cool* (1997).

1. Increased emphasis on the connectedness of everything to everything; a kind of oneness
2. A shift in the locus of authority from external to internal; Growing disenchantment with external authorities and increasing reliance on intuitive, inner wisdom and authority
3. A shift in perceived location of cause from external to internal⁶⁰

Harman capitalized on two insights from Huxley's perennial philosophy first, as a way to understand psychedelic consciousness, then as a justification for SRI's alternative futures research. The first concept, 'being,' presented an idea that there was a higher awareness, a "cosmic consciousness," that, with the proper tools, could enable one to understand ultimate reality, the infinite and eternal. In Harman's words: "From the vantage point, one's own growth and creativity, and one's participation in the evolutionary process, are seen to be under the ultimate direction of a higher center."⁶¹ Second, 'awareness,' the concept that individuals experience ordinary perception as a *partial* perception was used as a way to explain the importance of coming to know and understand a greater reality.⁶² In this, Harman brought together a belief that society could live more harmoniously only if people were granted opportunities to develop and expand their perception, allowing them to become aware of the partiality of their understanding of the world.

In another alternative futures report, for example, Harman points to techniques, like psychedelic experimentation, that "jolt the person out of his habitual perceptions so

⁶⁰ Willis Harman, "Belief Systems, Scientific Findings, and Educational Policy," 5.

⁶¹ Harman, *An Incomplete Guide to the Future*, 101.

⁶² Harman, *An Incomplete Guide to the Future*, 103.

that he sees—as he has not before—both his own transcendental nature and the and the influences of social institutions.”⁶³ Harman suggests that policy research move to a view of “man-in-the-universe” that is “immemorial and universal,” a kind of policy perennial philosophy.⁶⁴ Harman set out three hypotheses that guided his futures research, relying heavily on the humanistic psychologists and the psychedelic researchers: 1. That the potentialities of individuals are far greater than we currently are able to realize; 2. That a large portion of the subjective human experience is comprised of unconscious processes, embodying things like “intuition and “creativity”—and psychedelic agents could provide access to these facilities; and, 3. The limited images of the self that we currently have become self-fulfilling.⁶⁵ Thus, the “mind-expanding” subjective experiences of psychedelics could change the pathological beliefs and values that led to the problems in the first place. The name psychedelic, mind-revealing, describes what the substances were about for Harman: these substances could unlock the doors of the unconscious mind.

Although on the fringes of SRI, Harman’s Educational Policy Research Center interacted with the larger advancements in planning at SRI in the late 1960s. By the late 1970s, Harman’s alternative futures were distributed by SRI’s corporate consulting arms to paying multinational corporations. Consulting services, like the Long Range Planning Report Service, launched at SRI in 1958, provided contextual mapping of future business environments and distributed the most widespread reports on longer-range technological

⁶³ Harman, *An Incomplete Guide to the Future*, 32.

⁶⁴ Harman, *An Incomplete Guide to the Future*, 32.

⁶⁵ Harman, “The New Copernican Revolution,” 4.

forecasts.⁶⁶ Later, it became the popular Business Intelligence Program, dedicated to “research and report on the economic, technological, social, and political changes occurring in the business environment and their potential impacts on business...for making better plans and decisions.”⁶⁷ SRI executive Weldon Gibson acclaims Harman’s contributions, noting they were “not just limited to gauging the future for corporate or government planning,” but they also included “mystical” concerns that framed the way corporations addressed “more holistic concepts of a planet of limited capacity” and “the human condition.”⁶⁸

Alternative Futures at SRI

When Harman secured the contract from the Department of Health, Education and Welfare in 1967 he did not have a clear idea of how he would create alternative futures for the next thirty years. Although he held steadfast to his conviction about the failures of the dominant paradigm, Harman had no systematic method to validate his

⁶⁶ Jantsch, *Technological Forecasting in Perspective*, 174; For a fee of \$4,0000, companies received the Long Range Planning Service (LRPS), a package comprising: 40 Long Range Planning Reports per year on technological, economic, social, or political changes; special Research studies; access to the “Planning Library” at SRI; and consultations. 400 companies and agencies were members by 1966. See, Jantsch, *Technological Forecasting in Perspective*, 299.

⁶⁷ Bill Royce, “A History of Strategic Management and Planning at SRI: LRPRS. LRPS. TAPP. CSP. BIP. DA. SMP. Etc.” (Menlo Park: Stanford Research Institute, March 31, 1985), Art Kleiner Collection, Box 3:3, Folder 2, Futures Library, Oxford University.

⁶⁸ Weldon B. Gibson, “Chapter 14: Business Consulting and Development,” *SRI: The Founding Years* (Los Altos, CA: Publishing Services Center, 1980), 14-7.

findings. At first his group experimented with Hudson Institute's "Standard World" scenarios, later moving to other mathematical methods and technological forecasting. However, these did little to confirm their hypothesis regarding the undesirability of the guiding principles of modern society.⁶⁹ Harman articulates his struggle over the use of methods in one policy briefing document in 1970:

A conflict exists between the basic premises of a democracy—that man is, by virtue of his transcendental nature, endowed with reason, will, and a valid sense of value—and the reductionistic, deterministic, physicalistic premises of the predominating behavioral-science and sociopolitical theory found in the universities which train the society's leaders. Sociology has shifted from its earlier emphasis on the semi-philosophical "humanities" approach to an emphasis on techniques and empirical studies, with the implication that man is a creature of his drives, habits, and social roles, and in whose behavior reason and choice play no decisive part.⁷⁰

Several issues were at stake in selecting an appropriate methodological approach, some of them reminiscent of Kahn and Mann's critiques in *Military Planning in an Uncertain World*. Like Kahn and Mann, the SRI group aimed at the conceptual limitations of purely quantitative analysis, as numbers were unable to capture the pluralism of views across different social organizations and individuals that constituted particular social and cultural environments.⁷¹ Harman claimed that if the method concentrated too much on

⁶⁹ Russell Foote Rhyne, *The Act of Choosing: A Context-Matching Theory, and Its Practical Implications* (New York: IUniverse, 2003), 232.

⁷⁰ Harman, "Context for Education in the Seventies," 6.

⁷¹ Russell F. Rhyne, "Projecting Whole-Body Future Patterns—The Field Anomaly Relaxation (FAR) Method," Education Policy Research Institute (Menlo Park: Stanford Research Institute, February 1971).

theoretical and rational analysis, it excluded irrational or unconscious forces.⁷² However, the specific methodology that could even comprehend the complexity of social worlds, and fluctuating subjective perceptions, was up for debate.

Harman eventually contracted former RAND and SRI operations analyst and management consultant Russell F. Rhyne from the research consultancy Johnson Research Associates in Santa Monica, California.⁷³ Rhyne's critiques of social planning systems based only in quantification, and his disenchantment with simulations for planning longer term social systems, and his previous work developing non-normative futures for business and military strategy, made Harman and Rhyne a good match. When Rhyne began to construct SRI's alternative futures, he built from contextual work he pioneered at Johnson Research Associates for corporate long-term clients and the Defense Department on contingent patterns and alternative world projects, a technique that would have little long-term influence. These alternative worlds described a plausible future environment where-in the future might play out, and importantly, included alternative evolutions of the environment that would enable one to examine present strategies. One inspiration, a 1968 report, "Contingent United States Patterns" focused on creating alternative future contexts through a complex bracketing of alternative political-economic and technological developments. These originated from Rhyne's more

⁷² Harman, *An Incomplete Guide to the Future*, 122.

⁷³ Rhyne had been a member of the Defense Analysis Center at Stanford Research Institute from 1962-1968, and before that, an operations analyst at RAND Corporation in the mid-1950s. In addition to his credentials in aeronautical engineering from California Institute of Technology, he also received a doctorate in philosophy for political science from University of California at Berkeley.

influential counterinsurgency work, notably in SRI's Counterinsurgency Surveillance Analysis Project in the early-to-mid 1960s,⁷⁴ and at the RAND Corporation.⁷⁵

Harman and Rhyne, both trained as engineers in the physical sciences, understood social systems to be much more complex and less predictable than physical systems.⁷⁶ At the same time, Rhyne and Harman did not outright reject empirical strategies common to physical engineering. Instead, they struggled to combine intuitive and calculative techniques, attempting both to attend to subjective experience and to validate these through the empiricism of the scientific method. Rhyne justified the necessity of introducing inventive methodologies in this way:

Many efforts by physical-science engineers to redesign social systems indeed have been crass and in a sense brutal. That has happened largely because atomistic approaches (*This* and *this* and therefore *that*) that work rather well in

⁷⁴ Interesting, a 1969 Stanford-SRI Study Committee report specifically names three of Rhyne's counterinsurgency reports for the Pentagon in South and Southeast Asian "economic development" projects as reason for divestment. These include, "Counterinsurgency communications requirements in Thailand," March 1965; "Communist terrorist camps in Southern Thailand," 1967; "Preliminary investigations of the vanadium vapor magnetometer in counterinsurgency surveillance," April 1967. SRI Committee Report, printed in *The Stanford Daily*, 15 April 1969, 11.

⁷⁵ "The strategic setting of a conflict, as we use the term, consists of those parts of the total environment—political, physical, military, etc.—which tend to induce some kinds of conflict and inhibit others," Rhyne wrote in the introduction to a 1965 SRI research memorandum, "The Strategic Setting for Conflict in South Thailand," 1. This approach, originally designed to create combat strategy, "begins with a description of aspects of local geographical, ecological, and communal relations, followed by brief treatment of the internal conditions in Thailand and Malaysia." Rhyne continues: "it is possible to describe the local conflict situation and to project three hypothetical lines of evolution whereby the present situation might become more serious." Rhyne, "The Strategic Setting for Conflict in South Thailand," 2.

⁷⁶ At the same time, there were other movements in physical engineering that aimed to approach electronic systems "holistically." See, Jones-Imhotep, Chapter 4 "Hostile Environments and Cold War Machines," *The Unreliable Nation: Hostile Nature and Technological Failure in the Cold War*.

the “hard” sciences have been carried over unthinkingly into the “soft” (and more difficult) sciences of man, where field relationships tend to dominate.⁷⁷

To reiterate, one must not understand Rhyne’s assertion as an outright rejection of “hard” sciences. In fact, Rhyne and Harman assumed the “rule-based” science methods should be utilized once subjective perceptions of the environment were represented. “The explicit focus on alternative, whole-body projections that is, [a self-consistent portrait of a future] was produced by the discovery that the corporate ten-year plan of Douglas Aircraft Company was being founded on component plans (submitted by the several divisions of the company) that were embedded in different, mutually exclusive pictures of what the world might be like,” Rhyne once explained.⁷⁸ That is, Rhyne and Johnson Research Associates offered a way for SRI to synthesize diverse perceptions about the future that could supposedly be empirically substantiated.

The method, what Rhyne called Field Anomaly Relaxation (FAR), mixed social field theory and mathematical relaxation to create non-normative, “quasi-organic whole-body futures.” The descriptions of the technique are vague and complicated, and frankly, unconvincing. Namely, Rhyne attempted to capture the complexity of qualitative social environments through intuitive methods while satisfying the empiricists with mathematical relaxation techniques, with dubious success. In the first research report for the EPRC in 1971, “Projecting Whole-Body Future Patterns—The Field Anomaly

⁷⁷ Rhyne, *The Act of Choosing*, 138.

⁷⁸ Rhyne, “Projecting Whole-Body Future Patterns—The Field Anomaly Relaxation (FAR) Method,” 11.

Relaxation (FAR) Method,” Rhyne emphasized the importance of method, insisting it was “an operational, practical, workaday tool.”⁷⁹

The actual FAR technique lacked precision—even Rhyne admits that some steps are “difficult to retain clearly within one’s own mind, difficult to explain to others, and difficult to adjust in response to criticism unless it is given some structure.”⁸⁰ However, the technique generated alternative future “trees” of “comparably plausible alternative scenarios” that aimed to “bracket” the future through “sequentially credible way[s] in which the contextual pattern[s]” might unfold.⁸¹ While there is nothing particularly insightful about Rhyne’s convoluted methodology, both the trees and the resultant scenarios, understood as a step-by-step process for imagining alternative future possibilities, provide an example of corporate scenario planning’s convoluted historical genealogies. The spiritual and methodological rebellion of the alternative future histories were intentionally complicated, relying more on transcendental idealism than on verifiable methodologies. SRI’s alternative future histories trees were evolutionary in inspiration, echoing Jesuit priest and paleontologist Teilhard de Chardin’s phylogenetic understanding of evolving consciousness.⁸²

Regardless, the alternative future trees developed from two primary modes of analysis. The first was semi-qualitative: Rhyne attempted to apply the social field theory methodology from the Gestalt psychologist Kurt Lewin to analyze complex fields of

⁷⁹ Rhyne, “Projecting Whole-Body Future Patterns,” 1.

⁸⁰ Rhyne, “Projecting Whole-Body Future Patterns,” 30.

⁸¹ Rhyne, *The Act of Choosing*, 232.

⁸² Pierre Teilhard de Chardin, *The Phenomenon of Man*, trans. Bernard Wall (New York: Harper Torchbooks, 1965), 192.

seemingly unquantifiable “social sectors.”⁸³ Lewin’s commitment to Gestalt holism, a reaction to the piecemeal approaches in experimental psychology based upon measurable independent variables and associated responses, was part of the reason for his warm reception into later American countercultural strains.⁸⁴ German Jewish émigré Kurt Lewin came to the United States in the mid-1930s, after completing his doctorate at the University of Berlin, a center for Gestalt psychology. Lewin was recruited by Massachusetts Institute of Technology in 1945 to set up the Research Center for Group Dynamics where he made advancements in the fields of action research and group dynamics. His research on group dynamics built the foundations for sensitivity training and the National Training Laboratories.⁸⁵ Although Lewin gained considerable fame in the interwar period, many found his grand theories dubious, lacking the controls necessary for experimental psychological investigation.⁸⁶

⁸³ Kurt Danziger, “Making Social Psychology Experimental: A Conceptual History, 1920-1970” *Journal of the History of the Behavioral Sciences*, Vol 36, 4(Fall 2000): 343; On Lewin, see Alfred Marrow, *The Practical Theorist: The Life and Work of Kurt Lewin* (New York: Basic Books, 1969).

⁸⁴ On the longer history of scientific holism, a reaction to “disenchantments” with “mechanistic,” “instrumental” natural science in interwar Germany, see Anne Harrington, *Reenchanted Science: Holism in German Culture from Wilhelm II to Hitler* (Princeton: Princeton University Press, 1996).

⁸⁵ By the 1940s, he was the preeminent social psychologist in America, attracting the attention of academics, like Margaret Mead and Gregory Bateson. He attended the early Macy Conferences, and had a profound impact on the work of Gregory Bateson’s theoretical understandings of “ecology of mind.”; on the relationship between Lewinian field theory and Bateson, see Peter Harries-Jones, *Upside-Down Gods: Gregory Bateson’s World of Difference* (Oxford: Oxford University Press, 2016). For more on the relationship of Gregory Bateson’s work and scenario techniques, see Chapter 5.

⁸⁶ Kurt Danziger, “Making Social Psychology Experimental: A Conceptual History, 1920-1970” *Journal of the History of the Behavioral Sciences*, Vol 36, 4 (Fall 2000).

Like Lewin, however, Rhyne maintained that outcomes and any process of change were the product of complex and interacting forces making up the surrounding environment, what Lewin called a “field.”⁸⁷ Rhyne drew from one of the premises of Lewinian field theory: the theoretical vision that individuals and groups, and their “multitude of co-existent interdependent” variables, must be understood in the context with the, in another one of Lewin’s words, “total situation.”⁸⁸ Lewin primarily used field theory as a means to analyze and change group behavior by constructing the psychological “forces” influencing an individual’s behaviors in their indeterminacy.⁸⁹ This “total situation” was more than lists or abstract theoretical language; Lewin preferred “topological maps,” building from the mathematical and geographical study of topological space rather than conventional Euclidean models.⁹⁰ Topological space, in Lewin’s words, enabled one “to speak in a mathematically precise manner of equality and differences of direction, and of changes in distance, without presupposing the “measuring” of angles, directions, and distances, which is usually not possible in a sociopsychological field.”⁹¹ This would, Lewin contended, avoid the “classificatory

⁸⁷ See Kurt Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods,” *American Journal of Sociology*, 44, 6 (May 1939), 868-896.

⁸⁸ Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods.”

⁸⁹ Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods.”

⁹⁰ Topological thinking is also a contemporary methodological concern in the politics of technoscience. As science studies scholar Michelle Murphy writes, “Topology names areas of study in mathematics and geography concerned with multidimensional space and crucially with the transformations, deformations, and interconnections within spatialized arrangements. See, for example, Michelle Murphy, *Seizing the Means of Reproduction: Entanglements of Feminism, Health, and Technoscience* (Durham: Duke University Press, 2012), 11-12.

⁹¹ Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods,” 891.

pigeonholes” that scientific methodologies forced upon group analyses.⁹² Lewin’s aim was nothing short of the philosophical reorientation of social psychology to the task of: “1. The integrating of vast areas of very divergent facts and aspects... [i.e. cultural, political, economic, etc.] 2. The treating of these facts on the basis of their interdependence...3. The handling of both historical and systematical problems...4. The handling of all “sizes” of objects or patterns...5. Problems of “atmosphere” (such as friendliness, pressure, etc.).⁹³ Social field theory was used by RAND operations analysts and organizational change management theorists even as it was overlooked by a postwar psychological profession moving towards empirically verifiable methodologies.⁹⁴

Historians of science in the collaboratively written *How Reason Almost Lost Its Mind* have written about Lewin’s field theory as a “methodologically defined” “heightened space of observation and intervention” as it was taken up by American Cold War era social scientists, like Leon Festinger and Paul Lazarsfeld.⁹⁵ This critique is part of a larger argument that Cold War social scientists operationalized rationality, attempting to guide decision-making processes through rigid rules and tight, experimentally controlled conditions. They describe Lewin’s “total situation” as a “mechanism” for standardization by creating “consistency” in “comparable units of behavior,” opening them up to intervention.⁹⁶ Certainly, part of this formulation is

⁹² Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods,” 891.

⁹³ Lewin, “Field Theory and Experiment in Social Psychology: Concepts and Methods,” 870.

⁹⁴ Danziger, “Making Social Psychology Experimental: A Conceptual History,” 342-343.

⁹⁵ Erickson et. al, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality*, 112-113.

⁹⁶ Erickson et. al, *How Reason Almost Lost Its Mind*, 112.

correct. Yet, flattening Lewinian field theory's complicated intellectual inspirations under rationalism or positivism is limited.⁹⁷ Though it was taken up by some Cold War psychologist instrumentally, as a way to control social situations, others, like Rhyne, followed Lewin's more utopian theoretical visions.

Lewin's field theory emerged from the concerns of Gestalt psychology, a German school of thought, offering a "holistic view" based upon subjective perception and the contextual environment, what some theorists call "atmospheres."⁹⁸ As critical scholars Javier Lezaun and Nerea Calvillo have argued, Lewin's contribution to social sciences was more than an elaboration of experimental laboratory conditions. Lewin's fields also attempted to "make explicit" the atmospheric conditions of the environment "conducive to the proliferation of staged but undermined events."⁹⁹ Alternative futures were not simply "a function of economic, demographic, technological, sociological, and political variables," Harman once argued.¹⁰⁰ Just as important were the affective atmospheres, including: "individuals' values and aspirations, attitudes and prejudices, beliefs and

⁹⁷ Lewin theories also animated cases against anti-racism in America in the postwar period. John P. Jackson Jr., *Social scientists for social justice: Making the case against segregation* (New York: New York University Press, 2001); Susan A. Glenn, "The Vogue of Jewish Self-Hatred in Post-World War II America." *Jewish Social Studies* (2006): 95-136.

⁹⁸ Bernard Burnes and Bill Cooke, "Kurt Lewin's Field Theory: A Review and Re-evaluation," *International Journal of Management Reviews* 15, no. 4 (2013): 420.

⁹⁹ Javier Lezaun and Nerea Calvillo, "In the Political Laboratory: Kurt Lewin's Atmospheres." *Journal of Cultural Economy* 7.4 (2014): 453. This argument follows philosopher Peter Sloterdijk's claim that the twentieth century became an era when "air-conditioning" and the creation of environments became governing practices. SRI's alternative futures are part of this tradition of taking aim at contextual conditions as social, political, and economic contained, yet indeterminate affective experiences, open to intervention. Peter Sloterdijk, *Terror from the Air* (Los Angeles: Semiotext(e), 2009).

¹⁰⁰ Harman, "Educational Policy Research—Toward a Unifying Focus," 7.

disbeliefs, visions and despairs.”¹⁰¹ At the same time, field theory allowed for the abstraction of systemic social problems, like economic inequality and racism, into individualized affective dimensions and perceptions.

What Lewin’s field theory provided for Rhyne, and subsequently Harman, was a way for each alternative future to feature a descriptive framework of indeterminate component elements, including affective dimensions and perceptions (what Rhyne called “sectors”) and alternative conditions for each sector (called “factors”). The sectors in Rhyne’s first alternative futures report “Projecting Whole-Body Future Patterns,” included economics, internal politics, science and technology, foreign relations, and U.S. demographic patterns and world population. Rhyne bracketed each alternative future—specifically, no more than six sectors and five or six alternative factors for each future—in order to examine of all the possible combinations which would be internally self-consistent so as to not be overwhelmed by hundreds of possible combinations (Figure 6). For example, the sector U.S Economics included the factors: prosperous, free-enterprise; slow growth, free enterprise; depression, free enterprise; prosperous, government control; unsuccessful, government control; non-expanding, successful; communalism. Rhyne’s grandiose vision articulated a multitude of factors and sectors in order to call attention to a wide range of possibilities. Rhyne then evaluated the combinations of factors within sectors through a seemingly complex matrix.

¹⁰¹ Harman, "Educational Policy Research—Toward a Unifying Focus," 7.

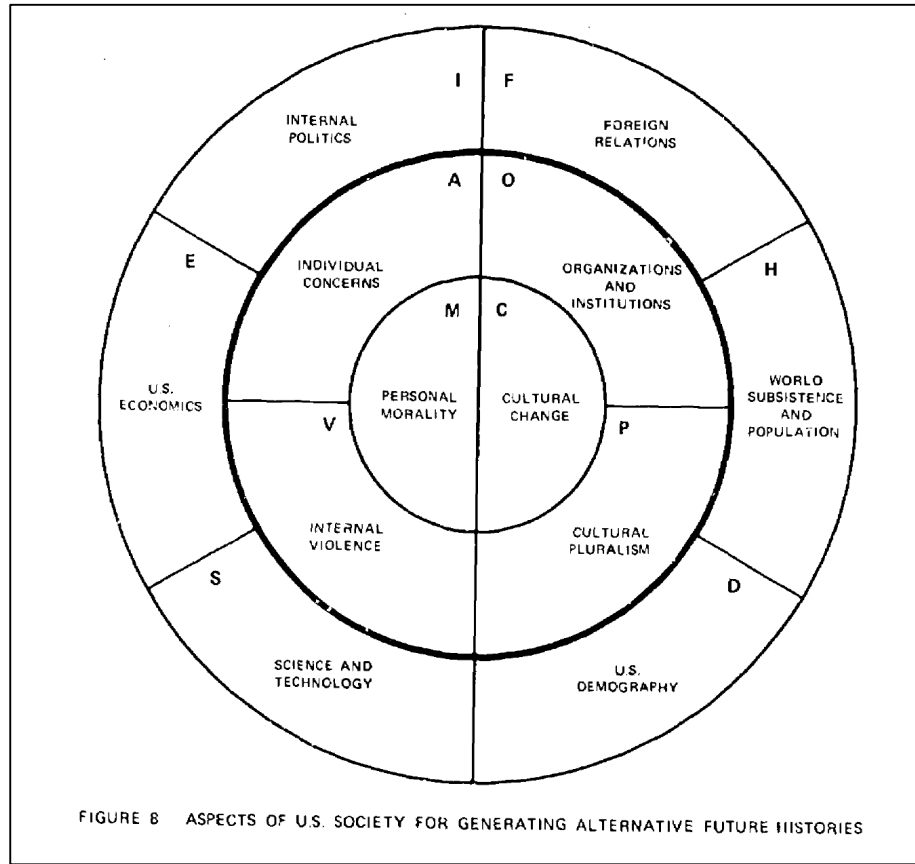


Figure 8. “Lewinian Social Field Map.”¹⁰²

Then, there was the secondary quantitative method: generating “schematized whole conditions” through a matrix of pairs in an effort to ‘scientifically validate’ the findings. Future context, however, was tricky, as each perspective needed to be understood within a whole future and by a whole group (for example, of managers or war strategists). Rhyne argued that the matrix of pairs, a “most nearly mechanical” operation, was necessary to expand the rigour of the operation. As Art Kleiner documents in *The Age of Heretics*, it was at this point that the SRI’s alternative futures researchers utilized SRI

¹⁰² Rhyne, “Projecting Whole Body Future Patterns—The Field Anomaly Relaxation (FAR) Method,” 53.

forecasts, coding the trends onto punch cards, and feeding them into mainframes.¹⁰³ This created hundreds of futures. The resultant alternative futures, a combination of sectors and factors, was strangely algorithmic; for example, one scenario was called “E₃I₃S₁D₁H₁F₁.” Then, researchers analyzed the scenarios for internal consistency, and discarded those without it.¹⁰⁴ For example, a scenario of a prosperous, growing economy could accompany rigid, “cybernetic bureaucracy.” The final results of the self-consistent scenarios were projected as “trees” (Figure 7 and 8).

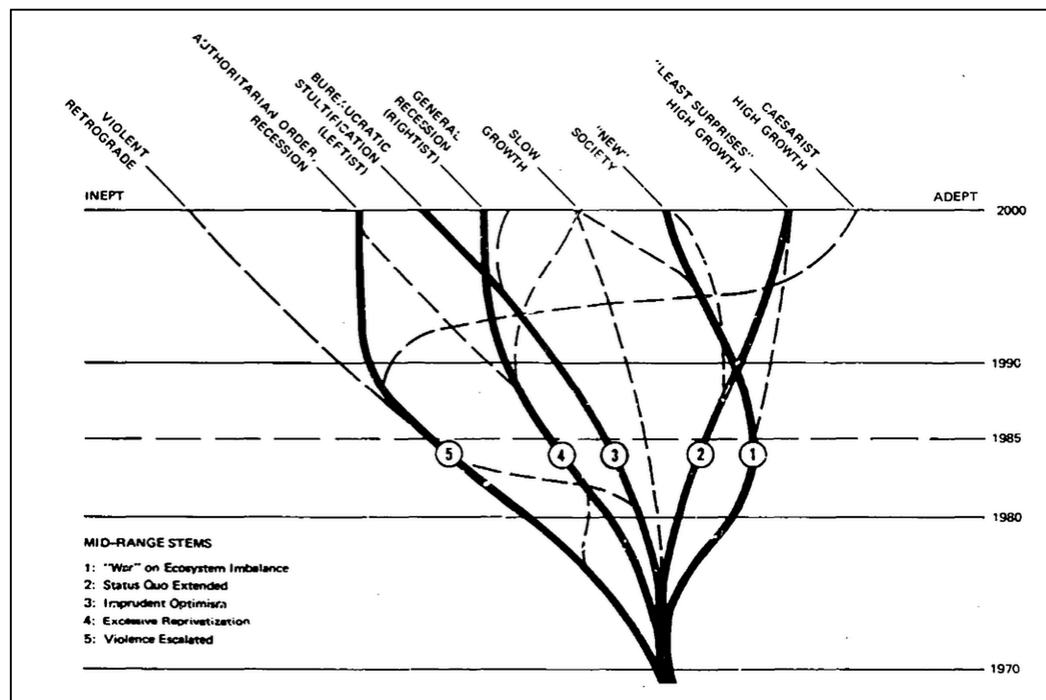


Figure 9. “Tree of Alternative Future Histories (Adept-Inept Dimension).”¹⁰⁵

¹⁰³ Kleiner, *The Age of Heretics*, 170.

¹⁰⁴ Rhyne, “Projecting Whole-Body Future Patterns,” 26.

¹⁰⁵ Oliver W. Markley, “Alternative Futures: Contexts in which Social Indicators Must Work,” *Education Policy Research Center*, (Menlo Park: Stanford Research Institute, 1971), 5.

In their first attempt, SRI created five main futures (solid lines) and secondary alternatives (dotted branches) derived from over forty “highly plausible” alternative futures stretching thirty years into the future.¹⁰⁶ The trees each focused on changes in a pivotal element impacting the future. The first was the degree to which society would be open, flexible, tolerant of diversity, decentralized or authoritarian, violent, and bureaucratic. The second was the “degree to which a society is adept in the Faustian sense (i.e., both competent and motivated to attempt control of its own density).”¹⁰⁷

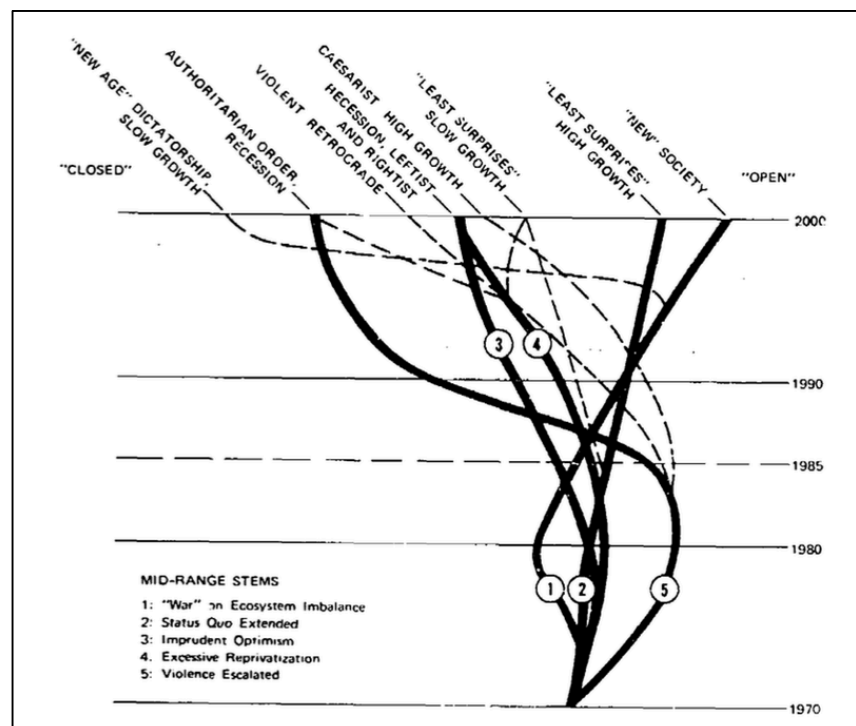


Figure 10. “Tree of Alternative Future Histories (Open-Closed Dimension).”¹⁰⁸

¹⁰⁶ Markley, “Alternative Futures: Contexts in which Social Indicators Must Work,” 3.

¹⁰⁷ Markley, “Alternative Futures: Contexts in which Social Indicators Must Work,” 8.

¹⁰⁸ Markley, “Alternative Futures: Contexts in which Social Indicators Must Work,” 4.

Harman rarely mentioned the details of the scientifically dubious FAR methodology in his EPRC reports. Frankly, he focused more on the resultant alternative future trees and scenarios that derived from Rhyne's FAR method. From the trees, the SRI group narrated five scenarios of alternative futures, including, "Violence Escalated," where trust and confidence throughout society breaks down, and authorities increasingly rely on force as a means to maintain control, while bureaucratic structures and solutions remain inflexible.¹⁰⁹ In yet another, a continuation of the unlikely "Standard World" from the Hudson Institute, what SRI called "Status Quo Extended," high economic growth prevails, and pollution problems are brought under control.¹¹⁰ And yet, growth and economic inequality problems continue to plague urban and rural areas. In a departure from others, the scenario "War" on Ecosystem Imbalance," includes a largescale effort to reduce pollution, and a redistribution of the flows of material wealth, eliminating domestic poverty.¹¹¹ The SRI futures group became fixated on the appropriate means to enable the massive social changes in this last scenario, what they began calling a transcendental "New Society."

Harman defined change in the terms of normal science processes called paradigms, following the popular and yet contentious theoretical framework in the sociology and history of science at the time from physicist turned historian of science

¹⁰⁹ Markley, "Alternative Futures: Contexts in which Social Indicators Must Work," 10; The EPRC studied narrative form as a crucial way to portray the differing futures. For example, one EPRC report classified utopian worlds into three groups: Structured, Dynamic, and Transcendental. Joan Lewil, "Utopias as Alternative Futures," Education Policy Research Center (Menlo Park: Stanford Research Institute, March 1970).

¹¹⁰ Markley, "Alternative Futures: Contexts in which Social Indicators Must Work," 10.

¹¹¹ Markley, "Alternative Futures: Contexts in which Social Indicators Must Work," 10.

Thomas Kuhn.¹¹² Different from Merton's normative paradigms, and the narrower aims of Kuhn's, Harman used paradigm to describe the basic, yet limited way, of "perceiving, thinking, valuing, and doing, associated with a particular vision of reality."¹¹³ Harman relentlessly pushed against what he imagined to be the "dominant paradigm" of industrial society—a favouring of the rational and the empirical— that structured the basic assumptions around which policies were built. Harman's team argued that the crises undergirding the macro-problem meant that a "paradigm shift" was necessary, and that the "dominant paradigm," based primarily on industrial assumptions that privileged positivistic science and command and control over technology, was bound to fail.

Harman identified the Western scientific-model, one that did not allow for "tolerance of ambiguity in the basic concepts and of multiplicity of models of the universe," as the problem.¹¹⁴ "The inadequacy of technoscientific values and premises to guide human affairs is a central issue," Harman wrote in one of his first SRI policy briefs: "in the absence of a thorough re-examination of basic premises and values, [technoscientific values] add to the problem rather than to its solution."¹¹⁵ These political critiques of technoscience were also developed and expanded by critical historians of

¹¹² Norman McEachron, policy associate at the EPRC, introduced the group to the Kuhnian paradigm shift in "A Contemporary Framework for Social Change" *Education Policy Research Center*, (Menlo Park: Stanford Research Institute, June 1971); Thomas Kuhn, *The Structures of Scientific Revolutions*, 2 ed. (Chicago: University of Chicago Press, 1970).

¹¹³ Thomas Kuhn also looked to Gestalt psychology and history as a means to attack the history of science as an accumulation of scientific truths. Paradigms were concerned with the tacit and intuitive knowledges held by scientific communities, and the intellectual crisis and conflict leading to gestalt 'paradigm shifts' in scientific revolutions. Kuhn, *The Structures of Scientific Revolutions*, 24.

¹¹⁴ Sherwood et. al, "The psychedelic experience—a new concept in psychotherapy," 79.

¹¹⁵ Harman, "Alternative Futures and Education Policy," 16.

technology, like David Noble and Langdon Winner, works that would have considerable influence on the fields of science studies.¹¹⁶ In other words, certain strands of science studies and corporate scenario planning have entangled genealogies, something not often expressed in the scholarly literature.

Harman utilized Kuhn's paradigm shift as a framework to understand the breakdown of the dominant industrial paradigm. In a May 1971 report "Planning Amidst the Forces for Institutional Change," Harman pointed to inadequacy of the dominant paradigm—a prerequisite of a Kuhnian paradigm shift— as evidence that a new paradigm might be emerging:

Kuhn uses the term "dominant paradigm" to refer to the basic way of perceiving, thinking, and doing, associated with a particular vision of reality, largely embodied in unquestioned, tacit understanding transmitted primarily through exemplars. Thus, applying this concept to the whole society, a paradigm is more than an ideology or a world view, and less a total culture. Kuhn documents the sequence of phenomena that tend to accompany the breakdown of influence of an old paradigm and its replacement by a new one. Growing awareness of problems which appear to be intrinsic to, and unresolvable within, the old paradigm is one such sign.¹¹⁷

Differently, the transcendental paradigm, was characterized by "a metaphysical asserting transcendental man" that "fundamentally" challenged the dominant "industrial-state" paradigm.¹¹⁸ One must note that throughout Harman's alternative futures the aim was not

¹¹⁶ David F. Noble, *American by Design. Science, Technology and the Rise of Corporate Capitalism* (New York: Alfred A. Knopf, 1979); Langdon Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought* (Cambridge: MIT Press, 1977).

¹¹⁷ Harman, "Planning Amid Forces for Institutional Change," 3.

¹¹⁸ Harman, "Planning Amid Forces for Institutional Change," 3.

to theorize the future per se, but to understand the foundational “unconscious processes” that play a role in both individual and social change—what one might call a worldview.¹¹⁹ Alternative futures, for Harman, were essentially ordering patterns for an inherently uncertain future. Continuing in the language of Kuhn, Harman suggests that “you see the Gestalt or you don't; it appears plausible and useful or it doesn't”.¹²⁰ Like Kuhn, Harman understood that the motivations for the paradigm shift were not rational or planned, but tacit and intuitive.¹²¹

Changing Images of Man

By the early 1970s, Harman’s transcendental visions that pulled together critiques of technoscience and economic growth with corporate planning gained traction. For example, in February 1972, Harman debated alternative futures at a White House Conference on the Industrial World Ahead presided over by President Nixon. It was the first U.S government conference exclusively concerned with business interests, and the first one on the future. Speaking on a panel with Herman Kahn, Harman admitted that little could be done to change the future, even towards his transcendental scenarios. However, Harman asserted that one has a choice whether or not to attempt to identify the forces shaping the future:

¹¹⁹ Harman, *An Incomplete Guide to the Future*, 5.

¹²⁰ Harman, *An Incomplete Guide to the Future*, xi.

¹²¹ Kuhn, *The Structures of Scientific Revolutions*, 191-198.

The extent to which our deliberate actions can affect the future is undoubtedly limited...Continuity of cultural change, institutional inertia, unexpected events, and subliminal social forces conspire to shape the course of history and to thwart attempts to design the future. Quite apart from our desires, the transformation postulated in these remarks is either upon us or it is not—it is not our choice to make. However, we can choose either to understand and move with the tides of history, whatever they may be—or to attempt to resist them.¹²²

Harman made clear that the future was not explicitly controllable, as he asserted the importance of comprehending the possibilities. These possible alternative futures, rather than being value-neutral, or disinterested like Hudson Institute's, could be distinguished by the way "society seeks resolution of its dilemmas."¹²³ This version of alternative futures as transcendental possibilities from the late 1960s gained traction at a time amidst larger societal concern about the negative effects of modernization that spread beyond countercultural movements.

Even as the transcendental scenarios of Harman's team gain popularity in the business world, however, changing goals at SRI, and the oil shocks and stagflation leading to the redirection of long-term planning efforts at SRI, halted Harman's alternative futures research. The alternative futures reports by Harman's group would be rejected by Department of Education over debates about its usefulness and its scientific approach. The Department of Health, Education, and Welfare eventually cut the funding for the SRI center in 1972, in search of more immediate-term policy problems, believing

¹²² Willis W. Harman, "Key Choices of the Next Two Decades" (paper presented at the White House Conference on the Industrial World Ahead, "A Look at Business in 1990" Washington, D.C., February 7-9, 1972), 36.

¹²³ Harman, *An Incomplete Guide to the Future*, 14.

Harman's obscure, long-range analysis unusable.¹²⁴ However, for Harman being “unusable” by the government bureaucracy only redoubled his efforts.

Harman continued exploring the long-term alternative futures approach in 1972 at the Center for the Study of Social Policy at SRI, a center he founded after the closure of the EPRC. The Charles F. Kettering Foundation, established by Charles Kettering, the “mercurial” engineer responsible for the creation of the cash register, provided the funding for the widely popular 1974 study, “The Changing Images of Man.”¹²⁵ At the time, the Kettering Foundation sought to support “high leverage,” “risky” social policy research ideas.¹²⁶ “The Changing Images of Man” study, led by Harman, continued his original alternative futures research, concentrated on the conceptual foundations that would support the transcendental paradigm in the future, what they identified as “images of nature of man in relationship to the universe.”¹²⁷

Changing Images of Man was written in dramatic prose by the mythologist Joseph Campbell, and featured contributions by psychologists B.F. Skinner and Carl Rogers, microbiologist René Dubos and anthropologist Margaret Mead and over twenty other heavyweight intellectuals from the humanities and engineering, to the United Nations and British Intelligence. In this, it continued the postwar vision of academic

¹²⁴ Markley and Harman, *Changing Images of Man*, xviii.

¹²⁵ Kleiner, *The Age of Heretics*; The document gained wide-spread notice thanks to journalist Marilyn Ferguson’s bestseller *The Aquarian Conspiracy* (1980). Ferguson has been credited with catapulting the “New Age” into the spotlight in her study of pioneering experimentation in the fields of parapsychology to holistic medicine. Willis Harman, and *Changing Images of Man*, were important sources for Ferguson.

¹²⁶ Markley and Harman, *Changing Images of Man*, xviii.

¹²⁷ Markley and Harman, *Changing Images of Man*, xix.

interdisciplinary collaboration as a crucial feature to fixing the problems of American liberal democracy.¹²⁸ The report built from the argument that imaging futures was important from Dutch futurist Fred Polak's *The Image of the Future* (1973). Polak asserted that that admen and strategists, and their corporate interests, had hijacked the future, and what was needed was imagined positive alternative futures for a future of “Western civilization.”¹²⁹ At the same time that it posited a transcendental paradigm, *Changing Images of Man* distanced itself from the bureaucratic regulations of civil rights and the radical politics of some counterculture movements, neglecting to engage substantially with gender or race. In this way, SRI’s corporate scenario planning efforts collapsed what were generally considered systemic problems—like economic inequality and racism—into individualized fields made up of abstracted “factors” and “sectors.” While drawing upon many countercultural intellectual resources as I have described in the chapter, including critiques of economic growth and technoscience, many within the research group, including Joseph Campbell, feared the “individualism” and “rootlessness” of the countercultural movements.¹³⁰

Subsequently, the transcendental paradigms from *Changing Images of Man* were taken up by SRI’s Business Intelligence Program, a future business environment consulting service started in the 1950s. In a 1973 report “Life Ways and Life Styles,”

¹²⁸ Jamie Cohen-Cole, “The Creative American: Cold War Salons, Social Science, and the Cure for Modern Society.” *ISIS* 100, no. 2 (2009): 219-62.

¹²⁹ Fred Polak, *The Image of the Future*, trans. Elise Boulding (Amsterdam: elsevier, 1973); Jenny Andersson and Egle Rindzeviciute, “The Political Life of Prediction / The Future as a Space of Scientific World Governance in the Cold War Era,” *Les Cahiers Européens de Sciences Po*, no. 4 (2012): 1424.

¹³⁰ Kleiner, *The Age of Heretics*, 284.

social economist Arnold Mitchell offered diluted a version of Harman’s alternative futures that was distributed to multinational corporations (Figure 9). Utilizing an expanded version of Kuhn’s paradigm (that he gleaned from Harman), Mitchell defined paradigms as “a useful way of clustering diverse values” that paralleled his analysis of changing “life ways and life styles.”¹³¹

CONTRASTING PARADIGMS	
Paradigm of Industrialism	Postindustrial Paradigm
<ul style="list-style-type: none"> ● Development and application of scientific method; wedding of scientific and technological advance. ● Industrialization through organization and division of labor; machine replacement of human labor. ● Acquisitive materialism; work ethic; economic-man image; belief in unlimited material progress and technological and economic growth. ● Man seeking control over nature; positivistic theory of knowledge; manipulative rationality as a dominant theme. ● Individual responsibility for own destiny; freedom as a fundamental right; nihilistic value perspective; individual determination of the “good”; society as an aggregate of individuals pursuing their own interests. 	<ul style="list-style-type: none"> ● Complementarity of physical and spiritual experience; recognition of all “explanation” as only metaphor; use of different noncontradicting “levels of explanation” for physical, biological, mental, and spiritual reality. ● Teleological sense of life and evolution having direction/purpose; ultimate reality perceived as unitary, with transcendent order. ● Basis for value postulates discoverable in own inner experience of a hierarchy of “levels of consciousness”; potentiality of supra-conscious as well as subconscious influence. ● Goals of life—aware participation in individual growth and the evolutionary process; individual fulfillment through community; integration of work, play, and growth. ● Goals of society—to foster development of individuals’ transcendent and emergent potentialities. Economic growth, technological development, design of work roles and environments, authority structures, and social institutions all are to be used in the service of this primary goal.

Source: W. W. Harman, White House Conference on the Industrial World Ahead

Figure 11. “Contrasting Paradigms”¹³²

Rather than a push for transcendental images of the future, based upon rethinking the conceptual premises of industrial society, Mitchell suggested categorizing consumer preferences based upon countercultural values, like critiques of industrialization and capitalism. Mitchell’s uptake of Harman’s transcendental scenarios would, a decade later, provide the basis for the widely successful corporate psychographic market

¹³¹ Mitchell, “Life Ways and Life Styles,” 32.

¹³² Mitchell, “Life Ways and Life Styles,” 33.

segmentation methodology VALS (Values, Attitudes and Lifestyles) that allowed advertisers to differentiate groups not by demographic characteristics, but by social values.¹³³ That is, in the 1970s, Harman's transcendental futures based upon psychedelic and metaphysical epistemologies informed marketing strategies for multinational corporations.

Harman's association with psychedelic experience and the science of consciousness would ultimately go on to alienate him from Stanford Research Institute in the mid-1970s as the social climate for spiritual and intellectual experimentation changed. Harman felt defeated and reoriented his research to reconciling unknowable phenomenon and science together. He left Stanford Research Institute to lead The Institute for Noetic Sciences—the non-profit think tank led by astronaut, and Gaia hypothesis proponent, Edgar Mitchell. However, his alternative futures would live on in scenario approach as some members of SRI like Peter Schwartz moved to the Shell's Group Planning department, and eventually went on to found the Global Business Network with fellow SRI researcher, and former philosophy professor, Jay Ogilvy.

Following the development of SRI's alternative futures—from 1960s psychedelic experimentation to 1980s corporate marketing psychographics—reveals a more complex portrait of corporate scenario planning, one that exceeds a narrative of the commodification of countercultural ideas. Corporate scenario planning came to life at SRI by way of Willis Harman, a disenchanted electrical engineer immersed in the countercultural ethos of the Stanford campus in the sixties and seventies. While building from some aspects of the countercultural lifestyle, including the search higher

¹³³ Adam Arvidsson, "General Sentiment: How Value and Affect Converge in the Information Economy," *The Sociological Review* 59, no. 2 (2011): 39-59.

consciousness, Harman and associates entangled these quests, not with radical political activism, but with ‘rationalist’ planning strategies. Thus, the aim of this chapter is to show the ways that SRI alternative futures complicated the normative sense of “rationality” and the reified concept of counterculture as generally understood in the history of science.¹³⁴ Secondly, this chapter advances the claim that corporate scenario planning relied upon critical examinations of technoscience, connecting some genealogies in science studies *and* business strategy. In the next chapter, I will draw out the ways that the attention to values, and the focus on subconscious processes, had a foundational impact on scenario techniques at the multinational energy and petrochemical corporation Shell. The transcendental scenarios attracted the attention of Shell as oil planners Pierre Wack, Ted Newland and others visited Harman at Stanford Research Institute before writing scenarios on the turbulent price of oil in mid-1970s, scenarios that would profoundly change the image of corporate scenario planning.¹³⁵

¹³⁴ Historian Howard Brick argues that “the counterculture” was not monolithic, but instead compromised a multiplicity of “defiantly non-conformist attitudes, uninhibited behavior, and generalized dissent,” Howard Brick, *Age of Contradiction: American Thought and Culture in the 1960s* (New York: Twayne, 1998), 113-14; also in Weidman, “Between the Counterculture and the Corporation,” 136.

¹³⁵ Kleiner, *The Age of Heretics*, 300.

CHAPTER 4:

THE REPERCEPTIVE SCENARIO

By the mid-1970s, scenario techniques originally developed by Hudson Institute, Stanford Research Institute, and a handful of other think tanks and consulting firms, were implemented and transformed by a variety of multinational corporations with varied success. Yet, it was the story of the ‘unconventional’ economic planner Pierre Wack, leader of the multinational energy and petrochemical company Shell’s “elite” London-based scenario planning team, that catapulted the obscure speculative narrative-based decision-making technique into strategic management legend.¹ In a 2003 article from

¹ The story of Pierre Wack has been told numerous times in the strategic planning literatures. See Art Kleiner, “Consequential heresies: How ‘thinking the unthinkable’ Changed Royal Dutch/Shell,” *Currency Magazine* (1989); Kleiner, *The Age Heretics: A History of the Radical Thinkers Who Reinvented Corporate Management*, 121-154; Art Kleiner, “The Man Who Saw the Future,” *Strategy & Business* Issue 30 (Spring 2003), <http://strategy-business.com/article/8220>; Pierre Wack, Shell’s first scenario team leader, wrote “Scenarios: Uncharted Waters Ahead,” *Harvard Business Review* (Sept. 1985): <http://hbr.org/1985/09/scenarios-uncharted-waters-ahead> and “Scenarios: Shooting the Rapids,” *Harvard Business Review* (Nov. 1985): <http://hbr.org/1985/11/scenarios-shooting-the-rapids/ar/1>; See also, the second head of the Shell scenario team, Peter Schwartz’s *The Art of the Long View: Planning for the Future in an Uncertain World* (New York: Doubleday/Currency, 1991), 7-10; Group Planning member Arie de Geus’ *The Living Company: Habits for Survival in a Turbulent Business Environment* (Cambridge: Harvard University Press, 1997), 46-51; Peter Senge’s *The Fifth Discipline: The Art & Practice of the Learning Organization* (New York: Doubleday/Currency, 1990), 167-173; Global Business Network member Joel Garreau’s “Conspiracy of Heretics,” *Wired* 2, no. 11 (1994): 98-158; Global Business Network intern Cynthia Selin’s “Professional Dreamers: The Past in the Future of Scenario Planning,” In Bill Sharpe and Kees Van der Heijden (editors), *Scenarios for Success: Turning Insights into Action* (Sussex: John Wiley & Sons, 2007), 27-52; Kees van der Heijden’s, the fourth head of the scenario team, *The Art of Strategic Conversation*; Peter Cornelius, Alexander Van de Putte and Mattia Romani, “Three Decades of Scenario

Strategy & Business, a business journal for corporate executives sponsored by the former management consulting firm Booz-Allen & Hamilton, business journalist Art Kleiner described how Pierre Wack trained Shell's managing directors to foresee a complex array of unexpected political and economic contingencies impacting the oil industry.²

Combining spiritual metaphors and business jargon with Shell's financial accomplishments, Kleiner explained at length how Wack's 'esoteric' nature enabled him to adapt scenario planning, and alert Shell to upcoming changes in the Arab world of the late 1970s—including the effects of the Organization of the Petroleum Exporting Countries (OPEC), fluctuating energy supply and demand, the accompanying energy crises based upon escalating oil prices, and the increasing pressures to address environmental and social problems.³ This “art of seeing” was not something any

Planning in Shell,” *California Management Review* (Vol 48: No. 4, Fall 2005), 92-109; Thomas Chermack, *The Foundations of Scenario Planning: The Story of Pierre Wack*, (New York: Routledge, 2017); Former Shell planners Angela Wilkinson and Roland Kupers wrote “Living in the Futures,” *Harvard Business Review* (May 2013): <http://hbr.org/2013/05/living-in-futures> and *The Essence of Scenarios*.

This story is also part of the critical academic literature. See, for example: Robbie E. Davis-Floyd, “Storying Corporate Futures: The Shell Scenarios,” in George E. Marcus (editor), *Corporate Futures: The Diffusion of the Culturally Sensitive Corporate Form* (Chicago: University of Chicago Press, 1997); George E. Marcus, ed., *Para-Sites: A Casebook against Cynical Reason* (Chicago: University of Chicago Press, 2000), 404; *After Oil*, (Edmonton: Petrocultures Research Group, 2016); R. John Williams, “World Futures,” *Critical Inquiry* 42 (Spring 2016); Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, The Whole Earth Network, and the Rise of Digital Utopianism*, (Chicago: University of Chicago Press, 2009), 186-194; Susie O'Brien, “‘We Thought the World Was Makeable’: Scenario Planning and Postcolonial Fiction,” *Globalizations* 13, no. 3 (3 May 2016). All heavily rely on the text created by Art Kleiner and the *Harvard Business Review* texts by Pierre Wack without considering the literature critically.

² Kleiner, “The Man Who Saw the Future.”

³ Kleiner, “The Man Who Saw the Future.” Also, Sharpe and van der Heijden, *Scenarios for Success: Turning Insights into Action*. There are alternative narratives from Shell insiders. See, for example, Michael Jefferson, “Shell Scenarios: What Really Happened in the 1970s and What May be Learned for Current World Prospects,” *Technological Forecasting & Social Change* 79 (2012): 186-197 and Wilkinson and Kupers, *The Essence of Scenarios*.

corporate planner could achieve. As Kleiner explained it, Wack and his “brilliant” planning team from the 1970s represented a “golden age” of scenarios that was now past, as contemporary corporate leaders were not being trained appropriately to see future uncertainties.⁴ Kleiner specifically credited Wack’s spiritual teachers—including the mystic philosopher G.I. Gurdjieff who Wack encountered in weekly salons during his university days in World War II Paris, and the Hindi mystic Svamiji Prajnanpad, who mentored Wack in midlife—for teaching Wack to expand his perceptions of reality.⁵

This account of how ‘Eastern’ mysticism influenced Pierre Wack’s adaptation of scenario planning rapidly spread in the 1990s through management books like *The Age of Heretics: A History of the Radical Thinkers Who Reinvented Corporate Management* and *The Art of the Long View: Planning for the Future in an Uncertain World*. In the pages of business journals like *Harvard Business Review*, *Wired*, *Fortune*, and *Strategy & Business*, with titles like “The Man Who Could See the Future,” “Living in Futures,” and “Professional Dreamers,” business journalists presented a tale that the elite, London-based Group Planning team at Shell were the ‘heretical’ ‘gurus’ of planning under uncertain conditions.⁶ This “art of seeing” was not a capability one could develop “in a

⁴ Kleiner, “The Man Who Saw the Future.”

⁵ For Prajnanpad, cultivating the “art of seeing” was a way of expanding normal perceptions, through things like guided meditation. Wack was not the only French technocratic disciple of Prajnanpad, suggesting a larger tradition of postwar French engineers interested in ‘Eastern’ mysticisms. Another one of his students, Daniel Roumanoff, was a commercial engineer and economic advisor to the French Embassy in the 1970s. He introduced Pierre Wack to the work of Prajnanpad, providing the details of his ashram in India to Wack. Roumanoff wrote a dissertation on his teachings in French. Kleiner, *The Age Heretics*, 134; “Pierre,” Svâmi Prajñanpad: *Biographie*, ed. Daniel Roumanoff (Paris, 1993).

⁶ See, for example, Ron Bradfield et al., “The Origins and Evolution of Scenario Techniques in Long Range Business Planning,” *Futures* 37 (2005), 800. However, Hudson Institute’s “Corporate Environment Study” widely disseminated scenario planning as an adequate aide to corporations planning in uncertain conditions, and Royal Dutch/Shell was an active, paying

set of workshops—or even through an elite agency of analysts and internal consultants.”⁷ While maintaining that scenarios were not about predicting the future, this literature paradoxically linked Shell’s economic successes in the 1970s to the enlightened thinking techniques of its scenario practitioners. These publications, crafted by an entire industry of unacknowledged business journalists, ghostwriters, talented editorial staff, and a financially endowed publishing infrastructure, disseminated the fantasy that Pierre Wack conducted scenario planning as a kind of “in-depth training” that could only be achieved by those who “devote[d] their careers to increasing their collective awareness of the outside world.”⁸ The case of Shell’s scenario techniques, as an historical episode tied to the fantastic imaginary of a visionary economist and corporate storyteller, provides an occasion to examine a decisive shift in beliefs about late-twentieth century decision-making authority from staid corporate planners and their mathematical tools to corporate strategists with their big philosophical ideas and compelling presentations.

This chapter highlights how the rising industry of “thought leadership” journalism of the late-twentieth century transformed beliefs about Shell’s 1970s scenario planning techniques, and was a significant contributor to the technique’s contemporary legitimacy in the discipline of strategic management. In the hyper-competitive business

participant (See Chapter 2). Another early experiment with corporate scenario planning at General Electric took place in the Business Environment project in 1967, before Royal Dutch/Shell’s more famous use of corporate scenario planning. Ian Wilson, “Future Forecasting for Strategic Planning at General Electric,” *Long Range Planning*, (June 1973): 39-42. However, even with scenario planning, GE saw a steep drop in market share in the 1980s. Kleiner, *The Age Heretics* and Gill Ringland, *Scenario Planning: Managing for the Future* (New York: John Wiley & Sons, 1998).

⁷ Kleiner, “The Man Who Saw the Future.”

⁸ Kleiner, “The Man Who Saw the Future.”

environment of the 1990s, one increasingly driven by the idea of innovation—the notion that the newest, and boldest, ideas led corporations to future success—multinational corporations like Shell relied upon the “charismatic authority” of their decision-makers.⁹ By identifying the importance of what historian of science Steven Shapin calls the “personal equation” in contemporary corporations facing “radically uncertain futures,” the chapter shows how corporate scenario planning exceeds conventional understandings in the history of science of impersonal planners that sought to operationalize calculative rationality.¹⁰ However, as this chapter demonstrates, the “charismatic authority” of “thought leaders” like Pierre Wack was produced and promoted by a business publishing industry that was invested in the selling the success of corporate scenario techniques even though a direct connection to Shell’s improved strategy or financial success was questionable.¹¹

⁹ I build from historian of science Steven Shapin’s account of sociologist Max Weber’s *charismatic authority* in his study of contemporary industrial scientists. Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*.

¹⁰ Shapin, *The Scientific Life*, 10.

¹¹ Michael Jefferson, Roland Kupers and Angela Wilkinson have made clear it is an urban legend that scenarios enabled Shell to anticipate the 1973 and 1979 oil crisis. Though, they admit the coincidental timing of the scenario techniques and these crises that led to scenario’s popularity. See, for example, Jefferson, “Shell Scenarios: What Really Happened”; Kupers and Wilkinson, *The Essence of Scenarios*.

Pierre Wack as Thought Leader

The term “thought leader” emerged in 1995 as a marketing tool: in the inaugural issue of *Strategy & Business*, editor-and-chief Joel Kurtzman used the term in an interview series on prescient business ideas with leading management thinkers of the mid-to-late-twentieth century, like the “father of modern management” Peter Drucker, the disruptive innovation expert Clayton Christensen, and female-empowerment evangelist Rosabeth Moss Kanter.¹² Kurtzman made famous the term “thought leaders” to vaguely describe business leaders who addressed “big questions” and “whose insights are valid and important.”¹³

Critiques of this late-twentieth century figure of the “thought leader” have emanated from numerous academic domains, including political science, history, and anthropology. In his 2017 book *The Ideas Industry*, political scientist Daniel Drezner has argued that the propagation of foreign policy ideas has come to be dominated by “thought leaders”— those who promote their one big idea that will “change the world”— where in the midcentury “public intellectuals” reigned.¹⁴ Historian of science David Sessions has identified how the pursuit of high paying gigs for television, public

¹² Joel Kurtzman, “In This Issue,” *strategy + business* Issue 1 (October 1, 1995), <https://www.strategy-business.com/article/11895?pg=0>; Art Kleiner, “Remembering Joel Kurtzman,” *strategy + business* (April 10, 2016), <https://www.strategy-business.com/blog/Remembering-Joel-Kurtzman?gko=8dd48>

¹³ Joel Kurtzman, *Thought Leaders: Insights on the Future of Business* (Jossey-Bass Publishers, 1998), 1. This book, itself a publishing alliance between the management consulting company Booz-Allen and Jossey-Bass Publishers, drew on the “intellectual capital” of its top consultants and academics.

¹⁴ Daniel Drezner, *The Ideas Industry: How Pessimists, Partisans, and Plutocrats are Transforming the Marketplace of Ideas* (Oxford: University of Oxford Press, 2017), 9.

speeches, and book deals has made thought leadership “more of a marketing principle than a philosophical insight,” where thinkers are prone to “bloat their expertise and hustle in so many markets that they end up selling fakes.”¹⁵

In the corporate realm, one of the most well-known examples of thought leadership’s shortcomings is articulated in historian Jill Lepore’s eviscerating critique of Harvard Business School professor Clayton Christensen’s theory of “disruptive innovation.”¹⁶ Disruptive innovation, a mainstay in contemporary Silicon Valley, proposed companies that radically ‘disrupt’ an industry are more successful and competitive than those seeking to gradually improve a product. However, Lepore has revealed that Christensen’s case studies, the ‘proof’ of disruptive innovation—like the disk-drive industry and mechanical-excavator industry—were based on “dubious” sources and “questionable” logic.¹⁷ Specifically, Drezner argued that it was because Clayton Christensen, a “bold, risk-taking entrepreneur,” appealed to a “plutocratic worldview” that disruptive innovation took Silicon Valley by storm.¹⁸

The “charismatic” entrepreneur of the twenty-first century—who could be considered one brand of thought leader—is the subject of historian of science Steven Shapin’s *The Scientific Life: A Moral History* (2008).¹⁹ Shapin revisits German

¹⁵ David Sessions, “The Rise of the Thought Leader,” *The New Republic*, 28 June 2017.

¹⁶ Jill Lepore, “The Disruption Machine: What the gospel of innovation gets wrong,” *The New Yorker*, 23.

¹⁷ Lepore, “The Disruption Machine: What the gospel of innovation gets wrong.”; Also, Sessions, “The Rise of the Thought Leader.”

¹⁸ Drezner, *The Ideas Industry*, 199; Also, Sessions, “The Rise of the Thought Leader.”

¹⁹ Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*.

sociologist Max Weber's concerns about the loss of charismatic leadership and trust to impersonal routinization and bureaucracy in the modern industrialized world.²⁰

Challenging Weber's argument, Shapin contextualizes and seeks to legitimate the "charismatic authority" demanded of contemporary scientific entrepreneurs.²¹ He advocates that "trust, familiarity, and personal virtues" are essential attributes for those looking towards an uncertain future, instead of part of a scientific persona that has been "lost" in the contemporary.²² When researchers, those who "speak on behalf of nature, technology, and the future," face the "radical normative uncertainties" of late modern technoscience, they rely on personal virtues, Shapin argues.²³ In the face of uncertainties—where there is no known direction for future ventures—investors, consumers, and others, look to individuals with "personally embodied leadership" that both "participants and commentators" call "charisma" for reassurance.²⁴

This "charismatic authority," however, is not an essential characteristic of specific individuals, as Shapin's account implies, intentionally or not. Though charisma

²⁰ Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 3-4; Max Weber, *Economy and Society: An Outline of Interpretive Sociology*, 2 vols., eds. Gunther Roth and Claus Wittich, trans Ephraim Firschoff et al. (Berkeley: University of California Press, 1978).

²¹ Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 267.

²² Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 3.

²³ Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 312.

²⁴ Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 267. Shapin remarks that it is known that there will "be a market for a product" like an improved razor blade, "which people are reasonably believed to want." However, in the case of innovative technologies that are "substantially new thing[s] in the world," the needs are less clear. "People at the time of an investment decision do not know [what] they want," Shapin contends. In none of the "high-tech, biotech, and organized nonprofit research" directed at the future, "can patterns for success be taken off the shelf." Shapin, *The Scientific Life: A Moral History of a Late Modern Vocation*, 266-269.

is most often a capacity attributed to particular individuals, it is actually produced through relationships in particular historical and cultural environments.²⁵ Business sociologist Rakesh Khurana, in his *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs* (2002), has underscored this aspect of Weberian charisma as he scrutinized the corporate decision-making process of CEO hiring over the last twenty years.²⁶ Specifically, Khurana describes how CEO hiring generally rules out qualified candidates, and systematic searches, in favour of a small number of celebrity outsiders who are considered to possess “charisma,” and are thought of as saviors.²⁷ This ability to inspire public confidence and motivate employees, however, often comes at a price of tangible knowledge about the organization, that become problems only after the fact.²⁸ Different from Shapin, Khurana understands “charisma” as a social product that relies on a kind of “magic” that must be recognized by others in order to be effective.²⁹

²⁵ I follow what feminist theorist Sara Ahmed names “affective economies,” referring to the historically contingent social arrangements that allow for the circulation of emotional states that come to be seen as a property of specific individuals. Ahmed, “Affective Economies,” 249.

²⁶ Specifically, Khurana argues that to understand charisma as a “characteristic inherent in certain types of individuals” is to “miss his [Merton’s] most important insights.” Charismatic authority derives from “a particular set of social relations and the cultural context within which those relations are embedded.” Rakesh Khurana, *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs* (Princeton: Princeton University Press, 2002), 157.

²⁷ Khurana, *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs*.

²⁸ The case of Enron hiring Jeffrey Skilling as the CEO in 2000, and Enron’s subsequent fraud scandals in 2001, is a primary example Khurana uses to support his claim that charismatic leadership is often perilous. Khurana, *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs*, x-xi.

²⁹ Khurana, *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs*, 157.

This chapter emphasizes the role that thought leadership journalism played in helping to produce and legitimate the charisma of Pierre Wack. Instead of highlighting his training in macroeconomics, or his technical proficiencies in economic forecasting, or his decades of experience as Chief Economist at Shell Française, publications concentrated on his charismatic presentation skills, his profound phrases and metaphors, and his spiritual practice. In recovering the labours of the thought leadership editorial process, the chapter proposes that the legitimacy of Shell's scenario techniques cannot be understood without this unacknowledged act of translation.³⁰ To make this argument, the

³⁰ My use of the term *translation* is in critical conversation with the sociology of translation, an important theoretical tool for some genealogies in science studies and business strategy. The sociology of translation, developed primarily by science studies scholars Bruno Latour and Michel Callon in the mid-1980s, raised the question of how things, like theories, concepts, and objects, materialized through networks of heterogeneous relations. The sociology of translation (more often called actor-network theory) focused on the successful enrollment—what Callon called ‘the art of intersement’—of allies into this process of materialization. Science studies scholars engaged with the domains of business generally use *translation* to describe how successful strategies “must integrate itself into a network of actors who take it up, support it, diffuse it.” Madeleine Akrich, Michel Callon and Bruno Latour, “The Key to Success in Innovation Part 1: The Art of Intersement,” *International Journal of Innovation Management*, Vol. 6, No. 2 (June 2002): 202. Actor-network theory has also recently been used by business historians to understand how the colossal four volume commissioned history of Shell, *The History of Royal Dutch Shell* written by Jan Luiten van Zenden, Joost Jonker, Stephen Howarth and Keetie Sluyterman in 2007 (and called by Ponzoni and Boersma “one of the greatest achievements in commissioned corporate history” (125)) has helped to legitimate business history as an academic discipline. Elena Ponzoni and Kees Boersma, “Writing History for Business: The Development of Business History Between ‘Old’ and ‘New’ Production of Knowledge,” *Management & Organizational History*, 6, 2 (2011): 123-143. It has also been highlighted by Shell business strategists as relevant for long range strategy professionals seeking to keep their “innovations innovative.” Rafael Ramirez, Leo Roodhart and Willem Manders, “How Shell’s Domains Link Innovation and Strategy,” *Long Range Planning*, vol 44 (2011): 250-270. In contrast to these theoretical uses, this chapter does not seek to identify how scenarios operated in order to improve business strategy. While actor-network theory often presumes science studies can provide epistemological understanding to unaware actors, this chapter argues Shell planners were cognizant of the translation acts they were attempting. Thus, this chapter seeks to historicize *translation* as an approach to late-twentieth century corporate scenario planning. In doing so, it suggests actor-network theory shares epistemological strategies with other domains, like strategic management. See also, Steve Woolgar, Caterlijne Coopmans, Daniel Neyland, “Does STS Mean Business?” *Organization* Vol 16(1) (2009): 5-30.

chapter examines the disparities between what Shell scenario planners understood they were doing in the mid-1970s, and how their decision-making process was later articulated to a wider business audience in the late 1980s and early 1990s. In this way, the chapter attends to the central argument of the dissertation that corporate scenario planning differs in crucial ways from conventional understandings that mid-to-late twentieth century corporate megastructures are guided by impersonal planners who sought to operationalize rationality, and control decision-making processes through commanding authority and rigid rules.

The chapter begins by recounting the tale of how Pierre Wack used his esoteric training to develop scenario planning in order to strengthen Shell's strategy, as it has been conveyed by business journalists. In this version, scenario planning became an 'enchanted,' 'unconventional' methodology enabling a "remarkable" few to clearly see troubled futures ahead, and support their corporation's flexible responses.³¹ Then, the chapter shows how Shell's scenario techniques from the 1970s were actually based upon 'business as usual' principles of profit margins and risk strategy in the face of the limited supply of cheap oil that were central to Shell's planning department even before Wack joined. And, finally, the chapter cracks open the enchanted tale that circulated in thought leadership pieces—their own kind of "inscription devices"—and demonstrates how an unacknowledged network of commissioned business historians and storywriters,

³¹ "Remarkable men" would become a trademark of Shell scenarios. It was journalist Art Kleiner that first presented Wack's interest in "remarkable people," defining it as meaning "unconventional," not in the mystical terms other critical scholars have prescribed to it. Kleiner, "Consequential Heresies." The idea of "unconventional" men leading corporate planning efforts supported Kleiner's thesis that there are heretical corporate actors remaking postwar business. Kleiner, *The Age Heretics*.

including editors and ghostwriters, helped to produce and disseminate a narrative that framed Pierre Wack as a visionary thought leader by way of scenario planning.³² The tale of Wack emerged with the rise of the publishing company Doubleday, a niche publisher housed within the large publishing company Currency, that formed in 1989 by editor Harriet Rubin to promote business “thinkers, not just doers” who “rebel against the status quo.”³³ Rubin’s first commission in 1989, by the firebrand business journalist Art Kleiner, provided the primary account of Pierre Wack as a corporate heretic.³⁴ Kleiner went on to ghostwrite the two other leading accounts from former Shell planners: Peter Schwartz’s *The Art of the Long View* (1991) and Arie de Geus’ *The Living Company* (1997).³⁵ This version of Wack as a visionary thought leader rebelling against outmoded,

³² Inscription devices—what Latour defines as “a written trace that makes the perceptive judgment of the others *simpler*”—have played an important role in helping science studies to de-emphasize cognitive and social peculiarities of scientists in laboratory science practice. Bruno Latour, “Give Me a Laboratory and I Will Raise the World,” In *Science Observed*, Karin Knorr-Cetina and Michael Mulkay (editors), (London: SAGE Publications, 1983): 161. See also Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton: Princeton University Press, 2013). This chapter suggests that inscription devices play an important role in the critical study of corporate techniques in addition to laboratory practice. On studying corporate techniques, see Chapter 1. My use of the term inscription device, similar to my use of other theoretical tools in actor-network theory, is critical. Thus, this chapter seeks to identify how Shell planners utilized their thought leadership texts as public relation tools.

³³ E. Scott Reckard, “Succeeding by reading in the ‘80s: Authors jump on “In Search of Excellence” bandwagon,” *Chicago Tribune* (24 December 1989).

³⁴ See Kleiner, “Consequential Heresies: How ‘Thinking the Unthinkable’ Changed Royal Dutch/Shell.”

³⁵ I build from business historian Christopher McKenna’s argument that ghost-writers have played an important role in twentieth-century corporate strategy, and should not be ignored. Like this chapter, McKenna’s article unearths the intellectual labours required to create Alfred Sloan’s ghost-written classic, *My Years with General Motors*: “John McDonald, however, was not the only person hired to assist Alfred Sloan on this mammoth project. Alfred Sloan also required a secretary, Catherine Stevens, to transcribe his reminiscences and, equally important, someone to comb through the corporate archives of General Motors to unearth the firm’s early history. What Alfred Sloan and John McDonald needed... was ‘a long-term research assistant, preferably a trained historian, to work with us.’” Christopher D. McKenna, “Writing the Ghost-Writer Back

“mechanistic” business planning, provided the model for not only a new sense of scenarios, but also for what Currency/Doubleday could offer to its executive readership.³⁶ This notion that Pierre Wack’s thought leadership led to Shell’s economic success did not originate solely in the internal operations of Shell, or even in the 1970s.

Expanding the analysis to include how the Shell scenarios have been formulated, communicated, and disseminated, the chapter concludes by reflecting on how the story surrounding Shell scenario planning should be of as much interest to historians and science studies scholars seeking to understand the import of corporate scenario techniques. By examining the differences between the accounts, it becomes clear that the story of how scenarios became corporate strategies is anything but transparent. This quandary also raises important questions for how historians should study contemporary corporate techniques that are often obscured by a corporation’s investment in establishing its own histories.³⁷ The history of Shell’s scenarios is mired in the accounts from planners who were invested in Shell’s success. Specifically, it arose in business journals, some sponsored by management consulting firms, whose existence relied entirely upon convincing corporate executives that their journals were capable of “laying out an agenda covering which issues are worthy of thought.”³⁸ More than this, historians and critical theorists, presuming that the scenario accounts were straightforward, have

In: Alfred Sloan, Alfred Chandler, John McDonald and the Intellectual Origins of Corporate Strategy,” *Management & Organization History*, 1:2 (2006): 112.

³⁶ Kleiner, *The Age Heretics*, 125-126.

³⁷ Justin Douglas, Bretton Fosbrook, Kira Lussier, and Michelle Murphy, “Knowing Corporations: Towards a Critical Corporate Studies,” unpublished manuscript.

³⁸ Kurtzman, *Thought Leaders: Insights on the Future of Business*, 1.

helped to reify this storyline.³⁹ Many have uncritically cited Shell scenario team’s “heretical” ability to navigate uncertainties by looking beyond quantitative models and embracing a countercultural ethos, without providing the important context for how this account developed.

The Reperceptive Scenario

Before examining how this tale was produced and why it matters, this chapter first recounts the story of how Pierre Wack developed scenario planning in the 1970s. The details of this tale—reported mostly by Shell insiders, and commissioned historians—has structured understandings of the role Pierre Wack played in Shell’s economic success. At the same time, the fact that only Shell insiders have had access to this material and have organized and financed the creation of the only public collection of Shell’s archival records on scenarios makes it difficult to ascertain with any certainty what ‘actually happened’ or even the precise details, including the organizational structure of Shell’s planning group or the day-to-day operations of the group.⁴⁰

³⁹ In Fred Turner’s book *From Counterculture to Cyberculture*, for example, the history on scenario planning is derived entirely from Art Kleiner’s *The Age of Heretics*. Turner, *From Counterculture to Cyberculture: Stewart Brand, The Whole Earth Network, and the Rise of Digital Utopianism*, 186-194; see also, *After Oil*; Williams, “World Futures.”

⁴⁰ Former Shell scenario team members Napier Collyns and Angela Wilkinson gifted the Pierre Wack Memorial Library to Saïd Business School at the University of Oxford, creating what would become the Oxford Futures Library in the mid-2000s. Originally this collection was a fixture of one of the Global Business Network offices in The Hague, Netherlands. Art Kleiner’s archive was added in 2016, as well as former RAND and Institute for the Future researcher Wayne Boucher in 2008.



Figure 12. Pierre Wack at Shell Française, 1968.⁴¹

The story of Pierre Wack and Shell scenarios began in the late 1960s, a time of existential crisis for the long-term future of Shell. The ever-present question was: “what will happen when the oil runs out?”⁴² Shell was a multinational corporation, consisting of

⁴¹ Chermak, *The Foundations of Scenario Planning: The Story of Pierre Wack*, 274.

⁴² De Geus, *The Living Company*, 31.

more than 300 companies in over 100 countries around the world, and employing over 170,000 people.⁴³ All 300 companies were co-owned by a pair of holding firms, one Dutch and one British, that merged in 1906 to sell petroleum. They turned over more than \$100 billion dollars a year.⁴⁴ During the 1940s and 1950s, exploding postwar demands for oil were met by the profitable westward exportation of oil from the Middle East, a strategy most petroleum companies assumed would continue.⁴⁵ However, as early as 1967, inspired by the work from Daniel Bell's Commission on the Year 2000, the Studies and Policy division of Shell posited the plausibility of an "eventual downturn in the growth of the oil business, which may well come at or soon after the end of the century."⁴⁶ In the face of these potential future discontinuities, Shell was actively searching for innovative ways to understand and navigate the uncertainties.

Scenario planning at Shell, like the other case studies in this dissertation, emerged at a moment wherein sophisticated midcentury mathematical procedures—rational, model-based approximations of future demands— that promised to revolutionize planning came under fire in corporate planning departments.⁴⁷ Specifically, in 1965 Shell began using a then state-of-the-art quantitative financial prediction system known as

⁴³ De Geus, *The Living Company*, 10; Sluyterman, *Keeping Competitive in Turbulent Markets*, vol. 3 of *A History of Royal Dutch Shell*, 4.1.

⁴⁴ De Geus, *The Living Company*, 10.

⁴⁵ Daniel Yergin, *The Prize: The Epic Quest for Oil, Money & Power* (New York: Simon & Schuster, 1990), 422.

⁴⁶ Shell Group Planning, "Post Objectives Period: A Special Survey of Energy in the World Political and Economic Environment for the Years 1985-2000" (Royal Dutch Shell: Studies and Policies Division PL/2: December 1967). Pierre Wack Collection. Futures Library. University of Oxford; See also Sluyterman, *Keeping Competitive in Turbulent Markets*, 222-223.

⁴⁷ See, for example, Beck, "Corporate Planning for an Uncertain Future," 13.

Unified Planning Machinery (UPM).⁴⁸ When it was implemented, Shell planners claimed UPM would convert an entire succession of global activities for the multinational corporation—from oil extraction to consumer gas delivery—into estimates and statistics based upon the latest trends. UPM forecasts assumed the expansion of Shell was a self-evident long-term planning strategy, following the trends of rapid economic growth of the 1950s and 1960s.⁴⁹ However, UPM provided only “surprise-free” predictions that were increasingly unusable in the face of what were expected to be “non-linear and disruptive changes.”⁵⁰ For example, the formalization of OPEC in the late 1960s changed the profitability of expansion, and led to suspicions that a turbulent oil future lay ahead.⁵¹ Additionally, diversification strategies that gained prominence in the 1960s were also doubted; the same strategies that had incidentally helped propel Shell to decentralize, and also hastily enter the fields of nuclear power, coal, and metals in the mid-1960s.⁵²

In 1966, Shell began experimenting with scenarios from Hudson Institute, not in planning but in other company divisions like the Exploration and Production division, in order to assess the “political risks” of investments.⁵³ Though the Exploration and

⁴⁸ For discussion of UPM, see Wilkinson and Kupers, “Living in the Futures”; Jefferson, “What Really Happened”; Wack, “Scenarios: Uncharted Waters Ahead.”

⁴⁹ Sluyterman, *Keeping Competitive in Turbulent Markets*, 96.

⁵⁰ Kupers and Wilkinson, *The Essence of Scenarios*, 28.

⁵¹ In the late 1960s, Middle Eastern oil-producing countries, including Venezuela, Saudi Arabia, Iran, Iraq and Libya, formed the Organization of Petroleum Exporting Countries (OPEC), in order to derive economic benefits over the oil being exported from their lands. This was a particular problem to petroleum companies like Shell that relied on cheap oil from the regions. See, See Sluyterman, *Keeping Competitive in Turbulent Markets*, 13, 93.

⁵² Sluyterman, *Keeping Competitive in Turbulent Markets*, 93-95.

⁵³ Jefferson, “What Really Happened,” 187.

Production division assessed the “technical risks” of investment decisions, they had yet to include social and political constraints.⁵⁴ The economist Ted Newland from the Exploration and Production division had been tasked with a new project on Long Term Studies at the Shell Headquarters in London, and directed to think open-endedly about the future, after Shell executives learned that Exxon was working with Hudson Institute’s conclusions from *The Year 2000*.⁵⁵ Elsewhere in the company, Shell consultant James Lovelock—the British critical biologist responsible for the Gaia hypothesis—was also experimenting with scenarios in response to Kahn and Wiener’s *The Year 2000*.⁵⁶

In 1967, Shell consolidated these efforts into a stand-alone division called Group Planning; this new division was an attempt to move away from the single-line energy forecasts that UPM provided—a deterministic extrapolation of oil production or demand based upon past trends—that were deemed insufficient for the longer-term future of potential oil shortages. Instead of focusing solely on calculative forecasts, Group Planning also began developing plausible stories about how the business environment might change. The former Head of Economics for the Exploration and Production division Jimmy Davidson became the leader of the new division at the London Headquarters.⁵⁷ In 1967, the economist Ted Newland also joined Group Planning, and

⁵⁴ Sluyterman, *Keeping Competitive in Turbulent Markets*, 222.

⁵⁵ Wilkinson and Kupers, “Living in Futures.” See Chapter 2 on “The Year 2000” studies from Hudson Institute. See Chapter 5 for Shell consultant James Lovelock’s “Outlook 2000” study, a Shell response to Hudson Institute.

⁵⁶ For more on James Lovelock’s work for Shell, see the conclusion. James Lovelock, “Some Thoughts on the Year 2000,” Contracted by Shell (1966). Professor James Lovelock Collection. Science Museum, London.

⁵⁷ Chermack, *Foundations of Scenario Planning*, 44.

began attending the Hudson Institute lecture-seminars to develop his understanding of scenario planning methodologies. The same year, Pierre Wack, then head economist at Shell Française, began study the long-term future of Shell strategy in a planning exercise called the Horizon Year Study; he too attended Hudson Institute's seminars.⁵⁸ Similarly based on Hudson Institute's research, Wack investigated the hypothetical liberalization of the French oil market based upon the uncertainties in the supply of natural gas.⁵⁹ Following these studies, Shell economists began developing and presenting scenarios to senior executives as one way to engage with uncertainty. Yet, scenarios had not proved useful enough to be implemented across the organization at that time. The experimentation with scenarios, however, continued.

Pierre Wack joined Group Planning at Shell's London headquarters in 1971 to lead a newly created scenario team with Ted Newland. There were eight other members of the scenario team for most of the 1970s, predominantly economists and Shell veterans, including Ted Newland, Gareth Price, Napier Collyns, Hans DuMoulin, Michael Jefferson, and Graham Galer.⁶⁰ Together this scenario group developed the trends and storylines for the scenarios booklets of the 1970s. When Wack was recruited to join the scenario team at Shell, he introduced Shell to a metaphysical approach to effectively make sense of the incalculable social and geopolitical forces that became part of the scenarios. He was also responsible for charismatically narrating plausible stories about how the future could unfold. It was not a cognitive capacity so much as an ability to

⁵⁸ Wilkinson and Kupers, "Living in the Futures," 4.

⁵⁹ Chermack, *The Foundations of Scenario Planning: The Story of Pierre Wack*, 46.

⁶⁰ Chermack, *The Foundations of Scenario Planning: The Story of Pierre Wack*, 86.

properly frame a situation—a worldview. More than a decade after the fact, Wack explained the significance this way:

Strategies are the product of a worldview. When the world changes, managers need to share some common view of the new world. Otherwise, decentralized strategic decisions will result in management anarchy. Scenarios express and communicate this common view, a shared understanding of the new realities to all parts of the organization.⁶¹

Scenario were presented in order to simultaneously provide a shared worldview and unsettle the fixed worldview of the future held by Shell’s executives. As Wack explained in one of his 1985 *Harvard Business Review* articles on the Shell scenario process:

Scenarios deal with two worlds; the world of facts and the world of perceptions. They explore for facts but they aim at perceptions inside the heads of decision-makers. Their purpose is to gather and transform information of strategic significance into fresh perceptions. This transformation process is not trivial—more often than not it does not happen. When it works, it is a creative experience that generates a heartfelt 'Aha' ... and leads to strategic insights beyond the mind's reach.⁶²

This meant that the scenario team scanned the business environment to build the scenarios. Then, they presented scenarios across the large multinational corporation as a way to deal with the world outside of the corporation while engaging with the inner

⁶¹ Wack, “Scenarios: Uncharted Waters Ahead.”

⁶² Wack, “Scenarios: Shooting the Rapids.”

worlds of the executives. Though it had a predictable pattern, scenario planning was a method of patient revelation. Kleiner explained it this way:

You research present key trends; you determine which are predictable and which are uncertain; you decide which uncertainties are most influential; you base some stories of the future on those uncertainties; you spend some time imaginatively playing out the implications of those stories; and then you use those implications to start all over again and develop a sense of the impending surprises.⁶³

At a presentation for members of the Global Business Network in the early 1990s—a consulting firm formed by former Shell planners that sold scenario to large corporations—Wack clarified the purpose of planning was “not to produce a document: What will the world of energy look like in ten years’ time? The purpose of planning is to change the mental map of critical decision makers.”⁶⁴

According to this tale, scenarios were more philosophical than technical: how could one learn to see the future economic turbulence while accepting that future predictions were impossible? And, how did one encourage executives to change their inner models of reality? Nevertheless, the process of finding out the ‘mental models’ of the decision makers often began with nothing more than interviewing executives with open-ended question like, “suppose I was a wizard,” what would you want to know about the future?⁶⁵ Though part of a much longer history in free-form questioning from

⁶³ Kleiner, “The Man Who Saw the Future.”

⁶⁴ Wack, “Planning in Turbulent Times,” video of presentation at GBN. Undated. Pierre Wack Collection. Futures Library. University of Oxford.

⁶⁵ Kleiner, “Wack @ Curemont,” Transcripts of interview between Pierre Wack and Art Kleiner, 53 pp. Pierre Wack Collection. Futures Library. University of Oxford.

humanistic psychology, not an uncommon practice in late twentieth century business, Shell scenario planners often inflated the outcomes of the experimental methods.⁶⁶

The midcentury information revolution brought with it increasingly sophisticated mathematical procedures promising to revolutionize planning; but, according to Pierre Wack, they actually had “conditioned” Shell’s corporate managers to “have great difficulty to perceive change.”⁶⁷ Crucially, Wack’s aim was to train executives to see future certainties and uncertainties anew. The direction of some of future forces were “predetermined” –they could be easily identified as they were consequences of what had happened in the past. Often, these forces consisted of macroeconomic indicators such as supply and demand, GNP growth rates and changes in the business cycles. Wack understood the predetermined elements of the future to be “typical cyclical fluctuations” foundational to macroeconomic theory; it was the ‘non-economic’ factors of people and politics that were prone to behave unpredictably.⁶⁸ The 1973 “Rapids” scenarios, for example, explored economic growth, oil supply, and oil price options, specifically focusing geo-political conflicts to suggest the oil business was about to undergo a period of turbulence (Figure 13). In one scenario, oil prices rose slowly. In the second, oil prices crashed, something few oil companies considered. And, in yet another, oil prices rose

⁶⁶ Kleiner, “Wack @ Curemont”; on practices from humanistic psychology, see Grogan, *Encountering America: Humanistic Psychology, Sixties Culture and the Shaping of the Modern Self*.

⁶⁷ Pierre Wack, “Scenarios and the Gentle Art of Re-Perceiving: One Thing or Two Learned While Developing Planning Scenarios for Royal Dutch/Shell,” (Manuscript, Harvard Business Review Dec 1984). Pierre Wack Collection. Futures Library. University of Oxford.

⁶⁸ Wack, “Scenarios: Shooting the Rapids.”

quickly, and remained high.⁶⁹ The chart was meant to help “reframe our manager’s outlook” from “the calm upriver of the traditional environment” to “the turbulence of the rapids.” This would help Shell to “learn to live in a new habitat.”⁷⁰

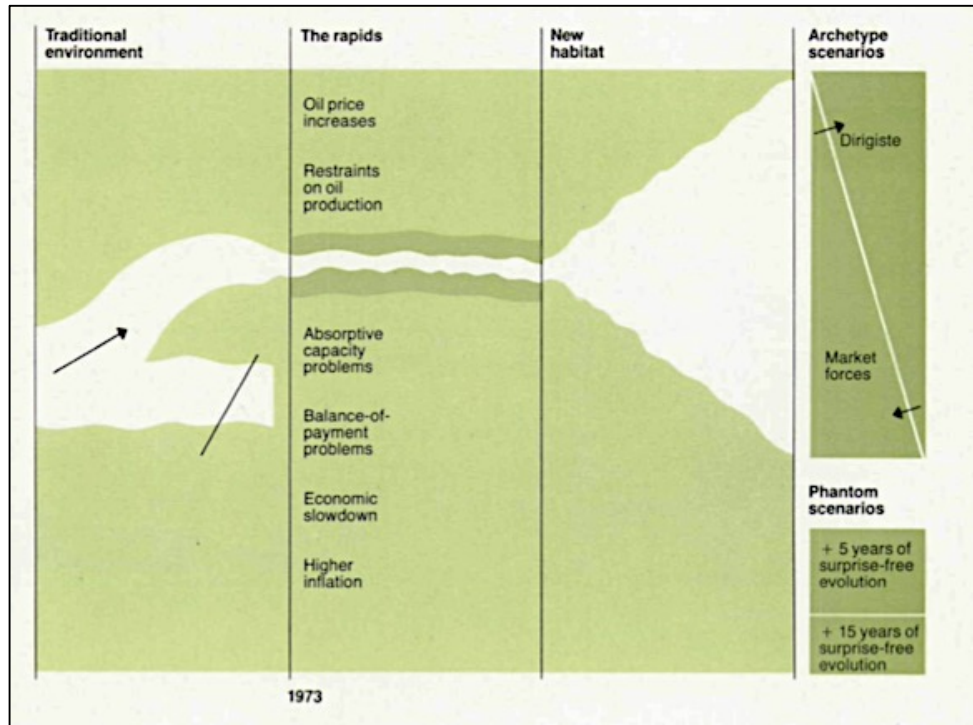


Figure 13. “The Rapids” Diagram presented to Shell Management Directors in 1973.⁷¹

⁶⁹ Wack, “Scenarios: Uncharted Waters Ahead.”

⁷⁰ Wack, “Scenarios: Shooting the Rapids.”

⁷¹ Wack, “Scenarios: Uncharted Waters Ahead.”

The directions of other forces—like geopolitical and social developments—were uncertain. Though scenarios often assumed market forces to be predetermined, they did not imagine “the economic” to be unencumbered by erratic social and political factors.⁷² Thus, though “economic disruptions,” were most often the “predetermined factors; uncertain were the reactions to it,” wrote Pierre Wack.⁷³ To parse and explore the predetermined and uncertain elements, Shell scenario planners made use of a wide variety of experimental techniques. For example, most scholars note how the development of this perspective came from introspective activities and uninterrupted exchange: weeklong retreats in secluded locations, like the austere monastery in the mountaintop town of Lurs in the south of France.⁷⁴ Group Planning colleague Napier Collyns described Wack as capable of seeing “truths about the future that others could barely imagine.”⁷⁵ Former Shell scenario editor and academic Betty Sue Flowers described Wack as “a kind of wild man whom could be found in his Shell office, in the most sterile building in London, sitting on his floor amidst a haze of *puja* sticks, meditating, to come up with his stories about the future of oil and gas.”⁷⁶

Others, like former Group Planning member Michael Jefferson, attributes the tale of scenarios to Wack’s ability to “‘package’ the story lines” and captivate his audience

⁷² This differs from the way of understanding “the economy” as a container, see Mitchell, *Rule of Experts*; Murphy, *The Economization of Life*; and the Introduction.

⁷³ Wack, “Scenarios: Shooting the Rapids.”

⁷⁴ This May 1974 retreat was original documented in Kleiner, *The Age Heretics*.

⁷⁵ Napier Collyns and Harbin Tibbs, “In Memory of Pierre Wack,” *Netview* 9, no. 1 (1998): 3.

⁷⁶ Davis-Floyd, “Storying Corporate Futures,” 172.

with his “references to proverbs...[and] analogies” in order to “fix his points in the imagination” of Group Planning members and executives.⁷⁷ Fred Turner has called Wack’s scenarios “corporate performance art.”⁷⁸ This understanding was shared by Ted Newland, who reflected on the importance of Wack’s charismatic scenario presentations:

The first thing to say is the presentation of scenarios is at least as important as the creation of the scenario and the process. I’m talking at the highest of effective levels, not down in the engine room of the planning department. You’ve got to have the right mix of talent in presenter and creator if you want to launch something that is—as the American’s call a game changer.⁷⁹

Wack’s scenario presentations were filled with parables, to gain interest in the stories told about the future. Wack often began his scenario presentations with a prosaic observation about how the flooding of river could be foreseen if one looks to the glacial run-off at the upper part of the river:

I happen to know the Ganges pretty well, from stream to mouth. It’s a very extraordinary river. Now, if you know that it had a monsoon rain at the upper part of the basin, you can be sure that within two days, some extraordinary floods are going to happen at Rishikesh, which is at the foothills of the Himalayas. And there days later in Moradabad, which is northwest of Delhi. And again four or five days later in Benares.⁸⁰

⁷⁷ Jefferson, “What Really Happened,” 193,194. ⁷⁷

⁷⁸ Turner, *From Counterculture to Cyberculture*, 187.

⁷⁹ Chermack, *The Foundations of Scenario Planning: The Story of Pierre Wack*, 54.

⁸⁰ Wack, “Scenarios and the Gentle Art of Re-Perceiving: One Thing or Two Learned While Developing Planning Scenarios for Royal Dutch/Shell.”

The stories were not about “fortune telling” or “crystal-ball-gazing,” Wack once remarked, but about focusing on the implications in the future for things that have already happened, much like his river explanations of the Ganges.⁸¹

It was not until 1989 that business journalist Art Kleiner first expressed the idea that Wack’s narrative-style of explicating corporate futures arose from his “mystical journey” into Eastern spirituality (though others, like critical scholars R. John Williams and Fred Turner, have reiterated this more recently).⁸² Kleiner described how Wack’s changed awareness began during his encounters with the mystic G. I. Gurdjieff in his weekly salons during World War 2, and continued during his travels in India, Thailand, and Japan.⁸³ During his time at Shell, he met his final spiritual mentor, the Hindi mystic Svamiji Prajnanpad, who, in addition to Gurdjieff, informed his search for “remarkable people” who cultivated an “art of seeing.”⁸⁴ Wack’s understanding of “remarkable people” (what would become a trademark of Shell scenarios thanks to Kleiner) has been

⁸¹ Wack, “Scenarios and the Gentle Art of Re-Perceiving: One Thing or Two Learned While Developing Planning Scenarios for Royal Dutch/Shell.”

⁸² Williams, “World Futures,” 528; On how organic thinking and “Eastern philosophy” in late-twentieth century American corporate management theories promised the “spiritual and therapeutic potentials of capitalism,” see Williams, “Technê-Zen and the Spiritual Quality of Global Capitalism,” 17.

⁸³ The Greek-Armenian mystic G.I. Gurdjieff was a controversial figure in Paris during World War II who ran the Institute for the Harmonious Development of Man at Fontainebleau. For a discussion of Gurdjieff’s approach to understanding multiple temporalities, see Williams, “World Futures,” 488-493.

⁸⁴ Though many, including Turner and William, attribute Wack’s interest in “remarkable men” to his time with Gurdjieff, Wack was much more pragmatic about it: “By remarkable, I mean someone outstanding, someone unique and remarkable people were people who were extremely acute observers and were very interested in things. Not the conventional type—it has nothing mystic... had nothing to do at all with the sense of Gurdjieff.” “Wack @ Curemonte,” pp. 52-53. Pierre Wack Collection. Futures Library. University of Oxford.

partially attributed to Gurdjieff's pseudo-autobiographical book *Meeting with Remarkable Men* (1960). In the text, Gurdjieff describes "remarkable men" as those who "stand out from those around him by the resourcefulness of his mind."⁸⁵ Yet, Wack attempted to correct this understanding. Wack's pursuit of remarkable people was not mystical at all according to him; it was a search for people with "unconventional" insights, who were "acute observers with a keen unending curiosity."⁸⁶ Thus, the understanding of Wack's art of "seeing," like his quest for "remarkable men," exceeded Wack's own articulation. It was Kleiner who defined Wack's "seeing" in the language of intuition: "a frame of mind beyond observation: the cultivated ability to connect patterns and causes."⁸⁷ Elsewhere, Kleiner suggests that Wack was hired to bring "awareness" to Shell.⁸⁸ In one of only a handful of published texts from Wack on scenarios, he uses obscure metaphors to define "seeing." In one place, "seeing" the divergent forces making up the future was akin to watching waves from "a large rock dropped in a lake"; elsewhere, creating narrative stories were ways to "shoot the rapids" of turbulent future forces.⁸⁹

Kleiner suggests there was something specific about Wack's ability to "see" interacting future forces and provide Shell with the necessary 'competitive advantage' against companies clinging to antiquated straight-line forecasts. By presenting "two or

⁸⁵ Kleiner, *The Age Heretics*, 157; quoted in Turner, *From Counterculture to Cyberculture*, 187.

⁸⁶ Kleiner, *The Age Heretics*, 135.

⁸⁷ Kleiner, *The Age Heretics*.

⁸⁸ Kleiner, "The Man Who Saw the Future."

⁸⁹ Wack, "Scenarios: Shooting the Rapids."

more” stories about how the future could come about, Shell’s scenario could “break” limited “perceptual world framework” passed down by economic quantification.⁹⁰ That is, Shell scenarios claimed to be more than narrative articulations of “what if?” pushed to the furthest degree of plausibility, like the scenarios of the Hudson Institute. In his 1985 *Harvard Business Review* reflection on the scenario process at Shell, Pierre Wack boldly declared that Shell’s scenario techniques provided “something very precious: the ability to *reperceive* reality.”⁹¹

World Oil Scenarios and Cold Reality

This tale of how Pierre Wack rescued Shell from the limitations of rational, model-based planning systems contradicts accounts from other Shell economist and planners that worked alongside Wack in Group Planning. For example, in 1979, former Shell scenario team member Hans DuMoulin, Head of Energy and Oil Economics, and John Eyre, an energy and oil economics analyst, were the first to publish on the internal Shell scenario planning efforts. Reflecting back four years after the first massive increase in oil prices in 1974, DuMoulin and Eyre, presented scenario planning as a useful “methodology for coping with uncertainty”:

⁹⁰ Wack, “Scenarios and the Gentle Art of Re-Perceiving: One Thing or Two Learned While Developing Planning Scenarios for Royal Dutch/Shell.”

⁹¹ Wack, “Scenarios: Shooting the Rapids.”

There have been many conflicting forecasts of future energy developments, ranging from ‘no problem’ to alarmist warnings of another, even greater, shock to come—a second energy crunch. The latter view has tended to predominate. The multiplicity of forecasts would itself be confusing enough and undoubtedly contributes to indecision and lack of action by policy-makers, but the picture is still further obscured by the current situation. At the time of writing (October 1978), oil consumption is only just back where it was five years ago, energy supply is in potential surplus and the sense of urgency seems to be gone. What is the truth? Is the second energy crunch, so widely predicted, real or not? If it is, how can the confusing messages be rationalized so that the actions necessary to deal with it can be set in motion?⁹²

Dumoulin and Eyre go on to describe scenarios as “sets of heuristic hypotheses about the future” based upon “the selection, construction and quantification” of forces shaping the future.⁹³ At the time, Shell Group Planning was heavily invested in Hudson Institute’s “Corporate Environment Study” discussed in Chapter 2, and their articulation of scenarios reflects this relationship.

This section reviews the characterizing Shell scenarios from Shell insiders during the late 1970s in order to highlight how scenarios were originally described as techniques to deal with the problem of growth due to the uncertain supply of cheap oil. Though most histories of Shell scenarios focus on Pierre Wack’s most-cited articles from *Harvard Business Review*, Wack’s articles were neither the first articles on Shell’s methods nor the first to be awarded with an *HBR* McKinsey Prize for “groundbreaking management thought.” Thus, an important place to understand how articulations of the Shell scenarios

⁹² DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” *Energy Economics* 1, no. 2 (1979): 76-86.

⁹³ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 76.

changed in the mid-1980s is to examine accounts from other Shell scenario team members and executives.

Originally submitted to *Harvard Business Review*, DuMoulin and Eyre's paper "Energy Scenarios: A Learning Process," was rejected in the late editorial process and subsequently submitted to the second issue of *Energy Economics*, a journal covering econometric modeling of energy systems.⁹⁴ DuMoulin and Eyre designate their process as a way of identifying "a hardcore of information, some solid facts on which we can base" future plans.⁹⁵ The article emphasizes the importance of understanding uncertainties as "barriers to growth," and thus threats to the oil business, something that would lose centrality in later articulations of Shell's scenario approach.⁹⁶ In one section, DuMoulin and Eyre foreground the central tenets of the "economic progress," meaning that:

at least for the next two decades, a high proportion of people in the industrialized world will want further economic progress. Growth, in the sense of increasing added value from man's activity, can be seen as a natural feature of human society.⁹⁷

⁹⁴ Jefferson, "What Really Happened," 192.

⁹⁵ DuMoulin and Eyre, "Energy Scenarios: A Learning Process," 77.

⁹⁶ DuMoulin and Eyre, "Energy Scenarios: A Learning Process," 78.

⁹⁷ DuMoulin and Eyre, "Energy Scenarios: A Learning Process," 78.

DeMoulin and Eyre describe two archetypal scenarios that were introduced in 1974 based on high-growth and low-growth scenarios: *World of Internal Contradictions* and *Business Expands* (formerly *Belle Epoque*).

Table 1. Two archetype scenarios	
World of internal contradictions scenario	Business expands scenario
A world which fails to liberate the forces making for growth	Barriers to growth removed
Systems proliferate and decay, alienation is widespread	Systems performance improved, alienation mitigated
Greater government intervention in the market economy	Reached by reaction against low growth
Diversion of resources to non-marketed sectors. Low commitment of risk capital	Conditions required:
Low growth of international trade (protectionism)	Effective political leadership
Strong move towards further egalitarianism	Governments understand and foster the process of wealth creation
Real GDP growth in World Outside Communist Areas (WOCA) = 2.5–3.0% per annum	Strong links into the international trade system
	Real GDP growth in World Outside Communist Areas (WOCA) = 4.0–4.5% per annum

Figure 14. “World of Internal Contradictions” and “Business Expands”⁹⁸

Essentially taken verbatim from Hudson Institute (including the chart-style presentation, see Figure 14.), “World of Internal Contradictions” described a low-growth world due to increasing national interests, government intervention, and alienation, while “Business Expands” described a high-growth world due to effective governance leading to wealth creation. This alternative future is propelled by the recognition that “the profit motive” is “natural and desirable provided it is exercised responsibly and takes into

⁹⁸ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

account the changing social dimensions.”⁹⁹ Besides being particularly dichotomous and simplistic, this description of the scenario process supports William Irwin Thompson’s earlier critiques of Hudson Institute scenarios: They were invested in a particular idea that increased enterprise was the only means of measuring progress, and that the growth of the corporation—with its industrial metaphors—came at the expense of society and the environment.¹⁰⁰

Secondarily, DuMoulin and Eyre discuss how Shell incorporated *social dimensions* into their descriptions of alternative futures, distinguishing them from forecasting frameworks. As I have discussed before, changing values and lifestyles were introduced to corporations as non-quantifiable factors that influenced the business environment in the 1970s. Building from Stanford Research Institute’s work, though unacknowledged, DuMoulin and Eyre describe how Shell began to account for the ways that social and political changes were barriers to their economic expansion: in their words, social dimensions were “likely to be as important, if not more important, than the purely economic dimensions.”¹⁰¹ These changes included, “suspicion of large scale technology, the environmental movement, concern with the quality of life, rejection of materialism, and changing attitudes to employment and worker participation” (Figure 15).¹⁰²

⁹⁹ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

¹⁰⁰ See Chapter 2 on this debate. Thompson, *At the Edge of History and Passages about Earth: A Double Book*, 142-151; World Opinion Forum. *Margaret Mead, Herman Kahn, William Irwin Thompson - Nuclear Power. The Next Century*.

¹⁰¹ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

¹⁰² DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

- † The following value changes are incorporated in the social dimension:
- institutionalization and rationalization of barriers to growth;
 - prizing of smallness, self-dependence and resilience;
 - restructuring of large systems, perhaps through decentralization;
 - suspicion of high technology and concern with the environment;
 - preference for leisure rather than marginal income and recognition of the importance of non-economic factors;
 - changing criteria for corporate success, eg value added, employment stability, participation.

Figure 15. “The Social Dimensions Influencing the Business Environment”¹⁰³

DuMoulin and Eyre conclude with three possibilities for future energy outlook based upon oil supply and demand by combining social changes, technological developments, alternative energy possibilities, and the behaviours of OPEC.¹⁰⁴ These uncertainties, captured in the terms of oil supply and demand, were constrained by three exploratory scenarios: “mirage,” “mini-crises,” or “abrupt fall of supply” (Figure 16). Through the framework of DuMoulin and Eyre, Shell scenarios are calculative, instrumental means of examining the threats (both imagined or real) in the future business environment. Though these are arguably one way that scenarios have come to

¹⁰³ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

¹⁰⁴ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 80.

be articulated, especially in sectors like banking, this is not how Shell scenarios have been understood.¹⁰⁵

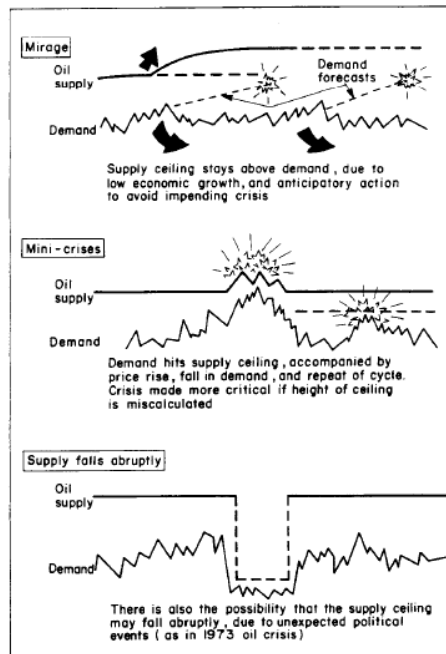


Figure 16. “The Next Oil Crisis?”¹⁰⁶

In 1980, Shell managing director André Bénard’s “World Oil and Cold Reality,” was the second article to be published on Shell scenarios. Derived from a lecture he gave at Harvard Business School in April 1980, it was published by *Harvard Business Review*, receiving the McKinsey Prize in 1980. Like DuMoulin and Eyre, Bénard highlights how oil prices could no longer be understood in traditional economic supply-demand calculations. While Bénard does not go into great lengths describing his understanding of

¹⁰⁵ See, for example, Justin Douglas, “Manufacturing Crises: A History of the Bank Credit Card Infrastructure.” PhD dissertation in progress, University of Toronto, 2017.

¹⁰⁶ DuMoulin and Eyre, “Energy Scenarios: A Learning Process,” 78.

the scenario process (he was not a member of Group Planning), he defines scenarios as “coherent sets of economic and social circumstances that could emerge from our present environment.”¹⁰⁷ They were useful, as Bénard explains, because oil prices no longer worked as predictors in purely economic equations. Thus, Bénard stresses that scenario techniques were “much more conducive to forcing people to think about the future than the forecasting techniques.”¹⁰⁸

Scenarios, Bénard indicates, focused on the paradoxical economic nature of oil in the 1970s. While with “every other commodity, a rising price tends to stimulate supply,” this was not the case for oil.¹⁰⁹ The problem, as understood by Bénard, was that there was “no readily available alternative for OPEC oil” meaning that “at higher price levels supply will decrease.”¹¹⁰ Thus, energy market stabilization could only be attained through diversification strategies of the oil companies. Bénard concludes that this means creating more “energy efficiency, alternative energy sources, and technology transfer” to OPEC nations, would be the only way to change the “teetering oil supply-demand balance.”¹¹¹ It is important to point out here that none of these Shell executives and planners understood scenario planning to be an unconventional business tool. These two

¹⁰⁷ André Bénard “World Oil and Cold Reality,” *Harvard Business Review* 58, no. 6 (1980): 91-101.

¹⁰⁸ Bénard “World Oil and Cold Reality.”

¹⁰⁹ Bénard “World Oil and Cold Reality.”

¹¹⁰ Bénard “World Oil and Cold Reality.”

¹¹¹ Bénard “World Oil and Cold Reality.”

articles make no mention of Pierre Wack— not his spiritual background, and not his special ability to help Shell to re-perceive reality, and forever change corporate planning.

The Heresy of Shell Group Planning

"Meaning is hot, and it's going to get hotter.
This is the age of disenchantment,
and people are looking for something more,
for an antidote to the masochism of work."

- Harriet Rubin, Executive Editor of *The Age of Heretics*¹¹²

The tale of Pierre Wack and scenario planning did not arise out of thin air. It was promoted by a rising business publishing industry that, with the help of ghostwriters and editors, produced “thought leaders,” like Pierre Wack. One could argue that it was the slump in Art Kleiner’s journalism career in the mid-1980s that helped to launch Pierre Wack as the guru of corporate scenario planning.¹¹³ The first person Kleiner worked with as a freelance journalist, after leaving his job as the editor of counterculture figure Stewart Brand’s *Whole Earth Catalogue*, was Harriet Rubin, the established editor of the

¹¹² Brian Dumaine, “Why Do We Work?” *Fortune* (December 26, 1994, Vol. 130, No. 13): 196-205.

¹¹³ In the *Wired* article “Confessions of a Ghostwriter” Kleiner describes how he “fell into ghostwriting in 1989, during a slump in my journalism career. Established but neither flush nor famous, I was delighted to get this relatively well-paid work helping business stars write books.” Art Kleiner, “Confessions of a Ghostwriter,” *Wired* 6.10 (October 1998): 65.

New York publishing company Doubleday.¹¹⁴ Rubin was introduced to Kleiner in the late 1980s just as she was building a new line of business publications—a publishing imprint of Doubleday called Currency—targeting a rising generation of disaffected business leaders.¹¹⁵ She was inspired by bold “individuals” who were driven to success—and there is no better example than her sympathetic portrait of Ayn Rand.¹¹⁶

Rubin, a distinguished poet and writer, wanted Currency to give life to these idealistic business figures in order to enliven what was imagined to be a boring (i.e. “status quo”) understandings of business management and organization. Doubleday was initially hesitant that there would not be an audience for books about, in words from the publicity materials, the “thought leaders,” that could “start a fire in our minds.”¹¹⁷ However, most of the publications, including the flagship book in the new line, Herman Miller Chief Executive Max DePree’s *Leadership is an Art* (1987), sold thousands immediately.¹¹⁸ In the late 1990s, Currency/Doubleday became the go-to source for publishing “thought leaders across a range of creative disciplines to help us navigate and

¹¹⁴ Art Kleiner first became acquainted with Shell’s Group Planning when he was hired to help them to setup their computer conferencing system in the mid-1980s.

¹¹⁵ Rubin recalls the idea for Currency came to her in the late 1980s when she was having lunch with a friend working on an MBA at Harvard Business School. Seeing all the impenetrable business books (elsewhere, she called them “dull” and “badly written”), her friend asked why someone didn’t publish books business people would like to read. Rubin wanted them to be beautifully voiced, providing an “almost poetic” version of corporate pasts and futures. Personal communication with Rubin; Reckard, “Succeeding by reading in the ‘80s: Authors jump on “In Search of Excellence” bandwagon.”

¹¹⁶ Harriet Rubin, “Ayn Rand’s Literature of Capitalism,” *New York Times*, 15 September 2007.

¹¹⁷ Reckard, “Succeeding by reading in the ‘80s: Authors jump on “In Search of Excellence” bandwagon.”

¹¹⁸ Reckard, “Succeeding by reading in the ‘80s: Authors jump on “In Search of Excellence” bandwagon.”

succeed in an uncertain and rapidly evolving world.”¹¹⁹ Rubin contends that Currency/Doubleday became the model for thought leadership that other publishers aimed to replicate.¹²⁰ Currency/Doubleday is a later iteration of a longer tradition of journalists crafting the “epistemic and social virtues” of “technoscientific innovators” from the 1960s and 1970s, a confluence of countercultural sentiments and the changing significance of “innovation,” “science” and “technology.”¹²¹ As media scholars Fred Turner and Christine Larson have argued, entrepreneurial network cultures and social media technologies have amplified the production and dissemination of reputations and ideas.¹²²

Kleiner’s initial commission from Rubin was an article for the pilot to the publishing house, a magazine called *Currency Magazine*, that would feature ‘unconventional’ (i.e. ‘enchanted’) business leaders. Though *Currency Magazine* did not survive, it was instrumental to the founding of *Fast Company*.¹²³ It was Shell scenario team member Napier Collyns who suggested to Rubin that Pierre Wack and the scenario

¹¹⁹ Reckard, “Succeeding by reading in the ‘80s: Authors jump on “In Search of Excellence” bandwagon.”

¹²⁰ Harriet Rubin, “Peter’s Principles,” *Inc.* 1 March 1998. <https://www.inc.com/magazine/19980301/887.html>

¹²¹ See, for example, historian of science Matthew Wisnioski’s examination of the short-lived magazine *Innovation*, in print from 1969-1972. Matthew Wisnioski, “How the Industrial Scientist Got His Groove: Entrepreneurial Journalism and the Fashioning of Technoscientific Innovators,” in *Groovy Science* 340-341. In *Groovy Science: The Counter-Cultures and Scientific Life, 1955-1975*, edited by Cyrus CM Mody, David Kaiser, and W. Patrick McCray, 109-134. Chicago: University of Chicago Press, 2016.

¹²² Fred Turner and Chrisine Larson, “Network Celebrity: Entrepreneurship and the New Public Intellectuals,” *Public Culture* 27:1 (January 2015): 53-84.

¹²³ Kleiner, “Confessions of a Ghostwriter.”

process at Shell be featured as a blueprint for what Currency/Doubleday could offer (though, other scenario team members Peter Schwartz and Arie de Geus, members that Kleiner would later ghost-write for, were also identified as potential thought leaders¹²⁴).¹²⁵ The other ideas, General Motors and the quality movement, Dow Chemical and corporate environmentalism, and the use of psychiatrist Elisabeth Kubler-Ross' work on grief by the 'dying' company Amtrak, were eventually scrapped. This article, "Consequential Heresies: How 'thinking the unthinkable' Changed Royal Dutch/ Shell," ended up focussing only on the compelling story of Pierre Wack and Shell Group Planning.¹²⁶ The article presented the thesis that Wack had changed corporate planning by being an unconventional "heretic." Wack as a "heretic" would become a larger argument of Kleiner's, a claim he articulated at the beginning of *The Age of Heretics*: the mid-to-late-twentieth-century was "an age where unconventional ideas become conventional wisdom rapidly. And that's a good thing, because the future of industrial society depends on our ability to transcend the destructive management of the past and build a better kind of business."¹²⁷

¹²⁴ Personal communication with Art Kleiner.

¹²⁵ Collyns, former Group Planning member, was working on public relations for Shell in New York at this time. The 1980s was a difficult time for Shell's image, and public relations was an important component to combat the negative publicity surrounding its role in environmental contamination. In addition to spills in California, and legal actions for toxic waste dumping at former facilities in Louisiana and Colorado, the 1989 explosion of an offshore oil platform in the North Sea, forced Shell to reckon with its image.

In addition to connecting Rubin and Kleiner to write about Wack, Collyns brokered the deal for Wack's articles on scenarios to be published at Harvard Business School. Personal communication with Harriet Rubin and Napier Collyns.

¹²⁶ The Global Business Network eventually republished and distributed "Consequential Heresies" to the companies it wrote scenarios for.

¹²⁷ Kleiner, *The Age of Heretics*, 3.

More than providing the platform for Kleiner to disseminate Wack's story, the editorial work of Currency/Doubleday helped to create the tale. After his original heresies article, Kleiner received an advance from Rubin on what would become *The Age of Heretics*, a book that profiled corporate visionaries who created change in large-scale organizations after the postwar period. In developing his heretics thesis, Kleiner made comparisons between corporate change makers and monastic types—like heretics, reformers, mystics, and protesters—and positioned these heretics against the stagnancy of scientific management techniques. A heretic was “someone who sees a truth that contradicts the conventional wisdom of the institution to which he or she belongs and remains loyal to both entities.”¹²⁸ In *The Age of Heretics*, Kleiner inserted his own critiques of “mechanistic principals,” and positioned his corporate heretics as more evolved:

I think that a consistent new truth common to all of the heresies in industrial society is the idea that society can't be planned, designed, and governed in a mechanistic fashion. We should indeed, use mechanistic principals to organize effectively. But when we get caught up by the seductive arrogance of those principles (and the way in which they seem to provide all of the answers), our organizations become intolerable. They don't cohere. They don't sustain themselves or the people in them.¹²⁹

As Kleiner would describe later, the entirety of *The Age of Heretics* was devoted to showing a business audience, “how they weren't in the business of making money, even

¹²⁸ Kleiner, *The Age of Heretics*, 4.

¹²⁹ James Evers, “An Interview with a Utopian Corporate Heretic,” *Training & Development* 52.06 (June 1998): 63.

if they thought they were.”¹³⁰ Additionally, Kleiner wanted to convey to “countercultural people” “the idea that you can’t make a better world, in our time at least, by fighting the system head-on. It has to be done by somehow enlisting corporate people to redesign their efforts from within.”¹³¹ This message would be a through line connecting the texts Kleiner ghostwrote for Currency/Doubleday.

The first ghost-writing assignment that Currency/Doubleday gave to Kleiner was a sprawling, disorganized 1200-page manuscript from a then obscure systems scientist from MIT Sloan School of Management, Peter Senge. The book would become the 1990 best-seller, *The Fifth Discipline: The Art and Practice of the Learning Organization*, though originally it was meant to be a co-authored publication with Shell Group Planning member Arie de Geus. Kleiner helped Senge crystalize his theory of “organization learning,” meaning, a corporation that encourages learning and dynamically changes in response to opportunities and threats. At the same time, Kleiner inserted his own conclusions about the “heretical” postwar transformations in business strategy. Kleiner’s earlier work on Wack and scenario planning featured in *The Fifth Discipline*, identifying Group Planning at Shell as an ideal learning organization.¹³² Shell’s use of scenarios to get at the “mental models” of the decision makers, argues Senge (by way of Kleiner), led Shell to “fortunes.”¹³³ Later, Kleiner ghost-wrote another influential text on organizational learning, Arie de Geus’ *The Living Company*. In *The Living Company*, de

¹³⁰ Evers, “An Interview with a Utopian Corporate Heretic,” 61.

¹³¹ Evers, “An Interview with a Utopian Corporate Heretic,” 61.

¹³² Senge, *The Fifth Discipline*, 167-170.

¹³³ Senge, *The Fifth Discipline*, 170.

Geus argues that corporations should be viewed as biological entities that learn, adapt, and evolve, not as machines.¹³⁴ Again, de Geus identified Shell scenario planning as the model experimental method to enable a company to learn, adapt, and be agile.¹³⁵ Another of Kleiner's ghost-writing assignments was Group Planning member Peter Schwartz's *The Art of the Long View: Planning for the Future in an Uncertain World*. A foundational book on corporate scenario planning that also helped to launch the Global Business Network, *The Art of the Long View* identifies Wack's goal that the "liberation of people's insights" was the initial inspiration for the "art of the long view."¹³⁶

This story linking Pierre Wack to Shell's financial success was reiterated by Harriet Rubin in public relations pieces for Currency/Doubleday. In the *New York Times* article "Business Books for New-Age Bosses," Rubin uses the case of Pierre Wack to argue that today's best-selling business books will "preach awareness": "Peak performance is a machine-age ideal. Awareness, on the other hand, comes from applying the ideals of scientific discovery to management."¹³⁷ In this the story writing of Kleiner and the public relation campaign and editing of Rubin, were involved in the crystallization of the idea that Shell scenario planning was successful because it was spiritually aware and unconventional. When Currency/Doubleday began, Rubin encountered the problem that most business leaders she was interested in could not

¹³⁴ de Geus, *The Living Company*, 125.

¹³⁵ de Geus, *The Living Company*, 125.

¹³⁶ Schwartz, *The Art of the Long View*, 9.

¹³⁷ Harriet Rubin, "Business Books for New-Age Bosses: Targeting baby boomers who are more into their mantras than the marketplace," *New York Times* (June 24, 1990): F11.

write—and in some cases, could not understand—their significance. As Rubin recalls, “I took the ideas” of business leaders like Shell Group Planning members Peter Schwartz, “and reworked their manuscripts until my blue pencil became like a sixth finger on my right hand.”¹³⁸ In an interview on his ghost-writing career, Kleiner reflects that his work for business leaders was to “crystalize their practice into thought” because “these highly paid corporate managers didn’t know how to think about their work.”¹³⁹ This exercise was part of a larger transformation in thought leadership journalism. Kleiner, who in 1999 became the editor of the management consulting firm Booz, Allen & Hamilton’s “thought leadership magazine” *Strategy & Business* continued to churn out the mystical story of Wack, including Kleiner’s widely read post on Wack, “The Man Who Saw the Future.”¹⁴⁰

There is ample evidence that Kleiner was well-aware of the role that he played in crafting compelling narratives to guide business leaders. In an interview about Kleiner’s role in the “marketplace of ideas,” Kleiner emphasized the importance of distinguishing oneself and attracting followers: “There are people out there inventing new practices, but they’re not necessarily communicating with each other. And they’re not necessarily aware of what each other is doing. And all of them are moving knowledge further than it would move if they hadn’t been there. But none of them are moving knowledge as far as

¹³⁸ Rubin, “Peter’s Principles.”

¹³⁹ The Bloom Group, “Inside the Marketplace of Ideas: An Interview with Tom Stewart and Art Kleiner,” <http://bloomgroup.com/content/inside-marketplace-ideas>. Evers, “An Interview with a Utopian Corporate Heretic,” 60.

¹⁴⁰ Incidentally, Kleiner would go on to ghost-write Booz, Allen & Hamilton’s corporate history, *Helping Clients Envision the Future*. Kleiner, “The Man Who Saw the Future.”

it would be if they were all communicating openly with each other. And they all have to make a living. Because they're all selling their services at the same time, they have to balance being competitive against being open and expanding knowledge."¹⁴¹ Kleiner admitted that his job as a thought leadership editor for a management consulting company was to "help bring the ideas to their potential"¹⁴²

Shell's scenario story was propelled by an integrated network of former Shell planner and associates building the Global Business Network (GBN), a California-based management consulting firm that portrayed themselves as the vanguards of the future.¹⁴³ GBN was cofounded in 1987 by a group of entrepreneurs, including former Shell planners Napier Collyns and Peter Schwartz. Kleiner was not only a member of GBN, but he was actively involved in documenting the history of GBN, and in teaching scenarios techniques. His work on Wack was largely instigated by Napier Collyns, an original member of the Shell scenario team and a founding member of GBN.

GBN formed in 1987 to research and distribute information about how scenarios would help corporations gain a competitive edge in future business environments.¹⁴⁴ Individuals in such fields as high technology and economics, artists and anthropologists, and business leaders and management scholars were assembled according to the

¹⁴¹ The Bloom Group, "Inside the Marketplace of Ideas: An Interview with Tom Stewart and Art Kleiner."

¹⁴² The Bloom Group, "Inside the Marketplace of Ideas: An Interview with Tom Stewart and Art Kleiner."

¹⁴³ On the larger history of management consulting, see Christopher Mckenna, *The World's Newest Profession*.

¹⁴⁴ On how GBN relied on extended speculative cybernetic thinking practices, like heterarchy, to legitimate its consulting expertise in the rising knowledge economy, see Fosbrook, "Evolution through *Heterarchical* Organization."

expertise needed for the consulting project at hand. GBN was built through these informal networks, framed by postmodern lingo, and articulated through the most unconventional methods, including everything from improvisational dance workshops to role-playing exercises exploring the restructuring of the economy.¹⁴⁵ In this sense, GBN imagined themselves as creative and bold “thought leaders,” revitalizing business at a utopian moment in the 1990s.¹⁴⁶ The abilities of the select group at Shell, and their ability to “see” the uncertain forces impacting future developments, became central to the conception of Shell’s success, something that was possible to see only in hindsight. However, GBN failed to foresee the collapse of the technology bubble in 2000, one it heavily profited from. More than this, the company that acquired GBN during the crash, Monitor Group, once known as the purveyors of scenario planning, went bankrupt and was acquired by Deloitte shortly after the 2008 financial crash.

What this all means is that the mythical understanding of corporate scenarios—the spiritualization of the process, the heretical nature of Pierre Wack, the influence of scenarios in financial success—has acquired the status of *myth*. In “cracking open” the inscription devices this section complicates the mystical story of Shell’s scenario planning. It shows how the story, what looks at the outset like a bizarrely interconnected series of radical ideas about corporate planning, were most often written (or ghost-written) by Kleiner, and often commissioned by Currency/Doubleday editor Harriet Rubin. All of these efforts coincided with the efforts of Global Business Network to distinguish themselves as management consultants for the uncertain future in the 1990s.

¹⁴⁵ Garreau, “Conspiracy of Heretics.” Garreau, a journalist for *Wired*, was also a member of GBN. His use of heretics comes from Kleiner as well.

Though Wack had spiritual guides, and filled his scenarios of corporate futures with metaphors and narratives, it was not Wack who described his narrative approaches in the existential, heretical terms that would later be ascribed to it. The most reputable scenario planning projects trace their origins to the work of Shell, and Pierre Wack in particular, including the now defunct Global Business Network, and the thriving Oxford Scenarios Programme at Saïd Business School at the University of Oxford.¹⁴⁷ In 2016, the Oxford Futures Library at Saïd Business School, housing Pierre Wack's book collection, a Shell report repository, and personal notebooks, became a permanent fixture of the Bodleian Library at the University of Oxford. Books and articles continue to circulate the idea that Shell's corporate scenario planning encourages thinking about corporate futures (an "open" and "irreducibly uncertainty" terrain) better than others by equipping leaders with existential capabilities to be "comfortable with the ambiguity."¹⁴⁸

¹⁴⁷ On the Global Business Network, see Chapter 1. The Oxford Scenarios Programme was developed by former Shell Rafael Ramirez, Kees van der Heijden and Hardin Tibbs, all former Shell planners, in 2004. The Oxford Scenarios Programme trains executives in the practices of scenario planning. Faculty are current and former members of the Shell scenario team and Global Business Network.

¹⁴⁸ Wilkinson and Kupers, "Living in the Futures."

The Art of “Seeing” Shell

This chapter interrogated the historical understanding of Shell scenarios. In doing so, the chapter identified the network of translators, mostly Shell insiders, that produced the myth that Pierre Wack’s heretical contributions led to Shell’s economic success even though a direct connection to Shell’s improved strategy or financial success was questionable. The chapter revealed how the rising industry of “thought leadership” journalism of the late twentieth century transformed beliefs about the multinational energy and petrochemical company Shell’s scenario planning techniques from the 1970s—by producing and promoting the “charismatic authority” of the “thought leader” Pierre Wack—and was a significant contributor to the technique’s contemporary legitimacy in the field of strategic management.

Business historians and some former Shell planners have established that Shell’s scenarios from 1973 and 1979 played no specific role in anticipating the oil crises and subsequent stagflation.¹⁴⁹ Even as histories continue to praise Wack for being able to skillfully “see” the future, former Shell planners admit the scenarios sometimes “fell short of expectations, were misunderstood, or were marginalized for political reasons.”¹⁵⁰

¹⁴⁹ As early as 1967, inspired by the work on the Commission on the Year 2000, the studies and policy division of Shell suggested Shell diversify in order to hedge against the “eventual downturn in the growth of the oil business, which may well come at or soon after the end of the century.” The report concluded Shell should seek diversification strategies in order to “be less susceptible to the effects of dirigisme” and “secondly to gradually adjusting the pattern of the Group’s business so as to be less vulnerable to the eventual decline of our present main activity” [i.e. be prepared for the decline of oil]. Proposed strategies included, heading “into other business on the fringe of the oil industry, including possibly some acceleration of investment into the chemical business.” Shell Group Planning, “Post Objectives Period: A Special Survey of Energy in the World Political and Economic Environment for the Years 1985-2000”; See also Sluyterman, *Keeping Competitive in Turbulent Markets*, 222-223.

¹⁵⁰ Kupers and Wilkinson, *The Essence of Scenarios*, 125.

In the celebratory, insider history of scenario planning at Shell, *The Essence of Scenarios*, former planner Angela Wilkinson and executive Roland Kupers conclude the scenario process at Shell did not have an exact function in furthering the core business. The evidence about the direct connection to strategy, they admit elsewhere, was “circumstantial, at best”; its job was “never to produce explicit strategy.”¹⁵¹ Some former Shell employees have been more damning, finding the scenario insights to be nothing more than an overview of what one could read in the *Financial Times*.¹⁵² Many members of the larger Shell organization called scenarios an “enormous distractions from the core business” that “led to wasting very large sums of money by encouraging a race down blind alleys.”¹⁵³ This “unusual corporate function” had “on at least three occasions” been almost discontinued as a Shell planning technique, following similar critiques scenarios faced at Hudson Institute and Stanford Research Institute.¹⁵⁴

The interesting question is not whether the tale of Shell’s scenarios is ‘made up,’ but why so many corporations and business leaders have decided to believe it. This chapter recovers the labours of the editorial process, and suggests that the rise of corporate scenarios cannot be understood without this unacknowledged act of translation. However, in attempting to recover the labours of the translation, the chapter identified the difficulties of articulating what happened, when the archives are restricted, and the

¹⁵¹ Kupers and Wilkinson, *The Essence of Scenarios*, 126.

¹⁵² Kupers and Wilkinson, *The Essence of Scenarios*, 126.

¹⁵³ Kupers and Wilkinson, *The Essence of Scenarios*, 126.

¹⁵⁴ Kupers and Wilkinson, *The Essence of Scenarios*, 123.

histories are obscured by corporate histories and commissioned authors. One of the challenges for historians of corporate techniques is how to articulate a coherent argument concerning methods like scenario planning without reifying the social and cognitive peculiarities of charismatic thought leaders, like Pierre Wack. This is where sciences studies could play an important role in the critical study of corporate techniques, so long as there is cognizance that there can be considerable overlap in theoretical tools between corporate strategists and critical science studies scholars.¹⁵⁵

¹⁵⁵ Inscription devices, acts of translation, and enrollment, for example, are theoretical tools that have enabled me to understand the success of Shell's scenario planning techniques just as they have been used to Shell strategists to articulate their own success. On inscription devices, etc. See, Latour and Woolgar, *Laboratory Life*; on the critical study of corporate techniques through the tools of science studies, see Douglas, et. al., "Knowing Corporations: Towards a Critical Corporate Studies."

CHAPTER 5: CONCLUSION

“The task of management is to create the conditions to maintain the ongoing modes of shaping meaning and action possible.”

-Francisco Varela, “Planning and Enacted Corporate Environments,”
Contracted by Shell Group Planning, 1986¹

Why did mid-to-late twentieth century corporate strategists utilize scenario planning to inform long-term business decision-making? What intellectual tools did these corporate scenario planners consolidate in an attempt to explore and exploit future uncertainties? By charting how Hudson Institute, Stanford Research Institute, and Shell transformed scenario planning to confront the contingent uncertainties of the future, like political and social changes and economic turbulence, this dissertation makes three primary contributions. First, the project of this dissertation has been to articulate a history of one future-oriented technique that originated in the postwar US military establishment. In other words, the dissertation has attended to the techniques of scenario planning, focusing on how the methodological considerations structured the creation of corporate

¹ Francisco Varela, “The Science and Technology of Cognition,” Contract by Shell (1986). Oxford Futures Library, University of Oxford.

future imaginaries, rather than examining the future images in isolation.² This line of inquiry follows historians that have examined the contested space of the future in the postwar period, detailing the diverse methodologies struggling to push the limits of what could be known and what possibilities could be imagined.³ At the same time, by highlighting the way that corporate scenario planners utilized the work of philosophers such as Aldous Huxley and Fred Polak to make sense of the future uncertainties, the dissertation has demonstrated how the history of corporate scenario planning unsettles the distinctions between the closed futures of the military forecasters and the emancipatory open futures of the philosophers after the late 1960s.

Second, this dissertation challenges the idea in science studies and the history of science that postwar business decisions have been exclusively guided by probabilistic calculus from sophisticated, computer-assisted data gathering and analyzing techniques. Alternative modes of decision-making—and a general awareness of the limitations of calculative strategies—existed alongside the increasing technical capacities in mid-to-late twentieth century corporate planning departments. Scenario techniques, while developed by postwar US military strategists, were used in multinational corporations and consulting firms to make sense of the uncertain contingencies presented by changing

² It follows historian Jenny Andersson’s argument that historical inquiry should attend to future methods, and move away from “cultural history of utopias and images of the future.” Andersson, “The Great Future Debate and the Struggle for the World,” 1414.

³ See, for example, on techno-utopianism, Patrick McCray, “Vioneering Technological Futures,” in W. Patrick McCray, *The Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future* (Princeton University Press, 2012), pp. 1-20; on DELPHI, see Olaf Helmer, “Analysis of the future: The DELPHI method” (Santa Monica: RAND Corporation, 1967), pp. 1-1; on the sciences of prediction, see Andersson, “The Political Life of Prediction.”

social and political environments of the mid-to-late twentieth century: peak oil, geopolitical turmoil, economic recession, consciousness concerning the negative effects of industrialization, and the fracturing of public values. However, computer techniques and data generation and analysis maintained a central role in corporate planning and strategy departments.

Even though scenario practitioners remained marginal characters in strategic management of the late twentieth-century, focusing on their historical efforts has revealed a much more complex portrait of rationality in decision-making technique than the historiography of the postwar sciences currently reveals. As scenario strategists moved from the calculability of forecasting, they experimented with heterogeneous non-calculative techniques and intellectual resources from the disciplines of sociology to postmodernist critical theory, drawing together sometimes contradictory rational and irrational methods. Corporate scenario planners did this as they sought to rescue management strategies from the limitations of technocratic approaches, approaches that were incapable of analyzing social and political forces—domains they considered to be incalculable. In this, corporate scenario practitioners were inspired as much by the humanistic psychology of Abraham Maslow and the epistemology of science of Thomas Kuhn as they were by the cybernetic theories of Warren McCulloch and Gregory Bateson. Others were inspired by James Lovelock's Gaia hypothesis, psychedelic experimentation, mathematical engineering contingency methods, and the mysticism of Svamiji Prajnanpad.

Corporate scenario planning gained momentum in the innovation-driven business environment of the 1990s. Though scenario planning was a relatively alternative, and

obscure, decision-making technique before the late 1980s, the rising thought leadership industry propelled scenario planning into the catalogue of mainstream strategy tools. On the one hand, scenario planning is an alternative approach to decision-making that struggles to bring the virtues of the imaginative to bear on the future in systemic ways. On the other hand, the varying success of this experimental technique for contemplating uncertainty became obscured by a rising industry of thought leadership. In this, the dissertation has shown how late twentieth century scenario planners have relied upon charismatic authority to reassure multinational corporations about speculative efforts that can only be deemed successful in hindsight.

Third, the dissertation shows corporate scenario planning efforts do not just come from postwar military operations research and systems analysis. Corporate scenario planning was also importantly animated by epistemologies that are often positioned as tools to counter capitalism—like critical biology and post-structuralism—fields closely associated with some genealogies in science studies. In the following pages of the conclusion, the dissertation provides one final example of this entanglement in order to campaign for a more entangled and complex portrait of the legacies of the science studies discipline.

After learning about the role of the late twentieth century thought leadership industry in the popularizing corporate scenario planning from the last chapter, it may be tempting to cast corporate scenario practitioners as scheming entrepreneurs seeking to extract profit by selling scenario planning techniques, nothing like critical science studies scholars. But this understanding would fall short. Critical theorists in fields from the biological sciences to anthropology partnered with scenario planners at Shell and the

California-based management consulting company Global Business Network beginning in the late 1980s. These corporate organizations used their theories of biological and machinic self-organization as intellectual resources for rethinking nondeterministic decision-making through scenario planning at the same time that critical theorists used these intellectual resources as counter-epistemologies of capitalism. By tracing how corporate scenario planners adapted their strategies and enrolled alternative intellectual ideals to face changing social and political environments—including theorists from science studies—this conclusion aims to critically engage with the historical entanglements. This is especially important as we begin conversations anew about alternative futures—what feminist science studies theorist Donna Haraway calls futures “otherwise”— in the age of climate and financial crisis.⁴

Learning from Corporate Scenario Planning

One place this collaboration between corporate executives and critical intellectuals occurred was not in a corporate boardroom, but in the Sonoran Desert, 50 miles north of Tucson, at the lauded construction site of the Biosphere II at the inaugural Shell Learning Conferences in May 1987.⁵ The head of Shell Group Planning Arie de Geus—a seasoned scenario practitioner— gathered an elite group of intellectuals, including, as mentioned

⁴ Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan ©_Meets_OncoMouse™: Feminism and Technoscience* (New York: Routledge, 1997).

⁵ “Excerpts from the “Learning Conferences,” 1986-1988,” transcribed by Art Kleiner. Stewart Brand Papers, Special Collections, Stanford University.

before, James Lovelock and Francisco Varela, as well as the American anthropologist Mary Catherine Bateson, and executives for what would become the beginning of the Global Business Network.⁶ The goal of this series of conferences was part of a larger effort of Shell's that animated their early corporate scenario planning efforts: to understand how they might adapt to uncertain future environments in order to outlast their competitors.



Figure 17. Learning Conference Participants James Lovelock, Mary Catherine Bateson, and Francisco Varela⁷

The foundations for the Learning Conferences began with a 1983 Shell Group Planning study headed by de Geus entitled, “Corporate Change: A Look at How Long-Established Companies Change,” which detailed the planning strategies of 30 long-lived multinationals, some as old as the seventeenth century, including East India Companies

⁶ Schwartz, *The Art of the Long View*,

⁷ From left: James Lovelock, British Library Archives. London, United Kingdom. Mary Catherine Bateson, Getty Images. Francisco Varela, Mind and Life Institute.

and the Hudson's Bay Company.⁸ The study drove the planning group, which included members from Shell's scenario planning team including Napier Collyns and Peter Schwartz, into a larger quest to understand how large and complex organizations, like Shell, could harness the latest intellectual resources on organizational change in to secure Shell's continued longevity.

Shell was known as being capable of drastic change: Originally, the British Shell Transport and Trading were sellers of oil for lamps in the Far East, while the Royal Dutch oil company imported kerosene from Sumatra.⁹ The two companies remained separate until a mid-1950s reorganization by McKinsey consolidated the organization, while keeping it spread over two central offices.¹⁰ However, by the late 1980s, the answer to how there could be life for Shell after oil was no longer centrally-controlled diversification or acquisition and merger policies, something scenario planning helped the organization grapple with in the mid-1970s.¹¹

The Learning Conference discussion began over desert walks and cookouts, discussions, cocktails hours, and elaborate dinners made from vegetables grown onsite in the Arizona desert. While Shell's name was on the conference, corporate executives from Volvo, AT& T, and Shell paid to think alongside the likes of Lovelock, Varela and Bateson—whose document of one of her father Gregory Bateson's cybernetic

⁸ Royal Dutch/Shell Group Planning PL/1, "Corporate Change: A Look at How Long-Established Companies Change (September 1983); de Geus, *The Living Company*, 239.

⁹ de Geus, *The Living Company*, 10.

¹⁰ de Geus, *The Living Company*, 196.

¹¹ de Geus, *The Living Company*, 10.

conferences entitled *Our Own Metaphor* provided a self-conscious, meta-analysis and a language for the methodology of the Learning Conferences.¹² Other intellectuals included MIT artificial intelligence researchers Marvin Minsky and Seymour Papert, and the computer scientist Danny Hillis.

The Learning Conference is just one of many spaces where critical biological theories became fruitful metaphors for rethinking Shell's planning process. This conclusion identifies the critical biologists that acted as heavyweight consultant-academics, specifically Lovelock and Varela, and examines how Shell seized upon their theories of biological organization—specifically the Gaia hypothesis and autopoiesis—as crucial metaphors for rethinking Shell's planning at the executive level, both funding and working alongside them as they continually developed their critical biological work.

Shell enlisted *Whole Earth Review* founder and countercultural figure Stewart Brand to assemble these intellectuals in a wide range of fields, including ecology, cybernetics, anthropology, and biology, to explore how corporations might make use of metaphors in mechanical and biological systems in to understand change in complex organizations.¹³ After the first Learning Conference session at the Biosphere 2, they

¹² “Excerpts from the “Learning Conferences,” 1986-1988,”; Mary Catherine Bateson, *Our Own Metaphor: A Personal Account of a Conference on the Effects of Conscious Purpose on Human Adaptation* (New York: Alfred Knopf, 1972). The Learning Conferences followed the arguments developed in Gregory Bateson's seminal text, *Steps to an Ecology of Mind* (1972), that the mind existed in the larger environment, and that ecological thinking could be applied to planning methods. See, for example, Gregory Bateson, *Steps to an Ecology of Mind* (New York, 1972), 438; Gregory Bateson, *Steps to an Ecology of Mind*.

¹³ Stewart Brand, “Notes Toward a Description of the Shell Learning Conferences,” Shell PL/13 (21 August 1986). Stewart Brand Papers. Special Collections, Stanford University; Brand made connections to Shell through his work at the MIT Media Lab, where he wrote his 1989 book *The Media Lab: Inventing the Future at MIT* (New York: Penguin Books, 1989); see also, Turner, *From Counterculture to Cyberculture*, 181-186.

would meet again at Volvo's post-industrial anti-assembly line factory Kalmar in Sweden with participant and Volvo CEO Bo Ekman. At the human potential movement's infamous Esalen Institute in California during another Learning Conference, they participated in improvisational workshops and, with participant Mary Catherine Bateson, examined AIDS as a metaphor for society's inability to adapt.¹⁴



Figure 18. Shell Learning Conferences: Biosphere II, Volvo Kalmar, Esalen¹⁵

It was not until the early 1990s that Shell planners began describing their multinational corporation as a living organism, and their planning processes as emerging out of a contingent network of relations. In his 1988 *Harvard Business Review* article, “Planning as Learning,” de Geus describes the planning process as “an emerging one.”¹⁶

¹⁴ The conversations from the 1987 Learning Conference at Biosphere 2 provided the framework for Bateson's 1988 book *Thinking AIDS*, see Mary Catherine Bateson and Richard A. Goldsby, *Thinking Aids* (New York: Addison-Wesley, 1988).

¹⁵ From left: Biosphere II, Getty Images; Volvo Kalmar, still image from Volvo Kalmar promo, “Volvo Kalmar,” <https://www.youtube.com/watch?v=aI7ornrCKnM>; Esalen Institute, The LIFE Images Collection/Getty.

¹⁶ Arie de Geus, “Planning as Learning,” *Harvard Business Review* (March/April 1988): 70-74.

Shell Group Planning member Peter Schwartz, in his influential *The Art of the Long View*, described multinational corporations as functioning “like organisms as their complexity... approach[es] that of biological systems.”¹⁷ In the foreword to de Geus’ *The Living Company*, MIT management theorist Peter Senge suggested that, “seeing a company as a living being implies that it creates its own processes, just as the human body manufactures its own cells, which in turn compose its own organs and bodily systems.”¹⁸

Brand envisioned the conferences as an extension of the interdisciplinary approach of the mid-century Macy Conferences, and especially the work of one of his mentors, Gregory Bateson.¹⁹ Like the Macy Conferences, the Learning Conferences helped to liberate conceptual tools from their scientific disciplines, extend the scale, and abstract the model in the form of metaphor.²⁰ The rationale behind the Learning Conferences, to be exact, was to understand learning in complex organizations, be they made up of *humans, nations, neural nets, species, ecosystems, computers, or corporations*.²¹ If the first order cybernetics of the Macy Conferences inspired a generation of management theorist to imagine the corporation and its planning practices as made up of feedback loops that could be modelled, described, analyzed, reconfigured, and controlled, the Learning Conferences was an expression of a version of second-order

¹⁷ Schwartz, *The Art of the Long View*, 98-99.

¹⁸ Senge in de Geus, *The Living Company*, 3.

¹⁹ Brand, “Notes Toward a Description of the Shell Learning Conferences.”

²⁰ N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literatures, and Informatics* (Chicago: University of Chicago Press, 1999), 80.

²¹ Brand, “Notes Toward a Description of the Shell Learning Conferences.”

cybernetics. In the framework of the Learning Conferences, corporations and planning became part of evolving and self-regulating entities made up of diverse beings in contingent and changing conditions.

James Lovelock, for example, was known for the development of the Gaia hypothesis that he created with another well-known critical biologist, Lynn Margulis.²² The Gaia hypothesis developed in the scientific field of atmospheric chemistry, and posited that the earth could be conceptualized of as a living system that produces the conditions for its own maintenance.²³ While the Gaia hypothesis is often explained in the simplistic language of holism, environmentalism, or as a New Age fad, the Gaia hypothesis was much more nuanced. In Lovelock's own words:

Gaia is an evolving system, a system made up from all living things and their surface environment, the oceans, the atmosphere, and crustal rocks, the two parts tightly coupled and indivisible. It is an 'emergent domain' - a system that has emerged from the reciprocal evolution of organisms and their environment over the eons of life on Earth. In this system, the self-regulation of climate and chemical composition are entirely automatic. Self-regulation emerges as the system evolves. No foresight, planning or teleology are involved.²⁴

The Gaia hypothesis was revolutionary in biology for the way it reformulated the relationship between organizations and environments. The Gaia hypothesis travelled

²² Lynn Margulis and James Lovelock, "Biological Modulation of the Earth's Atmosphere," *Icarus* 21, no. 4 (1974): 471-489.

²³ Margulis and James Lovelock, "Biological Modulation of the Earth's Atmosphere."

²⁴ James Lovelock, *Healing Gaia: Practical Medicine for the Planet* (New York: Harmony, 1991), 11.

outside of atmospheric chemistry partly due to Lovelock and Margulis' work of drawing together multiple scientific disciplines.²⁵ Yet, much less known, is the fact that Lovelock credits Shell with ultimately helping him to develop his theory of Gaia.



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The quest for Gaia

Do the Earth's living matter, air, oceans and land surface form part of a giant system which could be seen as a single organism? Could man's activities reduce such a system's options so that it is no longer able to exert sufficient control to stay viable?

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Consider the following propositions:

1. Life exists only because material conditions on Earth happen to be just right for its existence;

2. Life defines the material conditions needed for its survival and makes sure that they stay there.

The first of these is the conventional wisdom. It implies that life has stood poised like a needle on its point for over 3500 million years. If the temperature or humidity or salinity or acidity or any one of a number

spite of drastic changes of atmospheric composition and a large increase in the mean solar flux. The calculations were wrong because they left out the effect of the defence mechanism that life uses to protect itself.

Extinction through glaciation was not the only danger. Overproduction of ammonia and other heat-retaining gases could have resulted in the opposite effect, known as the "runaway greenhouse", that is to a rapidly increasing surface temperature that would have scorched the Earth and left it permanently lifeless as

Figure 19. "The Quest for Gaia"²⁶

In the late 1960s, Cambridge biologist Lord Rothschild, the director of Shell Research, began to provide financial support to the institutionally orphaned Lovelock.²⁷

²⁵ Isabelle Stengers, *In Catastrophic Times: Resisting the Coming Barbarism* (Lüneburg: Open Humanities Press, 2015), 44.

²⁶ James Lovelock and Sidney Epton, "The Quest for Gaia," *New Scientist* (February 6 1975): 304-306.

²⁷ James Lovelock, *Homage to Gaia: The Life of an Independent Scientist* (Oxford: Oxford University Press, 2000), xiii. Lovelock argues that Lord Rothschild was one of the first biologists to acknowledge the importance of Lovelock's Gaia hypothesis in the late 1960s.

One of Lovelock's first reports on Gaia was published in *New Scientist* with Sidney Epton of Shell Research in 1974.²⁸ Lovelock thanks Shell for being the only agency that supported his work on Gaia originally when other academic institutions were hesitant.

Lovelock also produced a report for Shell on the long-term prospects for their corporation in the late 1960s in response to Daniel Bell's Commission on the Year 2000, and Kahn and Wiener's work in particular. Different from Kahn and Wiener, Lovelock provided an alternative scenario concluding that industrial companies would be focused on profiting from products that alleviated pollution in 2000 because they would be so concerned with global pollution problems.²⁹ Lovelock concluded: "By 2000 a large proportion of the total energy turnover is going towards the avoidance of ecological disaster; then we can be sure that Shell will be in the business of counter-measures for profit. This might be its major activity."³⁰ Elsewhere, Lovelock credits this speculative research as the beginning inspiration for his continued research on Gaia.³¹

²⁸ Lovelock and Epton, "The Quest for Gaia," 306.

²⁹ James Lovelock, "Some Thoughts on the Year 2000," Contracted by Royal Dutch/Shell (1966). James Lovelock papers, Science Museum, London.

³⁰ Lovelock, "Some Thoughts on the Year 2000."

³¹ Lovelock, *Homage to Gaia: The Life of an Independent Scientist*, 168.

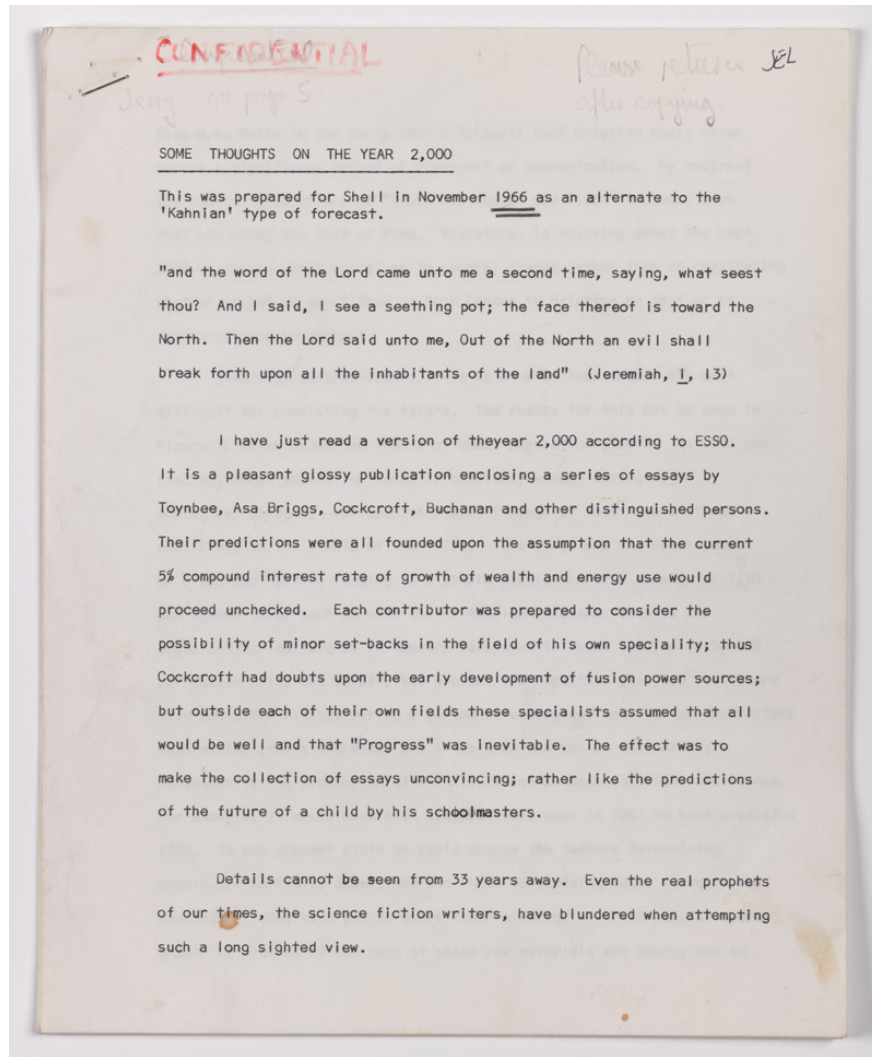


Figure 20. Lovelock's Thoughts on the Year 2000³²

Francisco Varela was another Learning Conference participant. Varela, along with fellow Chilean biologist Humberto Maturana, were responsible for developing a theory of biological autonomy in cellular organization that transformed the science of cognition.³³ Their theory of autopoiesis posited that living systems, like cells, could be

³² Lovelock, "Some Thoughts on the Year 2000."

³³ Humberto R. Maturana and Francisco J. Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding* (Boston: Shambhala Publications, 1987).

best understood as entities that called forth the conditions of their own existence. Put differently: autopoiesis was defined as a property of a living system that enabled it to change “without loss of organization.”³⁴ This insight was not only important for the development of Lynn Margulis’s theory of symbiogenesis— that posited that cooperation, not only competition, was a central process in evolution—Varela’s theories of autopoiesis were taken up by critical scholars looking for non-representational ways to theorize organization.³⁵ Though autopoiesis is often understood as being limited to living systems—as this was Maturana’s intention—Varela, like Bateson, had no qualms with the extension to other complex organizations.

Like Lovelock, Varela consulted for Shell, when he lived in Paris beginning in the 1980s. He was friends with Shell scenario practitioner Arie de Geus.³⁶ One important Shell Group Planning document was the translation of Varela’s research into actionable principles for Group Planning, contained in the 1986 report “The Science and Technology of Cognition.”³⁷ In it, Varela detailed what he saw as the four stages of the science of cognition: from cybernetics to the cognitivist to the self-organization alternative to, finally, the enactive alternative. More importantly: he provided Shell with implications this research had for executives thinking about planning as a dynamic

³⁴ Maturana and Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding*, xxi.

³⁵ Lynn Margulis, "Symbiosis and Evolution," *Scientific American* 225, no. 2 (1971): 48-61; For example, Félix Guattari, *Chaosmosis: An Ethico-Aesthetic Paradigm* (Bloomington: Indiana University Press, 1995).

³⁶ de Geus, *The Living Company*.

³⁷ Varela, “The Science and Technology of Cognition.”

process of learning. In one section “Planning and Enacted Corporate Environments,” Varela described the takeaway this way:

As in any cognitive system, environment and organization are correlative terms: an organization enacts their environment through their effective actions. A pathway or style of enactment is the same as the organization’s reality, which, in turn, brings forth future enactments. From this point of view the task of management is to create the conditions to maintain the ongoing modes of shaping meaning and action possible.³⁸

To understand how Shell took up these metaphors to think about organizational change in the context of corporate scenario planning, we can look at de Geus’ understanding of self-organization and autonomy in his development of “the Corporate Immune System” in his book *The Living Company*. Building from the Learning Conferences, de Geus suggested that Shell—though seen as a unity from outside— was actually “a movement... a multiplex... a structure of structures...”³⁹ This meant that “in crises, the environment diverges from those elements” that were harmonious before.⁴⁰ In one section called “Parasites” de Geus suggested:

The less a company operates in control of its environment, the more open it should be: foreign bodies and ideas will be able to enter easily. That is as it should be; indeed, it becomes a strength of the company. However, the company can never be sure how these bodies and ideas will behave, once inside. Every intruder has a choice: it can select a symbiotic relationship or it can pursue its own benefit, to the exclusion of all others.⁴¹

³⁸ Varela, “The Science and Technology of Cognition.”

³⁹ de Geus, *The Living Company*,

⁴⁰ de Geus, *The Living Company*,

⁴¹ de Geus, *The Living Company*, 197.

Just as Varela described the way an immune system used its openness to regain its balance with intruders, so did de Geus identify the way that successful corporations must use their open tolerance to react with intruders symbiotically rather than parasitically.

At the same time that corporations were struggling over the terms of dynamic organizational systems in the late twentieth century, critical theorists were similarly struggling with the relationship between biological and machinic organization. The French philosopher Félix Guattari, another friend of Francisco Varela's, appropriated autopoiesis to think through organization of machines and institutions in his final book, the anti-capitalist rethinking of subjectivity, *Chaosmosis*.⁴² Feminist science studies scholar Donna Haraway, in the now canonical "A Manifesto for Cyborgs," was at the same time thinking through the porous boundaries between biological and technological entities in what she called "cyborg sciences."⁴³ This is not to say that these theoretical tools were the same. Instead, the aim has been to show how corporate scenario planning has invested in diverse and contradictory epistemologies with heterogeneous politics. In this, it is important to wrestle with the contradictory epistemological commitments if we are to build truly alternative possibilities.

Future Alternatives?

My hope is that this historical account of the ways that twentieth century corporate scenario planners have imagined future alternatives is valuable to historians of

⁴² Guattari, *Chaosmosis: An Ethico-Aesthetic Paradigm*.

⁴³ Donna Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Socialist Review*, no. 80 (1985), 70–71.

science, but also to critical science studies scholars. Specifically, the aim has been to confront the ways that corporate scenario planners relied upon a surprisingly varied assortment of intellectual influences with varied politics. Corporate scenario planners consolidated these resources to engage with future uncertainties as they waged critiques against mathematical tools and calculative techniques, techniques many felt ill-equipped to face what was considered to be ultimately unknowable. Irrespective of the certainty with which Herman Kahn approached the use of scenarios, he nonetheless remained cognizant of the speculative nature of the venture: There is “a basic view that emphasizes discontinuity inconsistency, arbitrariness, disorder, and chance; that is, unpredictability of the specificity and uniqueness of actual events and conditions.”⁴⁴ In this case, Kahn continued, one “can emphasize the uncertainty of the future but include the concept that much of this uncertainty is basic and not governable by either objective or subjective probabilities, or indeed any serious analysis.”⁴⁵ Yet by the late 1980s corporate scenario planners legitimated their efforts through charismatic maneuvers that ultimately obscured the experimental, uncertain nature of their efforts. By recovering the efforts of mid-to-late twentieth century corporate scenario planners, my aim has been to explore how historical analysis that is alert to the entanglements between science studies and corporate techniques can shed light on pathways for new future alternatives.

⁴⁴ Herman Kahn, “Choosing a Perspective on the Future,” *American Outlook* (June 1, 1998).

⁴⁵ Kahn, “Choosing a Perspective on the Future.”

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