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BUSINESS STRATEGIES FOR A MESSY WORLD

Tools for Systemic Problem-Solving

Vincent P. Barabba and
Ian I. Mitroff

Business Strategies for a Messy World

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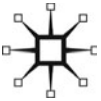

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This book is dedicated to the memory of two of the unparalleled giants of management and systems thinking: Russ Ackoff and Peter Drucker. They have provided us with a lifetime of inspiration. We forever remain their students.

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Preface

Why do some organizations and people—unfortunately far too few—not merely survive, but succeed rather remarkably in extremely difficult circumstances and perilous times? What do they do and how do they think that sets them apart from those that are nowhere nearly as successful? (Chapter 1 describes one highly successful organization in this regard.)

At the same time, why are the overwhelming number of popular, self-help books on how to succeed in business, government, and life in general, superficial, simplistic, and downright trivial? Especially disturbing are those that pretend to offer "hard, practical advice on how to deal with complexity." Why in other words do most books avoid talking frankly and realistically about the actual thinking and emotional skills—"tools" in the broad, not narrow, sense of the term—that people truly need in order to tackle the complex, dynamic, and messy problems with which increasingly we are inundated daily? Since the world is rapidly becoming more and more complex with every passing day—certainly not less—the ability to handle complex, dynamic, and messy problems is absolutely essential for survival, let alone success.

A recent post in *The HBR Blog Network* reported: "In a survey conducted by IBM in 2010 with more than 1,500 CEOs worldwide, 80% of leaders anticipated greater complexity in the future, but fewer than half of them felt confident to deal with that complexity. The business environment today has indeed become mindboggling[ly]

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complex due to accelerating globalization and rapid technology changes."[1]

Since no one except a Supreme Being is omniscient and in complete control of everything, just to be able to get up in the morning and function throughout the day, everyone has to make countless assumptions about the stability and predictability of such things as the traffic and weather, the dependability and goodness of our friends and society, etc. Most of time, our assumptions function well enough and thus remain safely beneath the surface of awareness. Indeed, we'd be generally overwhelmed and grind to a halt if we had to question all of our assumptions, certainly those upon which we depend daily. But when the unexpected happens, as it does increasingly, our assumptions not only become unsure, but as a result, they need to be re-examined and rethought. For this reason, many popular business books clearly recognize the need to examine and challenge the host of critical, taken-for-granted assumptions that mangers and leaders alike make, and need to make, daily about their business—for example, who their most important stakeholders are, what they need and are willing to accept, etc. But if challenging assumptions is so important, which it is, then it's truly mindboggling that, as far as we know, virtually none of the popular books talk about a systematic way of surfacing and critiquing critical, taken-for-granted assumptions. This is not only astonishing, but highly disturbing since it is far from obvious how one goes about challenging critical assumptions comprehensively and systematically.

It's as if the following crucial, widely shared, and unexamined assumption has somehow taken over our minds: *It's easy, if not trivial, to know and challenge the crucial assumptions which underlie our actions and beliefs*! Talk about an important, unexamined assumption!

We argue that the vast majority of business books are superficial because they do not directly question a common set of outmoded assumptions about how the world is supposed to function, and therefore, what people can bear to hear. (Unfortunately, this includes many of the academic books on management as well.) Perhaps they are right, for as the distinguished poet T.S. Eliot once said, "Humankind cannot bear very much reality." Eliot may indeed be correct. Nonetheless, it only identifies the problem since the need to examine critical assumptions, and thus face reality, has never been greater.

This book is our attempt to explain not only why the world has become increasingly complex, but most of all, what people and organizations of

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all kinds need to learn to do in order to succeed in a complex and messy world.

Beginnings

In a very real sense, this book began over 30 years ago when the authors first met. At the time, Barabba was the Director of the U.S. Bureau of the Census. And Mitroff was a Professor of Business Administration and Information Science at the University of Pittsburgh. The late Russell Ackoff (systems planner and thinker extraordinaire), who was a member of the American Statistical Association's Advisory Committee for the Census Bureau, brought them together.

Ackoff had previously issued a direct challenge to the Bureau to think and behave differently. He asked the Bureau to "design an Ideal (not utopian) Bureau for the year 2000." In a word, Ackoff asked the Bureau to go through the serious planning exercise of envisioning what an Ideal Census Bureau—that is, a Bureau that was freed from the onerous constraints of the present—would look like and how it would function. Furthermore, since Ackoff pioneered the concept of Idealized Planning, he insisted that one of the essential properties of an idealized design was that it had to be capable of being implemented. Ackoff thus challenged the Bureau to produce a strategy for actually implementing whatever ideal design it produced.

As a member of a major Advisory Committee to the Bureau, Ackoff felt that it was not proper for him to lead the challenge he had issued. He therefore suggested Mitroff instead.

Mitroff had studied the Philosophy of Social Systems Science with Ackoff's mentor, life-long friend, and colleague, C. West Churchman at UC Berkeley. (Ackoff was Churchman's first Ph.D. student in the Philosophy of Science at the University of Pennsylvania.) Mitroff was thus well suited to act as a consultant to the Bureau in order to meet Ackoff's challenge.

Many of the tools in this book had their origin in response to the design of an Idealized Census Bureau. However, they are particularly the result of follow-on projects such as the design, management, and policy implications of the1980 and 1990 censuses and a more recent project to establish a policy on privacy and data use in the new technological environment (see Appendix A). They were also refined

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in additional projects at Kodak, Xerox, and General Motors. Mitroff also developed the tools further in his over 30 years of work in Crisis Management.

In between his two terms of office in both a Republican and a Democratic administration, Barabba was the Director of Market Research at the Xerox Corporation. At the end of his second term with the completion of the 1990 Census, Barabba became Head of Marketing Intelligence at Eastman Kodak. Eventually, he became General Manager of Corporate Strategy and Knowledge Development at General Motors (GM), by which, as a consequence, he was able to make significant changes in the decision-making processes of GM. This eventually contributed to the creation of OnStar and MyProductAdvisor.com.

Mitroff left the University of Pittsburgh in 1980 to become the Harold Quinton Distinguished Professor of Business Policy at the Marshall School of Business at the University of Southern California (USC). (He later had a secondary appointment in the Annenberg School of Communications at USC as well.) He remained there until he retired from USC in 2006. From 1986 to 1986, Mitroff was the Founder and Director of the USC Center for Crisis Management. In this role, Mitroff helped found the modern field of Crisis Management.

Mitroff continues to remain active in consulting, research, and teaching.

For the past 30 years, along with Russ Ackoff, Murat Alpaslan, Peter Drucker, Ralph Kilmann, Richard Mason, Donna Mitroff, and Gerald Zaltman—not to mention countless other friends and colleagues—the authors have continually developed and refined the tools in this book. We have not only applied them to business and government, but to not-for-profits, colleges, and universities as well. In short, the tools have been developed and refined in a wide variety of settings, situations, and types of organizations.

As an aside, we note that even though we have naturally made use of the tools in previous books and articles, this is the first publication to put them together systematically and in as brief a form as possible. Our point is that they not only complement, but also fundamentally depend on one another.

This does not mean that the tools are perfect by any stretch of the imagination. Nothing could be further from the truth! Instead, they are the best of which we currently know.

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Through our continuous research and consulting, we have constantly sought to develop new and better tools as well as to improve on our old ones. As a consequence, we have no hesitation whatsoever in discussing frankly the strengths as well as limitations of the ideas in this book. The reader should in fact be extremely wary of anyone who is not willing to discuss openly and frankly the limitations of his or her approach.

Finally, we make no apologies for the fact that this is a hard-hitting, pull-no-punches book. In every case, we've tried as best we could to honour our fundamental commitment to talk about what people *need* to hear, not necessarily what they *want* to hear.

It's time to get Real!

Note

1 Kaipa, Prasad and Radjou, Navi , "Watching Wise Leaders Deal with Complexity," HBR Blog Network, 9:00 AM, February 5, 2013.

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Portions of Chapter 5 appeared in "Above and Beyond Knowledge Management" by Vincent Barabba, Russ Ackoff, and John Pourdehnad, *The Strategic Management of Intellectual Capital and Organizational Knowledge*, edited by Chun Wei Choo and Nick Bontis, Oxford University Press, 2002.

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Chaparral Steel—A Model Systems Design

Abstract: *By means of an actual business case, this chapter shows how the personality typology of the eminent Swiss psychiatrist and psychoanalyst Carl Jung gives rise to a unique form of systems analysis. That is, the Jungian personality typology may have originated in the desire to understand individual personality differences, but it is not confined to the study of individuals alone. For example, organizations and even systems have a "personality" in that they display distinct preferences for different forms and types of information and ways of making decisions based on what they consider to be information.*

The chapter argues that something is a problem if and only if it has important components in each of the Jungian personality quadrants or types.

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Open up any one of a number of popular business books and you'll hear the same models of excellence touted again and again: Google, Facebook, etc. We have no problems with these examples. We even agree with them. But since they are used repeatedly, we want to use a different one that has remained excellent for a long period of time.

Located in the rolling hills of central Texas, Chaparral Steel is one of the very few U.S. companies that survived the onslaught of competition from foreign steel mills—primarily Japanese—in the 1970s. Coupled with its intense, on-going commitment to the latest technology and its highly flexible and innovative management practices, Chaparral not only revolutionized the U.S. steel industry, but in 1992 it became the world's lowest-cost producer of steel. As part of its success story, it was acquired by the Gerdau Ameristeel Corporation in 2007.

Throughout its long and distinguished history, Chaparral Steel has been and is a model company. It is one of the best examples we know of an organization that has been conceived of and managed as a total integrated system.

We're going to describe the accomplishments and operation of Chaparral Steel in terms of a very different approach to systems thinking. The approach embodies fundamentally different perspectives and styles of decision-making. In other words, we're not going to use the widespread and commonly accepted notion of a system as a bunch of boxes composed of key activities, decisions, and/or processes with a complex tangle of arrows running each and every which way between them. In this view, the arrows represent the multiple interactions and feedback loops between the various elements that comprise a system.

It's not that this more common notion of systems is wrong. Rather, it leaves out some of the most crucial aspects of systems in terms of how different types of people and technologies not only depend on each other, but also have to work together seamlessly. If they are not able to work together, then a system can't even exist in the first place, let alone accomplish its intended goals. In this sense, since it leaves out vital aspects, the common approach to discussing systems is not systemic in the truest sense of the term.

The process we will use in discussing systems is based on the pioneering work of the Swiss psychiatrist and psychoanalyst Carl Jung. It pinpoints the different types of activities and processes that are essential if companies and organizations are to survive, and, even more, to prosper in today's highly dynamic and complex world.

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Chaparral Steel as a totally integrated system

Figure 1.1 describes the four essential sets of activities that any organization needs to perform. The essential activities fall into four distinct quadrants. In addition, the leadership of an organization needs to ensure that the four quadrants not only support one another, but also work together seamlessly if any of them are to be successful. In other words, acting alone, none of the quadrants can succeed by themselves.

In order to understand the meaning of Figure 1.1, let us briefly describe its underlying dimensions.

The horizontal dimension refers to how one initially represents, structures, or views a complex entity. The vertical dimension refers to how one analyses, responds to, or uses a process to make an important decision.

Taken together, the two dimensions compose two of the key aspects of the Jungian Framework. Jung observed that no matter what the field of human endeavor, the same two dimensions emerged repeatedly. The two dimensions captured the differences between how different people viewed any situation or field of human knowledge and/or practice.

The left-hand side "Details Parts" refers to the fact that no matter what the particular entity or situation, there is always the perspective or point

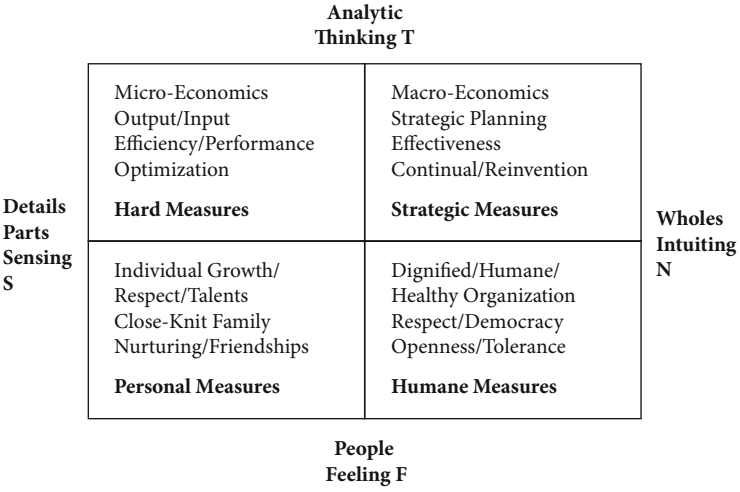

FIGURE 1.1 *Chaparral Steel—the Jungian Framework*

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of view that instinctively breaks a complex whole (problem, situation, system, etc.) down into its so-called separate, individual parts and then analyses/studies the parts in isolation. In other words, some people are comfortable if and only if they can break a complex problem or system down into its "individual parts" so that they can focus solely on the parts alone. The left-hand side also represents those aspects of a system that can be understood in terms of established concepts and measures.

The left-hand side is called Sensing or S for short. Sensing type personalities—people whose S side is strongly developed—prefer to gather information in terms of their senses. In fact, anything that isn't ultimately based on or reducible to the senses isn't considered to be "information."

The right-hand side "Wholes" stands for those who instinctively prefer *not* to break something down into its so-called "parts." Instead, they prefer to look at the whole of any entity or situation. If they do look at the "parts," it is not only to draw out all of the interconnections between them, but to create a whole whose value as a whole is greater than the product of the value of the individual parts. In other words, they don't look at anything in isolation. Finally, the right-hand side also represents the use of non-traditional concepts, ideas, and measures to assess the performance of a system.

The right-hand side is called Intuiting or N for short. Intuiting type personalities—people whose N side is strongly developed—prefer to gather information in terms of their imagination. In fact, anything that isn't ultimately based on imagination isn't information. In other words, facts hem Ns in. It's not that facts don't matter, but today's facts have a way of becoming the discarded realities of yesteryear. In other words, facts only matter in the aggregate, not in isolation.

The top of the vertical dimension, "Analytic," represents the use of impersonal ways (logic, science, statistics, etc.) of analyzing entities and situations, and making decisions. The bottom "People" represents the use of one's personal feelings to assess a person, organization, or situation. The bottom also represents looking at an organization, situation, etc. in intensely personal and human terms.

In terms of the Jungian Framework, the top of the vertical dimension is called Thinking or T for short. Thinking type personalities—people whose T side is strongly developed—prefer to analyze situations impersonally. In sharp contrast, Feeling or F types respond to every situation in intensely personal terms. It's not that one type is "right" and the other

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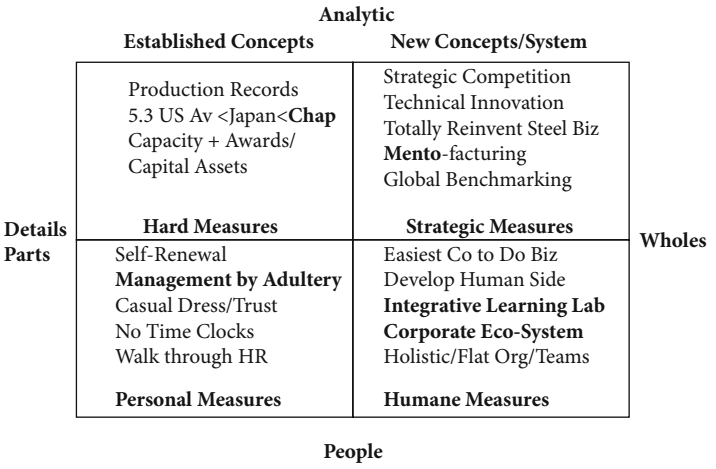

FIGURE 1.2 *Chaparral Steel—the "facts" of the case*

is "wrong," but that both need and depend upon one another in order to pick up and respond appropriately to everything that is involved in every situation.

Putting the horizontal and vertical dimensions together results in the four quadrants in Figure 1.1. With these ideas in mind, let's look at Figure 1.2 to get a better understanding of Chaparral.

Systems' issues

While Figure 1.1 provides an understanding of the general issues with which each of the four quadrants is concerned, Figure 1.2 illustrates how Chaparral is truly a systems organization in that not only are all of the four quadrants developed equally, but there is the realization that none of the aims and objectives in any one of the quadrants can be attained without the others. We cannot emphasize too much that it is not an issue of what quadrant is "right or wrong," but by itself, each quadrant only picks up a small percentage of the full set of issues that must be dealt with in any complex organization if it is to be successful and thus to exist for any extended period of time.

The items in red are those to which we pay special attention, for they are truly what set Chaparral apart from other organizations.

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Figure 1.2 shows that in terms of "hard measures" in the upper, left-hand quadrant, Chaparral Steel excels. Chaparral greatly outperforms its competitors financially because of all the things it is doing in all of the quadrants.

This is a remarkable feat for any company, but it is especially remarkable for one that is primarily technical. On the whole, technical companies do not generally perform well on the "people or Feeling quadrants," and not-for-profit, social service organizations do not generally perform well on the technical and financial or Thinking quadrants.

Chaparral constantly sets records for the production of steel and the efficiency of its operations. It generally beats all of its competitors in terms of production and finance. Thus, in terms of operational considerations and measures alone (the upper left-hand or ST [Sensing-Thinking] quadrant), Chaparral is not only outstanding, but is a clear leader in its field.

In terms of the upper, right-hand or NT (Intuitive-Thinking) quadrant, Chaparral excels in innovative, strategic thinking. At any point in time, literally every person in the organization is taking a class of some sort that is not only concerned with the reinvention of the organization, but of the entire steel manufacturing business. That's why Chaparral refers to itself as a "mento-facturing" organization. It is in the mental manufacturing business. It is not merely a traditional physical manufacturing organization as the term is currently understood and applied.

The bottom, right-hand NF (Intuitive-Feeling) quadrant refers to the fact that Chaparral not only strives to be the easiest company with which to do business, but that first and foremost, it's an ethical human community. It works continually to develop and present a human face to itself and to the outside world.

The bottom, left-hand SF (Sensing-Feeling) quadrant extends the ideas in the left-hand quadrant in terms of the pithy phrase "Management by Adultery." Chaparral obviously does not mean "adultery" in a sexual sense. Rather, it treats its employees as adults. For example, it trusts its employees in submitting travel expenses. It doesn't treat them as potential crooks. As a result, it saves considerable time and money in reviewing travel expenses.

Where problems come from

The Jungian Framework gives a very important answer to the important question, "Where do problems come from?" It is no great surprise to

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say that like all things human, in the first and last resort, problems basically come from people and their institutions. On the other hand, it is a revelation to understand why different people see entirely different problems.

Problems do not fall out of the sky fully formed and completely well specified. Rather, they emanate from deep inside of us. Problems originate from the most basic parts of our "individual" and "social personalities," that is, from the societies in which we live and of which we are fundamental parts.

A generalized organizational problem formulation and problem-solving "tool"

If one encounters an organization where *seemingly* there are no serious problems facing it—however highly unlikely this is for it wouldn't be human!—one can always form four Jungian groups by putting all those with the same personality type in the same group. That is, one puts all the STs [Sensing-Thinking] into one group, all the NFs [Intuitive Feeling] into another, etc. One can then ask each group to uncover whatever problems the organization is having trouble acknowledging.

Much more commonly, the Jungian Framework can be used to help shape the problems that an organization is having trouble defining. In our experience, using the Jungian Framework in this way always brings to the surface the issues and problems that are lurking just beneath the surface of an organization. More significantly, it gives four very different views of important problems so that one doesn't instinctively latch on to the view that is most in sync with one's personality and organization, and thus neglect the others, with often disastrous consequences.

Even though we believe that the Jungian Framework is an extremely important and indispensable tool in the problem-solving arsenal of organizations—certainly if they are to be able to tackle the complex, messy problems that they face—we would be remiss if we didn't point out that like everything, it has its weaknesses. To use this particular part of our "tool kit," it is necessary to have individuals and organizations that are willing to take a brief psychological instrument or test—the Myers-Briggs—that "measures their 'psychological type.'" More basic, they have to believe in the exercise and the test itself.

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They also have to be willing to spend at least a half a day working together in Jungian groups to see how the Jungian Framework sheds valuable insight on themselves and their organization. Unless individuals and organizations are willing to spend time, unfortunately, several will continue to suffer the numerous dysfunctions that plague far too many organizations: absenteeism, deep hostility, high turnover rates, suspicion, poorly run meetings, etc.

Nonetheless, if a consultant or member of an organization understands the Jungian personality system well enough, then he or she can rather quickly pick up on the "psychological language" that most individuals or organizations are using without first having to administer the Myers-Briggs test. One then uses one's consultant skills as best as one can to address the underlying psychological needs of the various Jungian personality types—for example, that STs often have an inordinate need for clarity and precision far beyond what a particular situation demands, and NTs and NFs often have a need to float off into futuristic fantasizes that are not "grounded in today's 'realities'," etc.

A particular strength of the Jungian approach is that having been through it once, it does not take as much time to go through it subsequently. Indeed, it often makes future group meetings far more efficient and productive.

A strong caveat is in order. If a group or organization suffers from severe dysfunctions, then it requires treatment far beyond the Jungian Framework. It requires deeper organizational interventions.

Examples

A recent article in *The New York Times* reported on how Patrick J. Geraghty arrived in Florida about a year and half ago to lead and reform the state's largest health insurer, Florida Blue.[1] Geraghty has gotten Florida Blue to literally reinvent itself. As a result, it is one of the best contemporary examples of NT and NF we could hope to find.

To give but two illustrations, Geraghty has set up "retail stores" around the state where current and prospective members of Florida Blue can come in and speak to a live human being about their health needs, plans, etc. He has also worked tirelessly with physicians throughout the state to buy into Florida Blue's new treatment and payment plans. Notice that these also incorporate SF in a deep and sincere way.

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To make sure that his radical vision for Florida Blue is feasible financially, Geraghty and his team have of course done their ST homework.

The second example concerns organizational health. It is absolutely amazing to us that people can write popular books about the various dimensions of healthy organizations without at least once mentioning the Jungian Framework.[2] Again, it is not that the Jungian Framework is the beginning and end of everything pertaining to organizations or that it's the only framework that one could use to understand them. Instead, the Jungian Framework is one of the most powerful ways of analyzing an organization *as a system*. For instance, the ST aspects of organizational health are concerned fundamentally with efficiently well-planned and well-run meetings. It is also concerned with individual physical health. NT is concerned with innovative, strategic thinking and plans; NF with how much an organization works together as a community; and SF how much it really cares about individual people.

Concluding remarks

This chapter leads to the following important definition of a problem: *Something is a problem if and only if it has significant aspects in each of the four Jungian quadrants.* To turn it around, *something is an exercise if it exists or emanates primarily from one or two at most of the Jungian quadrants.*

The preceding paragraph obviously needs clarification. There is no doubt that *on their surface* and *when they are first presented*, many problems do not appear to involve all of the Jungian quadrants. Thus, it would appear that many technical problems do not involve all of the quadrants. Nonetheless, from our experience, we have never seen a "problem" in the true sense of the term that does not have important aspects in all four quadrants. For instance, every problem has technical aspects of some kind (ST/NT). But given that it is humans who perceive what is and is not a "problem," every "problem" impacts human behavior and thereby has important NF and SF components.

We thus stand by the statement that something is a problem if and only if it has significant aspects in all of the quadrants. Alternately, all "problems" worthy of the name have important aspects in all of the quadrants. The danger is that the aspects we neglect or downplay often come back to haunt us as major crises.

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This leads to the following series of questions that the reader can use to assess his or her organization with regard to the Jungian Framework:

1. How well does your organization do in managing issues in terms of the four Jungian quadrants? For instance, is the organization well managed in terms of ST concerns/metrics, that is, in terms of impersonal, analytic details? Does it do strategic thinking in terms of NT, that is, the whole system? Is it a community in the sense of NF? Does it care about and treat individuals well, i.e., SF?
2. Does it do an equal job with respect to all of the quadrants, or does it concentrate on one or two of them at most?
3. In which quadrants is the organization especially strong and/or weak? Why?
4. Does it define/treat important problems from an integrated Jungian perspective? That is, does it produce integrated (ST, NT, NF, *and* SF) definitions of important problems before working on them? Why, and why not?
5. Does it seek out and reward people explicitly who can integrate the different thinking and approaches found in the Jungian quadrants?
6. Does it have on-going educational programs so that people can learn to integrate the Jungian quadrants?
7. Does it have on-going educational programs so that people can learn to speak the language of the different Jungian quadrants? Does it need to have such programs?
8. Which organizations do you know that serve as models with regard to the Jungian Framework? What can you learn from them?

Notes

1. Abelson, Fred, "Bracing for Health Care Shifts, a Florida Insurer Takes Steps to Be an Innovative Player," *The New York Times*, Wednesday, February 6, 2013, pp. B1 and B10.
2. For example, see Lenicon, Patrick, *The Advantage: Why Organizational Health Trumps Everything Else in Business*, Jossey-Bass, San Francisco, 2012.

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2

Critical Arguments—The Toulmin Argumentation Schema (TAS)

Abstract: *Complex arguments are a prime feature of complex business decisions.*

In 1958, the distinguished historian and philosopher of science, Stephen Toulmin, published a remarkable little book, The Uses of Argument. In it, he laid out the general structure of all arguments. It quickly became an academic bestseller. It was adopted widely in courses on Rhetoric, Political Science, International Affairs and Policy Analyses, etc.

Although we first applied the Toulmin Argumentation Schema (TAS) to the analyses of complex business and governmental problems over 30 years ago, to the best of our knowledge, it has still not been widely adopted in schools of business and government, not to mention practice. Few outside of Rhetoric, Political Science, International Affairs and Policy Analyses, etc. even seem aware of it. This chapter exists in part to correct this unfortunate state of affairs.

In short, the situations facing organizations are so complex, dynamic, important, and thorny such that whether they know it or not, they need ways of examining the major arguments on which their key decisions depend.

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Complex arguments are a prime feature of complex business decisions. For this reason alone, we need to examine the nature of complex arguments.

Let us start with two *seemingly* simple and straightforward questions that every organization faces: "If we decide to hire someone, whom should it be?" and "Should we fire X?"

On their surface the preceding questions *seem* simple and straightforward. In fact, they are anything but. In today's world, even the lowliest person at the bottom of the pyramid can affect the whole of an organization. Why else would Zappos shoes spend so much time training every person in their organization so that no matter what their position, every one acts as though they service customers directly, whether they actually do or not? As a result, the questions generally call for thoughtful responses.

At first glance, the questions are about "who," but just beneath the surface, they are really about "how decisions should be made." For this reason, we're not going to explore the questions in the ways in which they are typically handled. Although the usual types of background checks and performance reviews certainly play a key role, the questions require a different form of consideration.

We're going to consider the answers as the outcomes of complex chains of reasoning, for that's what they really are. To do so, we need to introduce some important concepts that we use throughout the rest of the book.

The TAS

In 1958, the distinguished historian and philosopher of science, Stephen Toulmin, published a remarkable little book, *The Uses of Argument*.[1] In it, he laid out the general structure of all arguments. It quickly became an academic bestseller. It was adopted widely in courses on Rhetoric, Political Science, International Affairs and Policy Analyses, etc. Strangely enough, it was not widely adopted not in Philosophy. Such is the fate of all innovators. They are not necessarily prophets in their own lands.

Although we first applied the TAS to the analyses of complex business and governmental problems over 30 years ago, to the best of our knowledge, it has still not been widely adopted in schools of business

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and government, not to mention practice. Few outside of Rhetoric, Political Science, International Affairs and Policy Analyses, etc. even seem aware of it. This chapter exists in part to correct this unfortunate state of affairs.

TAS, which is shown in Figure 2.1, is deceptively simple. It posits that all arguments (including the one in this sentence!) consist of a Claim (C), a set of Evidence (E), a Warrant (W), Backing (B), and Rebuttal (R). Since none of the parts of an argument are independent of one another, taken together, they constitute a system. Given that arguments are one of the most prominent components of problems, examining the structure of arguments eventually provides us with deeper insight into the nature of, and thereby, ultimately into complex systems, about which we say a lot more later.

All arguments, logical or otherwise, terminate in a Claim or a set of Claims. The Claim is the end result or conclusion of an argument. For instance, two very important and currently opposing Claims are: "The huge federal deficits are out of control and leading us straight to ruin. Therefore, government programs, and thereby spending, must be sharply curtailed." In contrast, an opposing Claim is: "Yes, the deficits are bad, certainly in the long run, but putting people back to work now is more important than saving money. We need to spend our way out of a terrible recession whose effects we are still suffering."

Our point is not to take sides with either one of these two partisan arguments over the size of the Federal deficits and what to do about them. Instead, we merely want to illustrate the nature of two highly important and opposing Claims, especially their role in the context of the broader TAS.

All arguments make use of some kind of Evidence E to support their Claim(s). Typically, E is whatever facts or data one has at hand. For instance, those who see the deficits leading us to economic ruin cite the

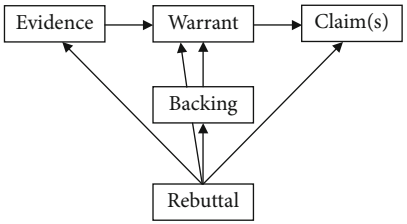

FIGURE 2.1 *The TAS*

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sheer size of the current deficits in the trillions of dollars and the fact that they are growing steadily. Thus, the "number of dollars" and the "fact" that "it has been growing steadily" are the Evidence for this position. On the other hand, those who view the deficits differently also acknowledge the size of the deficit, but they see it as a "manageable problem in the future," citing instances where we have recovered from deficits in the past. Thus, both sides start with very different sets of "facts." One side starts with the "sheer size of the current deficits;" the other with "past instances where we have recovered from deficits."

In general, both sides of an argument start with different Evidence because they are working backwards from different Claims. A Claim can thus be either the beginning and/or the end of an argument. Once one has a preferred Claim, one searches for Evidence to support it.

Instead of facts always leading unequivocally to or driving conclusions, more often than not, it is the other way around. One starts with a favored, pet conclusion, or typically a set of conclusions, and then works backwards to make it appear that one derived it by first starting with "Impartial Evidence," etc.

The Warrant is the set of reasons why the Claim follows from the Evidence. A good way to think of it is that Warrant is a "conceptual or intellectual bridge" that allows one to go from a limited set of Evidence E, to a general Conclusion, C (see Figure 2.1). To put it another way, the Warrant is the "because" part of an argument. For instance, a typical Warrant is: "Whenever E has resulted in the past, C has occurred *because* E is not only an indicator of C, but a prime factor in its occurrence or causation; since E has occurred this time as well, we are Warranted in concluding C once again." In this particular example, the Warrant functions as a "continuity preserver." Supposedly, whenever a particular set of facts or certain events E, etc. have occurred "n" times, then we are Warranted in concluding that they will occur "n + 1" times. Furthermore, according to this line of thinking (argument), the larger n is, the more we are entitled to conclude that n+1 will result. Thus, if something has occurred 1,000 times, then one feels that it is very likely it will occur on the next, that is, 1,001th time.

More often than not, the Warrant is the Claim of a prior argument, and so on ad infinitum. The same is true of the Evidence and all of the parts of an argument. In this way, arguments are parts of problems, and as we shall see, systems. Arguments are parts of problems—indeed, some of their most important parts—because arguments are used to define

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what is a problem in the first place and how it ought to be handled in the second place.

Most of the time, Warrants are implied rather than stated explicitly. In fact, a great deal of the time they are unconscious. In general, they are reflective of a person's entire personal history. In the case of society, they reflect its general history and current conditions.

Those who believe that the deficits are leading us straight to decline have some form of the following as a Warrant: "Whenever the deficits of a country are of a certain size, then economic decline/ruin is the inevitable and inescapable outcome." Alternately, "Unless we curb our deficits, then we will go the way of Greece, Spain, etc." In other words, "Unless we rein in our out-of-control spending habits, then what is true of Greece, etc. is a forerunner of what lies in store for us."

Those on the other side reason: "Proportional to the size of our current national GDP, the deficits are not significantly worse than they have been historically. Therefore, it does not follow automatically that economic decline/ruin is the inevitable and inescapable outcome."

Every argument also has a Backing B. B is the deeper set of underlying assumptions, basic reasons, or values as to why a particular Warrant holds. If the Warrant is not accepted at its face value—which is often the case—then the Backing is necessary in order to support it. For instance, those who oppose increasing the deficits generally believe, "One cannot trust Democrats in general with the economy." In sharp contrast, those who are more concerned about the well-being of all citizens believe, "All the Republicans want to do is to reduce the taxes of the wealthy who support them." Like Warrants, Backings are more often than not implicit and even unconscious.

In general, the Backing is the larger set of general philosophical assumptions a person has about what is right (Ethics), human nature, the world (reality itself). Since Backings are generally taken for granted, they are mostly implicit and unconscious.

Another way to think of it is as follows. If the Warrant W is the "conceptual bridge" that allows us to go from the Evidence E to the Claim C, then the Backing B is the "foundation" on which the bridge rests.

Finally, every argument has a Rebuttal R. In principle, R challenges each and every part of an argument. In terms of the metaphor of arguments as a "bridge" between Evidence and Claims, R attacks E as strongly as it can. R thus tries to "tear down the entire bridge and its foundation."

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For instance, a Rebuttal that many have considered absurd, if not insulting, is the following. Since Birthers do not believe that President Obama was born in the U.S., they therefore believe that he has not met one of the critical qualifications to be President. Alternately, he does not have a valid birth certificate, E in this case. In this as well as in most cases, it is virtually impossible to know which of the Rebuttals comes first: (a) that President Obama was not born in the U.S., or (b) that he does not have a valid birth certificate. Each functions as a combination of Evidence and Warrant to support the other as a Claim. In either case, they attack directly the Claim that President Obama is qualified to hold the office of President. To counter an opposing argument is in fact the overriding purpose of the Rebuttal.

Before proceeding further, we should make it clear that it is wrong to think that assumptions enter into Toulmin arguments via the Backing and nothing else. Important assumptions enter into every part of a Toulmin argument. One's Evidence is no better than all of the assumptions that have gone into its planning and execution. The same is true of Warrants, Backings, etc.

Whom to hire/fire?

Let's look at the decision to hire a particular person in terms of the Toulmin Argumentation Schema (TAS). Figure 2.2 merely shows one of the many variations on the general theme. Obviously, we couldn't represent every conceivable situation and hence every single argument. Instead, the point of Figure 2.2 is to illustrate the general use of the TAS so that the reader can use it for his or her specific situation.

Figure 2.2 attempts to make clear that what at first seems to be an airtight case or argument for a particular candidate is anything but. As in every argument, at stake are the respective strengths of the Rebuttal and the main structure of the TAS. If the Evidence, Warrant, and Backing are truly stronger than all of the parts of the Rebuttal, then the Claim follows. If not, then the Claim is rejected.

Notice that the decision whether to fire a particular person or not is essentially embedded within Figure 2.2 as well. In the decision to fire someone or not, the Rebuttal now becomes the main structure of the argument.

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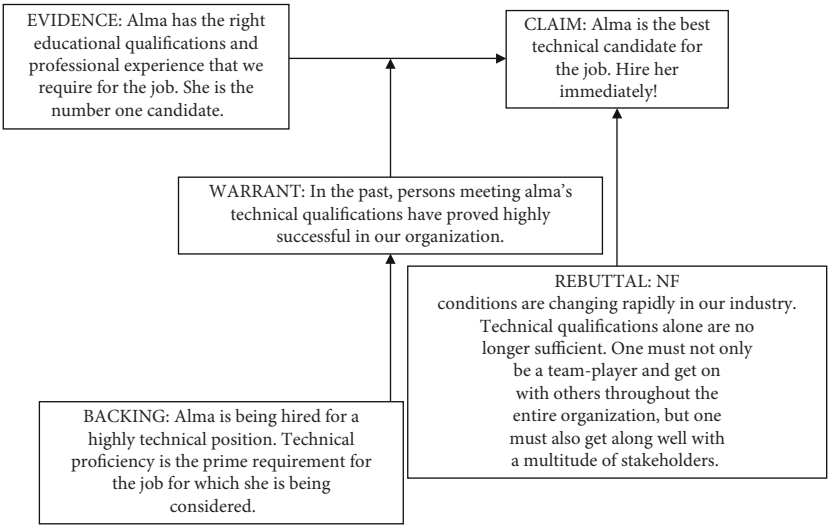

FIGURE 2.2 *Whom to hire*

Admittedly, in the grand scheme of things, the decisions to hire or fire someone are not necessarily the most important problems facing organizations. But, they can be, certainly in the case of an organization that is in the midst of a set of crises. The Catholic Church certainly went through this same set of circumstances with regard to its recent selection of Pope Francis.

Notice also that the Rebuttal can assume many forms. For instance, in today's world, identity thefts, and the fabrication of credentials and work history are unfortunately quite common. Therefore, potentially the Information and Security Departments of organizations are involved in the hiring and firing of candidates, not to mention outside security firms.

Four views of change

Let us look at another issue that is even more critical: whether an organization needs to change, and if so, how much change does it need?

Table 2.1 below shows four positions regarding change and the accompanying Toulmin arguments that are needed to support the positions, that is, Claims.

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TABLE 2.1 *Four views of change*

Degree of change	Claim	Evidence	Warrant	Backing	Rebuttal
Status quo	No change is necessary	Sales of our products holding steady No serious threats on the horizon	If sales hold steady, then there is no need for change	We've operated this way successfully for 30+ years We are the industry leader	Serious competition has appeared in the past year
Moderate	Only moderate change in our operations is necessary	Our products and operations are strong	If sales hold steady, then there is no need for substantial change	We've operated this way successfully for 30+ years We are the industry leader	Serious competition has appeared in the past year
Major	If we are to survive, we must make major changes	Our sales have been dipping steadily	It is not clear that our products will survive without major changes	It is irrelevant that for 30+ years we are the industry leader	This is not the time to panic
Radical	We need to become a new company with entirely new products and services	The market for our products and services has tanked	We will be out of business in 6 months if we don't change fast	We are no longer the leader in our industry	Don't panic; things will return to normal

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The positions above are so general that we've used them to conduct workshops with organizations of all kinds.

Twenty or so top executives and managers are assigned at random to defend a particular position. The reason for random assignments is not to bias any particular position. Besides, those who are against a particular position can often make the strongest case for it. That is, they often know it better than its supporters.

Each group is asked to make the strongest arguments they can for their assigned position. After each group has made their presentation, a timed debate then takes place to see what the strongest arguments pro and con are for each and any of the positions.

After the debate has taken place, four new groups are then formed by drawing people at random from each of the initial groups. Each of the new groups is then asked to consider the four initial positions and respond to the question, "Now that you heard a debate between four very different positions, what is the best, possibly hybrid position that is good for the organization right now?"

Note carefully that the process does not leave to chance the exploration of four different approaches to change. Further, it intentionally does not leave out any of the stances along the spectrum so that later they will be charges that an important position was neglected.

The process is heavily dependent upon the assumptions that are made about the organization, its products, structure, customers, etc. For this reason, we explore the nature of assumptions in the next chapter.

Concluding remarks

This chapter has introduced another of the major tools in this book. In effect, our argument is that the situations facing organizations are so complex, dynamic, important, and thorny such that whether they know it or not, they need ways of examining the major arguments on which their key decisions depend.

We are not saying that the TAS needs to be applied to every decision or situation facing organizations. That would be to render it useless and irrelevant. We are also not saying that organizations need to use the TAS formally, that is, lay out the Warrant, Evidence, etc. systematically. But make no mistake about it. We are saying that whether one acknowledges it or not, one is in effect using the TAS all the time. Whenever one puts

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forth a Claim, one is making an argument. Indeed, the TAS wouldn't make any sense at all if it weren't already in our minds so-to-speak.

Like everything else, the more one uses the TAS, the faster and better one becomes at it. Indeed, we have found that it's easier for people to zero in on the really critical parts of an argument the more one uses the TAS.

The TAS also gives a new and important meaning to the concept of the Learning Organization. In our view, a Learning Organization is one that systematically keeps track of its critical Toulmin arguments and reviews them periodically to see if the Evidence, Warrants, Backings, and Rebuttals have changed significantly such that the Claims are no longer supported, and hence, are in need of serious revision. In other words, a Learning Organization records and thus has an official memory of its most critical decisions. Obviously, this will not work if the records are used in any way to blame people. Instead, their prime purpose is to help an organization learn from its successes *and* mistakes. (We talk more about this in a later chapter.) But to do this requires that an organization is essentially healthy emotionally.

Finally, we note that the TAS resides in the entirety of an organization. In far too many organizations, Marketing and/or Finance control or are solely responsible for the Evidence with regard to important business decisions. The top executives control or are responsible for the Claims and Warrants. The Backing resides in the general culture. And, the Rebuttal often belongs to groups low in power. Thus, another requirement of the Learning Organization is that all the parts of the TAS be coordinated as an integrated system.

For instance, when Barabba worked for Kodak, he conducted a TAS to help explore if and when Kodak needed to get into electronic cameras and thus abandon its traditional photographic film business. Even though it had an early opportunity to enter into electronic cameras, it proved impossible for Kodak to make the complete switch. In essence, what Kodak was not willing to do to itself, its competitors did. That is, its competitors were the Rebuttal.

In effect, Kodak Park, the 2,000-acre facility with 50,000 employees that manufactured film and paper, was the Backing or better yet, a "drag" on the company's thinking. After all, how could Kodak abandon its heavy financial and emotional investments in Kodak Park? Today, the land has been repurposed as Eastman Business Park.

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Examining key arguments is no longer a luxury. It's literally a matter of life and death.

Note

1 Toulmin, Stephen, *The Uses of Argument*, Cambridge University Press, Cambridge, England, 1958.

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3

Assumptions—Strategic Assumption Surfacing and Testing (SAST)

Abstract: *Examining important arguments as we did in Chapter 2 is at best only half of the job facing organizations. Knowing the key assumptions that enter into arguments is the other half. Even more, knowing the key assumptions that undergird key actions and important decisions is fundamental to the success of an organization.*

Everything that people and organizations do hinges on the robustness and validity of the assumptions that they make about themselves, others, and the world around them. For this reason alone, it is absolutely astonishing that so little is written about how to make our assumptions explicit, critique them systematically and systemically, and modify, update, and replace them if need be.

This chapter describes a method known as SAST—Strategic Assumption Surfacing and Testing—for getting at key underlying assumptions. In brief, assumptions are the prime properties of stakeholders. Thus, SAST is a method for examining the key stakeholders and their associated properties or presumed characteristics that bear on important decisions.

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Examining important arguments is at best only half of the job facing organizations. Knowing the key assumptions that enter into arguments is the other half. Even more, knowing the key assumptions that undergird key actions and important decisions is fundamental to the success of an organization.

Everything that people and organizations do hinges on the robustness and validity of the assumptions that they make about themselves, others, and the world around them. For this reason alone, it is absolutely astonishing that so little is written about how to make our assumptions explicit, critique them systematically and systemically, and modify, update, and replace them if need be.

At best, our assumptions are hilarious, especially when they involve the inevitable misunderstandings and faulty mistranslations between different cultures. For instance, a tailor shop in Hong Kong had a sign out in front of it that read, "Customers giving orders will be promptly executed." On the one hand, one would like to assume that the shop offered extremely quick and reliable service. On the other hand, another interpretation is that the shop had a unique method of dealing with demanding, if not extremely bossy, customers! In the latter case, one also has to assume that the authorities were in tacit agreement with how the shop owner wanted to dispose of annoying customers.

In the preface, we remarked on the importance of assumptions. We also noted that while many popular books talk about the importance of examining one's assumptions, they offer little beyond mentioning it.[1]

Accordingly, we want to talk explicitly about a process known as Strategic Assumption Surfacing and Testing, or SAST, which the authors and their colleagues have developed for surfacing and critiquing important, taken-for-granted assumptions.[2] The best way to describe SAST is in terms of its origins.

Origins

In 1978, Mitroff had a year's appointment as a Visiting Professor at the Wharton School of Business of the University of Pennsylvania. He undertook a visiting appointment so that he could work closely with and learn further from Russ Ackoff and his colleagues.

During his time at Wharton, Mitroff was part of an important consulting assignment with a Philadelphia-based pharmaceutical company.

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As part of the assignment, Mitroff worked closely with Jim Emshoff, Director of one of Wharton's research centers, who had in fact initiated the project.

The problem facing the company was as follows. It manufactured an important painkiller, which at the time was available only by means of a doctor's prescription. In some states, upon going to his or her local pharmacy, the pharmacist was mandated by law to inform the patient that a much cheaper generic drug was available that would do as good a job in relieving pain as the brand name prescription. Because the particular drug was a financial mainstay of the company, while a cheaper generic was highly beneficial from a patient's standpoint, it spelled financial disaster for the pharmaceutical company. If sales of the brand name drug dropped precipitously, then the company had no other product to fall back on to pick up the slack.

Because the President of the company appreciated that more minds than his alone were better in making an important decision that affected the entire organization, he decided to involve his senior executives in deciding how to respond to a major threat to the company's profitability, if not its very existence. As a result, he asked the company's twelve senior-most executives for their advice.

This is precisely where things got interesting. Completely on their own, the twelve executives split themselves into three independent groups, each of which had a totally different definition of the problem, and as a result, a completely different solution.

One group wanted to "out generic the generics." In many ways, this is a knee-jerk response. One responds to a major financial threat by lowering the price of one's drug to meet the threat of lower-cost generic drugs.

Another group wanted to raise the price of their drug. The reasoning here was that this would send a direct signal to consumers that the company had great confidence in the fact that their drug was so much better than generics such that the company could charge a premium for it. This strategy obviously hinged on reverse consumer psychology. Supposedly, the higher the price, the more confidence consumers had in it.

Finally, the last group wanted to set a price that was mid-way between the group that wanted to raise the price of the drug and those that wanted to lower it to compete with generics. As innocuous sounding as this last group's proposal was, it had a very important consequence.

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If it was adopted, this group recommended getting rid of the Research and Development (R&D) arm of the company! Since R&D is by far the costliest aspect of running a drug company, this meant that the company would become even more profitable if the policy succeeded, or at least in the short run for there was no absolute guarantee that the company would never need new products.

Emshoff and Mitroff entered the scene because given that each group was of equal power, none of them could ram through their pet strategy over the strong objections of the others. In the end, they had to select a strategy with which they all agreed.

Preventing agreement was the fact that all of the groups had gotten themselves into an impossible situation. They had learned too well the tools they had been taught in business schools and on the job. In order to test the validity of a hypothesis or idea, they needed to collect "hard data" that would confirm or disconfirm the truth of their hypotheses or ideas. As a result, they diligently did what they had been taught. They collected reams of data. However, this supposedly sound strategy failed miserably. Collecting data only made things worse. In fact, the more data they collected, the worse off they became.

Ever since the great German philosopher Immanuel Kant, it has been known that one can't collect data without presupposing some theory as to the nature of the phenomenon one is studying. Otherwise, one just wanders around collecting everything and ultimately nothing. In other words, data are not theory and value free.

Unbeknownst to them, each group's pet proposal functioned as a hidden theory that steered it to collect data that insidiously supported the particular theory each group was in favor of! Data are anything but neutral.

The problem is that different theories direct one to collect different kinds of data. In this sense, data do not automatically test theories. Indeed, they often support them via a circuitous process.

The kinds of problems that the executives learned to solve in school were in reality nothing more than fancy exercises. They were problems in name only. They were so overly structured such that there was in effect one and only one kind of data that would lead to the one and only one "right solution."

We cannot emphasize too much that the executives had been overly schooled on exercises, none of which prepared them in the slightest for dealing with complex, messy problems. How they dealt with complex

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problems had nothing to do with how smart they were. It had everything to do with their miseducation.

Based on their different underlying theories about consumers, markets, etc., each group viewed the situation very differently. As a result, each of them bought into an entirely different proposal. In effect, each group was making completely different fundamental assumptions about the nature of the original situation and hence problem. They had to make several assumptions because there were just too many unknowns and uncertainties about the situation.

The question then became, "How can one get at the underlying assumptions that the groups were making?" One can't just walk up to a person or a group and ask, "Would you please tell me in a comprehensive, orderly, and systematic way all of the assumptions you've been making about an important issue?" If they could, then more than likely, they wouldn't need outside consultants to help them with complex, messy problems. Besides, most of the time, many, if not most, of our assumptions are unconscious. We don't even know that we're making any assumptions, let alone critical ones.

The breakthrough occurred when Emshoff realized that *assumptions are the presumed properties of stakeholders*—for example, what they are like, their values, power, resources, access to special sources of information, ability to influence others, etc. We cannot emphasize too much that it was absolutely necessary for each group to make assumptions because by definition, perfect certainty is not a prime feature of complex, messy situations. If anything, they are marked by enormous amounts of uncertainty. Furthermore, because of their complexity, whatever data one has is generally full of holes and/or contradictions.

In order to break the logjam in which the groups were caught, working separately, Emshoff and Mitroff had each of the groups list as many stakeholders as they could that affected the success of their favored strategies. As is well known by now—but it generally was not at the time—stakeholders are all of the parties that affect and are affected by a particular group's behavior, decisions, policies, or strategies.

It comes as no great surprise that all of the groups had the patient as a prime stakeholder. In essence, all of them assumed that a patient wanted low-cost, high-quality drugs. The major differences between them were in regard to what they assumed about physicians.

Physicians were obviously key since it was the physician who first wrote a prescription for the company's painkiller. The group that wanted

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to raise the price of the drug assumed implicitly that "physicians were 'price-insensitive.'" Their policy demanded that they posit that if a physician believed that a particular drug or treatment was effective or necessary in order to help a patient, then he or she would prescribe the drug or treatment relatively independently of cost, or at least they would do so in the days before medicine became as cost conscious as it is today and health costs spiraled wildly out of control.

In contrast, the group that wanted to lower the cost of the drug assumed implicitly that physicians were price sensitive, or at the very least were becoming increasingly price sensitive because of the rising costs of health care.

What's interesting is that none of the groups had conclusive data to support their most critical assumptions. Indeed, they had very little data in this regard, if any at all. They never realized that they needed to collect such data before.

A special wrinkle was especially important for helping the groups to examine their positions. Emshoff and Mitroff had the groups plot their most critical assumptions on two special dimensions: Importance and Certainty (see Figure 3.1). The horizontal axis ranged from those assumptions on the extreme left that were felt not to be as important to the success of a policy to those on the extreme right that were absolutely critical, that is, upon which the success of the entire policy hinged. The vertical axis ranged from those assumptions at the top about which one felt were absolutely certain; they were either absolutely true or false. Thus, if one felt certain that a particular assumption was absolutely true,

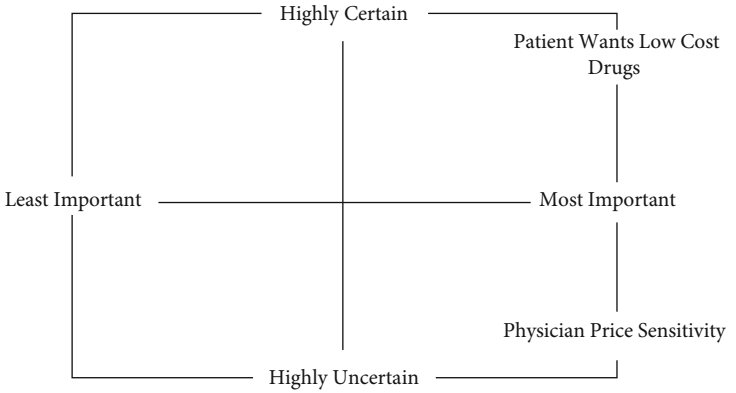

FIGURE 3.1 *Drug company SAST*

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then one felt that it was an absolutely true characteristic or property of a particular stakeholder. Conversely, if a stakeholder assumption was placed at the bottom of the vertical axis, then it was felt that the assumption was equally likely to be true as it was to be false. In other words, a situation of maximal uncertainty existed.

To take a simple example, if one was absolutely certain that it would or it would not rain on a particular day, then one would plot the assumption of rain or no rain at the very top of the Certainty axis. Conversely, if it were as likely to rain as to not rain—the odds were 50–50—then one would plot the assumption at the very bottom of the Uncertainty axis. In other words, maximal uncertainty was the case of 50–50.

Notice very carefully that it is the assumptions with respect to stakeholders that are being plotted and not the stakeholders, events, or situations themselves. Thus, in the case of rain, it is the assumptions of meteorologists regarding the chance of rain that would be plotted.

We cannot overstate the importance of this particular aspect of SAST. Very rarely do people have the ability or opportunity to examine their key assumptions systematically (methodically) and systemically (comprehensively as a system). They almost never have the ability or opportunity to see a map of their assumptions, in effect, a map of their fundamental beliefs about an important issue or problem. Such maps allow one to go beyond seeing assumptions individually and in isolation. They allow one to see the potential interactions between sets of assumptions.

At this point, the reader is probably not surprised to learn that of all the assumptions, those pertaining to physicians were the most important and the most uncertain. Were all physicians price insensitive versus price sensitive in every region of the country? No one knew because they had never collected the kinds of data that would inform them about this vital aspect of an important stakeholder.

As a direct result of the process, the pharmaceutical company finally knew what it hadn't known before but that it needed to know before it could make a crucial decision. Thus, if it wished to collect it, the company was equipped to gather new kinds of data.

We shall not burden the reader with further details of the case except to mention the name of the company and the drug: McNeil Pharmaceuticals, makers of Tylenol. Four years later, outside of a Chicago suburb, seven people died after taking Tylenol capsules laced with cyanide. The perpetrator or perpetrators were never caught.

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A more detailed view of SAST

In the years since Mitroff was involved in the early development of SAST, along with Ralph Kilmann, Dick Mason, and others, Barabba and Mitroff have applied SAST in a wide variety of important settings. Among these are Xerox, Eastman Kodak, the Census Bureau, GM, and most recently, public health agencies, etc. For this reason, in Appendix, we present a recent application SAST as it pertains to the important contemporary issue of privacy.

To summarize, SAST was developed to reveal the critical assumptions underlying strategic plans and policies and to create explicit visual maps for exploring those assumptions. To achieve these aims, SAST incorporates the following key principles:

Adversarial: SAST is based on the underlying premise that the best way to test an assumption is by making the strongest case one can for the strongest opposing assumptions one is able to envision.

Participative: SAST is based on the premise that the knowledge and resources necessary to solve and implement the solution to a complex problem are distributed among a group of individuals. In other words, no single individual no matter how well placed he or she is in an organization has all the relevant knowledge or even power to address a problem or issue adequately.

Integrative: SAST is based on the premise that a unified set of assumptions and action plans are needed to guide decision-making and that what comes out of the adversarial and participative elements of the process can be integrated.

Supportive: SAST is based on the premise that the ability to expose and examine assumptions deepens insight into an organization, its policies, planning processes, and strategic thinking.

The detailed steps of SAST include:

1 *Group formation*

- Key individuals from functional areas in an organization are formed into small six to eight person groups. In a private-sector organization, these include the CEO, Heads of Finance, Information Technology, Legal, Public Affairs, Security, etc.
- To minimize conflict, ideally the groups should consist of those individuals who get on relatively well with one another.

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- To maximize differences, the groups should differ in their particular knowledge and perspectives of important issues or problems. Each group should have a different orientation, perspective, or policy option from which to approach an issue.

2 *Assumption surfacing and rating*

- Each group meets separately, and from its own viewpoint, identifies the key assumptions that are inherent in an issue and especially in its own approach to it. All of the assumptions generated are then listed.

3 *Debate within groups*

- The debate involves three key activities:
  - **a.** By means of eliminating irrelevant assumptions, each group determines which assumptions need to be accepted as strategic premises. To accomplish this, each group asks itself, "If the opposite of a particular assumption is true, does it have any significant bearing on the issue?" If the answer is "No," then the assumption is judged "not relevant" to the group's position. That is, neither the truth nor falsity of a particular assumption is relevant. Of course, this may not only change over time, but another group may not accept it.
  - **b.** The group then ranks its assumptions with regard to their relative degrees of importance and certainty.
  - **c.** At this stage, individual data are then opened for discussion.
- Assumptions that are both important and certain become the central assumptions of a policy.
- Assumptions that are important but uncertain require monitoring and research.
- Assumptions in the other two quadrants may be dropped, but if the resources and time allow, these may be monitored as well.
- Using an Importance/Certainty graph, each group debates which assumptions are pivotal, that is, absolutely central to its position, and it prioritizes them.

4 *Further debate activities*

- The groups are brought together, and a spokesperson for each group presents their Importance/Certainty graph and

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concentrates on those assumptions that are central to the policy (important and certain, and important and uncertain). In order not to bog down the presentations, only clarifying questions are permitted at this stage. When all of the groups have presented, all of the assumptions are combined in a single slide and thrown open for evaluation, debate, and discussion.

- The assumptions that are central to, in the sense that they cut across, all of the groups are the basis for debate. The most contentious assumptions are the special objects of debate.

5 *Final synthesis*

- Ideally, the debate leads to a set of modified assumptions or a new set of agreed upon assumptions. Based on these, a Planning Book is produced. (The concept of a Planning Book is another key component of a Learning Organization.) If agreement on an assumption is not reached, it warrants further investigation. Where the data are inadequate, activities are undertaken to acquire specific data necessary to resolve a strategic issue.
- A Planning Book consists of:
  - **a.** A prioritized list of the most critical issues;
  - **b.** An assessment of the current state of knowledge with respect to the solution of the issues.
  - **c.** A list of current and future activities to produce information designed to improve the state of knowledge relevant to the critical issues.
  - **d.** When a policy decision must be made, the results of the information produced in accordance with SAST are collected and related to the issues for which they were undertaken. A final debate is held and judgment is made on the best set of assumptions *that are known at the present time* from which to proceed.
  - **e.** An appropriate policy is chosen, based on the new information and the synthesis that has hopefully emerged.

Concluding remarks

The authors are the first to acknowledge that SAST is a highly demanding process. It requires a great deal of understanding, patience, and

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commitment of time by those individuals and organizations desiring to use it. Nonetheless, we also know from experience that the more times SAST is performed, the easier, faster, and more efficient it becomes. For this reason, we are not concerned primarily whether everyone follows all of the steps exactly as we have listed them.

In this context, it is important to note that when Barabba was at Kodak and there were not enough resources available to set up four separate teams to debate a significant issue, an employee who had participated in the SAST process came up with the idea of his role-playing four separate positions. He thus took turns acting as four separate groups. In effect, he assumed the role of a rotating proponent for each of four separate positions.

What counts in the end is not following lockstep the detailed steps of a process, but in constantly innovating how it's to be used.

Our primary concern is that it is understood clearly that *assumptions are the presumed properties of stakeholders*. We are also concerned that before people and organizations make crucial decisions, they surface and debate as best they can the most critical assumptions upon which all key decisions depend.

Ideally, every organization should have a map of its most critical assumptions. It needs to monitor, critique, and update these assumptions on a regular basis as conditions change and new information is obtained. In this sense, SAST, or a variation of it, needs to be a cornerstone of the strategic planning and thinking of every organization, big and small, public and private, for-profit and not-for-profit. It is certainly one of the essential cornerstones of a Learning Organization.

At this point, the most relevant questions for the reader are, "Does your organization know and keep track of its critical operating and strategic assumptions? Why, why not? And if it doesn't, what can be done so that it can and will?"

Postscript

We want to close this chapter with a current example. It reveals as much as any example the extreme importance of so many of our assumptions, especially those that we take for granted. They literally deal with life and death.

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For over 30 years, Mitroff has been researching and consulting with regard to major crises, disasters, and tragedies of all kinds. During this time, both authors have found that one of the least recognized, and unfortunately most disturbing, aspects of all major crises is the extreme havoc they wreck with our taken-for-granted assumptions about the ways things are supposed to work. Along with the immediate and palpable tragedy of the loss of lives and serious injuries, major crises seriously challenge one or more of the major assumptions we have been making about ourselves and the safety of the world. In this regard, we have also found that those who are on the inside of a company or industry are often the last to see the folly of their assumptions.

We thus read the remarks of Barry Schiff, a retired pilot, in an op-ed he wrote in *USA Today* with regard to the South Korean airliner that crashed at the San Francisco International Airport on July 6, 2013, with more than a modicum of disquiet. According to Mr. Schiff, we shouldn't be afraid to fly on planes with pilots who are undergoing training with a supervising pilot. After all, given the high cost of fuel, it would be highly uneconomical to have pilots fly training missions with no passengers aboard. That may indeed be a perfectly reasonable and well-accepted assumption for Mr. Schiff and the other members of the airline industry, but it is not for us. This is precisely why one can never leave the testing and acceptance of key assumptions to the members of a company or industry. This is why those who conduct crisis management workshops insist upon having members from different industries who can challenge the "normal thinking" of those inside an industry.

We could multiply the examples ad nauseam. For instance, in the recent train crash that literally wiped out a whole Canadian town, it may well have been a reasonable working assumption to let engineers take a breather by just putting on the brakes on a large train carrying dangerous cargo. That is, it was until this working assumption failed disastrously. Now even the CEO of the company questions the practice.

Time and again our colleagues and we have found that one of the hardest tasks facing humans is to get them to become aware of and challenge their key operating assumptions before a major crisis, disaster, etc. Given that everything rides on the assumptions we make, it's literally a matter of life and death.

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Notes

1 For example, see Berger, Jennifer Garvey, *Changing on the Job, Developing Leaders for a Complex World*, Stanford University Press, Palo Alto, California, 2012.

2 See Mason, Richard O., and Mitroff, Ian I., *Challenging Strategic Planning Assumptions*, John Wiley, New York, 1981; Mitroff, Ian I., Mason, Richard O., and Barabba, Vincent P., *The 1980 Census: Policymaking amid Turbulence*, Lexington Books, Lexington, Mass., 1983.

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4

A Critical Application—The U.S. Census Bureau

Abstract: *This chapter looks at one of the major problems on which the two authors worked together early in their history: Determining whether the 1980 Census of the U.S. population count should be adjusted or not. Examining this important issue not only allows us to review the tools we've introduced thus far, but to see them in operation. It also allows us to begin to talk about systems.*

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Background

We want to backtrack and look at one of the major problems on which the two authors worked together early in their history of working together: Determining whether the 1980 Census of the U.S. population count should be adjusted or not.[1] Examining this important issue not only allows us to review the tools we've introduced thus far, but to see them in operation. It also allows us to begin to talk about systems.

The counting of the U.S. population is a major issue that the U.S. faces every ten years. Although on the surface the counting of the U.S. population is clearly a "governmental problem," it has all of the primary features that virtually all of the major problems and issues we face both in and out of government possess as well.

The U.S. Constitution mandates that a census be taken of every inhabitant of the U.S. every ten years. (The inhabitants may or not be citizens.) The results are not only used to apportion Congressional districts and to provide States with needed detailed information, but also to allocate potentially billions of dollars back to the States and cities for various mandated programs and grants from the general taxes collected by the Federal government. Thus, if there are errors in the census, cities, states, and, especially, various ethnic groups stand to lose out in political representation and in considerable amounts of monies. As former Atlanta Mayor Maynard Jackson put it during hearings on the 1980 Census, "There are only two itty bitty things at stake here: Money and Votes."

By means of special surveys it conducts regularly, the Census Bureau knows that it does not count completely everybody who wishes, let alone those who for various reasons don't wish, to be counted. For instance, it misses criminals or illegal, undocumented persons who are not aware of the strict protections of privacy governing the taking of a Census. Undocumented persons are particularly concerned that merely by being counted by one government agency, another agency (the U.S. Citizenship and Immigration Services or INS) would have access to the information, and thus, pick up and deport them.

The total population is easily undercounted because many people are not home on a particular day or time when a census taker knocks on their door in the process of following up those households who didn't fill-in and mail back the census form that was sent to them.

The problem of undercounting is especially harmful to Blacks and Hispanics. The Census Bureau knows from the special surveys that it

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conducts to check on the accuracy and completeness of the total census that it misses Blacks and Hispanics more than it does Whites. Indeed, evaluation of the 1970 Census estimated that Blacks were undercounted by 7.7 percent while the white population was undercounted by 1.9 percent.

A critical question is thus, "What number should the Census Bureau report as the official population of the U.S.?" Should it just use the "the actual number of people who were counted during the census process" because at least such counts are based on the numbers of people that have actually filled out a form that was sent to their household or who have been observed by a census taker? "The Count" also includes persons for which neighbors are willing to testify actually exist and live near them but for various reasons are not presently at home.

Or, should the Census Bureau adjust the numbers it observes upwards or downwards based on the results of the special surveys it conducts to check on itself? For example, since the Bureau knew that it missed Blacks by 7.7 percent and Whites by 1.9, why not just multiply the number of Blacks observed by 1.077 and Whites by 1.019? The trouble with this simple procedure is that as straightforward as it is, it can actually make things worse. In 1970, the Bureau *on average nationally* missed Blacks by 7.7 percent, but it did not uniformly miss Blacks in every city, state, and region of the country by the same percentage. Thus, merely multiplying by 1.077 would not have remedied the problem.

Counting is not a simple problem: in fact, there are no important simple problems anymore

The basic problem lies much, much deeper.

The fatal flaw is that counting is generally assumed to be a simple, straightforward problem when it is not. Indeed, counting is supposedly the most basic and simplest of operations in all of science. Presumably all one does is merely line up objects and tick them off.

For most people, counting is based on their earliest childhood experiences. Most people start out in life with a very few limited objects directly in front of them—candy, food, toys, etc.—that they can manipulate easily and thus "count completely." But counting a large population is not like this primitive experience at all.

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First of all, the population of the U.S. is spread out widely in space and time. To count this population requires the cooperation as well as the time and money to pay for a large body of temporary, but dedicated census workers. Second, as we noted before, many people don't want to be counted. Third, for the preceding and many other reasons, no one has ever observed directly the entire population of the U.S. at a certain point in time. And, it seems that no one ever will.

To put it mildly, counting a population that at the time of the writing of this book is close to 315 million people is not a simple problem that is open to direct observation. One doesn't just line up 315 million people in a straight line and count them. Indeed, 315 million people spaced four feet apart would circle the Earth about nine and a half times!

When the cost of conducting the Census was questioned at a Congressional hearing, with a smile on his face, Barabba responded that he could reduce the cost dramatically if Congress were to legislate, as other countries have done, that everyone stay at home on April 1 in order to be counted. The trouble with this simple-minded solution is that it would cost the economy literally billions of dollars in lost wages and income. It would also set off howls of protest from Liberals and Conservatives alike who would object to the intrusion of the government with regard to Civil Liberties. "Counting a large population" quickly turns into serious economic and political problems. Of course, the economic and political aspects of counting have been there all along. Most of the time, they are just not recognized.

The basic fallacy lies in believing that 315 million is a definite, real number like any other. In many senses, 315 million is a "policy number," that is, a number that allows the government to make important decisions. But even more, it is a "theoretical number" in the sense that it is the product of countless theoretical assumptions and complex statistical models. *Given the fact that people are constantly being born and dying at virtually every instant, it is not clear that at any single point in time there is a single number that represents the "true" population of the U.S.*

For example, as Table 4.1 shows, in 2013, it is estimated that the U.S. had:

TABLE 4.1 *Births and deaths*

One birth every	8 seconds
One death every	12 seconds
One international migrant (net) every	36 seconds
Net gain of one person every	15 seconds

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This point becomes even clearer if we reflect for a moment on the fact that to count a constantly changing population requires widely shared definitions of "life and death," which we don't have, and it appears that we are not likely to have, at least not in the foreseeable future.

Faced with this thorny and not easily resolvable problem, what should the Census Bureau do?

A different kind of problem-solving workshop

Because of the extreme importance of the issue, after coming back to the Census Bureau from working at the Xerox Corporation, Barabba decided to hold a weeklong SAST conference/workshop. First of all, it not only included key members of the executive staff of the Bureau who were responsible for the statistical and policy aspects of the census, but also included pertinent external stakeholders who were affected directly by the numbers that the Bureau submitted in its final report to the Congress. In fact, early on, a key decision was made deliberatively to include representatives of various stakeholder groups from several states and cities who were not only potentially undercounted, but as a result were engaged in suing the Bureau in Federal Courts to get it to adjust the numbers to their satisfaction. In this way, it couldn't be charged later that the Bureau had intentionally excluded persons and points of view it didn't like, want to hear, or with which it didn't agree. As Barabba jokingly said on more than one occasion, it even needed such groups to sue the Bureau to keep it from even thinking of being "dishonest."

The 30 or so participants were divided at random to role-play four very different policy positions. The first group was assigned to make the strongest possible case it could for sticking with the raw census counts, that is, for not adjusting the raw counts at all. The other three groups were assigned to make the strongest possible cases they could for various forms of adjustments, ranging from mild adjustment to strong. Mild adjustment was in effect a version of multiplying the number of Blacks counted by 1.077 that reflected the estimated undercount. The strongest case embodied the most radical, newest, and most controversial method of statistical adjustment. In short, the last case was at the very leading edge of statistical methodology.

We cannot emphasize too much that people were assigned at random to one of four groups. This was done to help ensure that no one would

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be automatically put in a group that represented their preferred position. This had the additional benefit of forcing everyone to examine positions with which they did not necessarily agree. This had a further benefit as well. Most people ended up making a stronger case for the particular position to which they were randomly assigned than their natural proponents did.

Over the five days of the SAST conference/workshop, the participants dug deep to examine the widest possible range of stakeholders that both strongly supported and opposed each position. They also examined the critical assumptions they made and had to make with regard to each of the stakeholders in order to make the strongest case for their group's position. They then assembled the assumptions into coherent arguments in support of each position. Next, they debated the arguments and assumptions pro and con for each position. When they had assured themselves that they had subjected each position to the strongest supporting versus opposing arguments, they were ready to take the final step, selecting which of the initial four positions—or a new "hybrid" position—they recommended that the Bureau support as its final position.

The Bureau not only published its final decision to go with the unadjusted, actual census counts in the Federal Register (the official newspaper of the Federal government so-to-speak), but more importantly, prior to the announcement, the Bureau also published the expected assumptions that would have to be true in order for the Bureau to be able to make the decision to adjust or not adjust the actual count. It also published a full account of the SAST conference/workshop process it had used to reach, and hence, to justify its final decision. When the actual count was completed, the Bureau identified the extent to which the improvement in the actual count over the expected count made the assumptions supporting the adjustment no longer acceptable. In the end it listed the major assumptions and arguments in support of its position not to adjust.

One could certainly disagree with the Bureau's final decision not to adjust the raw counts, but it was hard to disagree with the process it had used, especially since publishing it helped to insure transparency. This was further strengthened by the fact that many of the major participants in the SAST conference/workshop had no intention of stopping their lawsuits against the Bureau in order to force it to adjust the raw counts to satisfy them. Nonetheless, for the purposes of the SAST conference/workshop, they agreed to go along with the process and thereby be a part of it.

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Was it worth the effort?

On December 8, 1987, more than seven years following the start of the 1980 census, and after more than fifty lawsuits were filed, U.S. District Judge John E. Sprizzo decided that a lower courts' decision that overturned the Bureau's decision against adjusting the 1980 census should be reversed. Judge Sprizzo went on to say:

> The extensive testimony at trial overwhelmingly demonstrates that the determination as to whether the use of the currently available adjustment techniques will provide a more or less reliable estimate of the population than the unadjusted census is an extraordinarily technical one, about which reasonable statisticians and demographers can and do disagree. Certainly the Bureau, which has the necessary experience, expertise, and resources to collect and analyze the complex statistical data, is better equipped than the courts to decide whether, in view of this dispute among the experts, the census should be adjusted.

In a footnote, the Judge commented:

> The court rejects plaintiffs' [City of New York] argument that the Court should not defer to the Bureau's determination because the Bureau's decision not to adjust allegedly "rested on non-technical, political grounds." That claim is simply not supported by the evidence [sic]. The Court finds as a matter of fact that while non-technical consideration played a minor role in the Bureau's decision not to adjust, the Bureau's decision was primarily based on its determination that it was not feasible to develop and implement an adjustment methodology which would be more accurate than the census itself, a determination supported and confirmed by the evidence at trial.

Judge Sprizzo's findings brought to a successful close a tremendous effort on the part of many hardworking and talented Census employees and engaged citizens. (Notice carefully that in arguing his case, Judge Sprizzo was in effect using the TAS.) Their effort resulted in a 1980 census count for which the under enumeration was estimated at 1.2 percent, the lowest rate in the four censuses before 1980.

The Bureau's position was strengthened by the fact that it was one of the very few agencies, business or government, which did studies to show how well it was NOT doing its job! By performing additional sample surveys, the Bureau was able to establish how much it failed to count the entire U.S. population. As Barabba once said, *"The Census Bureau is the only*

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government agency that not only admits that it has made a mistake, but then precisely estimates the extent to which it has made it!"

As we've noted, since the authors first studied the Bureau many years ago, we have applied and refined the methods and tools we've used with many organizations, large and small, public and private, for-profit and not-for-profit, etc.

Concluding remarks

Let us review and reiterate briefly two of the major characteristics of SAST:

1. First of all, SAST is based on a process of "constructive conflict," not "destructive conflict" in which far too many organizations are already embroiled. Most organizations don't need a method or tool to create destructive conflict, but they desperately need methods to create productive conflict. For this reason, the methods we have developed are deeply adversarial. They primarily pit policy positions against one another, not personalities or entrenched positions of organizations whose functions (Product and Sales, Marketing, Planning, etc.) are strictly walled-off from one another in silos. This doesn't mean that there are no personality clashes, which there are. It merely means that we go out of our way not to get bogged down in them.

   We cannot stress too much that before a person or a group can make a crucial decision on an important issue, they need to undergo the strongest possible examination of strongly differing and opposing alternatives. They also need to debate the alternatives as strongly as they can as well. In other words, we don't merely assume, but we claim unequivocally that crucial decisions always involve more than one "good" or "best" alternative. If a decision involves only one, then the "first problem" is to create more viable alternatives.

2. SAST does not merely examine surface arguments and opinions, but it digs deep down to get at crucial underlying assumptions, arguments, and stakeholders upon which all positions rest, take for granted, and are needed to support any position. Thus, the debate over which position is "correct or best" is not confined to surface

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arguments. It is over more fundamental premises that can make or break any proposed solution or policy proposal.

In more ways than one, numbers make the world go around. For instance, when Alfred P. Sloan became CEO of GM in the 1920s, strange as it was, GM didn't know precisely how many cars it was building or selling. It also didn't know exactly how much money it was making because it had no centralized systems for collecting and processing the numbers of cars it was selling and the money it was making. While Sloan certainly didn't invent the fields of Corporate Accounting and Finance, he was one of the first top executives of a major corporation to realize that it needed a major finance unit and directed that it be developed.

But Sloan realized something even more important. Whenever Sloan and his top executives were discussing an important decision that they had to make and they reached agreement too quickly on a single course of action, Sloan is reputed to have said (we paraphrase), "Gentlemen I propose that we adjourn so that we can reflect, challenge our initial agreed upon position, and come back so we can have a better discussion and debate."

Yes, numbers do indeed make the world go around. But all the numbers in the world are never any better than all of the stated and unstated assumptions upon which they depend for support.

Assumptions are the things that really make the world go around. They are the fundamental premises upon which all thought and actions are based. For this reason alone, we examined the critical role of assumptions in Chapter 3.

Note

1 Mitroff, Mason, and Barabba, 1981, Op. Cit. This topic is discussed in greater detail in Mitroff, Ian, Mason, Richard, and Barabba, Vincent, *The 1980 Census: Policymaking amid Turbulence*, Lexington Books, Lexington, MA. 1983.

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5
Complex Messy Systems

Abstract: *This chapter talks about two of the other key concepts and tools that are needed if we are to have any hope of managing today's enormous challenges and daunting problems: (1) systems, and (2) messes.*

In brief, a "mess" is a complex, dynamic system of problems that are so interconnected such that no problem even exits apart from the mess with which it is associated. Thus, taking any problem out of a mess and studying it on its own distorts the very nature of the problem and the entire mess. The interactions between problems as well as the problems themselves are the key objects of study.

The chapter also shows that: Information is more valuable than data; knowledge more valuable than information; understanding more valuable than knowledge; and wisdom more valuable than understanding.

The chapter also presents heuristics for coping with complex, messy problems and systems.

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Introduction

As he did throughout his long and distinguished career, in his highly inimitable style, Russ Ackoff put the subject of this chapter succinctly: "Managers don't solve problems. They manage messes."

To which Ackoff also added: "The role of management is to manage the interactions of the parts and not the action of the parts taken separately."

In this chapter, we want to talk about two of the other key concepts and tools that we need to understand if we are to have any hope of managing today's enormous challenges and daunting problems: (1) systems, and (2) messes.

We begin with the concept of social systems.

The nature of social systems

One of the key tenets of the systems approach is that the successful performance of an individual, a group, an institution, an organization, or the whole society is *not* the *sum* of the separate performances of its separate parts. Instead, the successful performance of a system *as a system*, that is, as an integrated whole, is the *product* of the interactions between all of its parts.

To take a simple example, the performance of professional athletes is not a function of the separate performances of their arms, heart, legs, and lungs independently of one another. Instead, it is the property of how their whole physical and mental being as a complex, integrated, human system interacts. The distinction between two metaphors helps illustrate the differences between systems thinking and its opposite: mechanistic thinking. The mechanistic mind-set of the Industrial Age encouraged us to think about managing businesses and organizations as if they were made of replaceable parts like pieces of a jigsaw puzzle. For its time, the metaphor worked reasonably well.

When one starts a puzzle, one usually knows exactly how many pieces one has. Furthermore, the chances are high that all the pieces are there. In addition, each of the pieces or parts interacts with only a small portion of the others. Often, a particular part seems to have no connection with any other. Nonetheless, if one has trouble putting the pieces together, there is usually a picture on the box that reveals the one and only one ultimate solution to the puzzle.

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In contrast, in real life, there is no "picture on the box" or no "list of answers at the back of the book" to which we can turn for the solutions to all our problems.

Today's business and organizational challenges are more complex, to which the simple metaphor of a puzzle cannot do justice. We live in a world that is characterized by increasing complexity and an ever-accelerating pace of change. In short, we live in a world that is highly turbulent. It is an environment consisting of constantly changing processes, relationships, and components; it is more like a molecular structure than a jigsaw puzzle.

Depending on how the elements (pieces or parts) come together, we can end up with an entirely different outcome than we expected. We can't always know up front what we are creating. Unexpected consequences are always to be expected.

Most of the purveyors of the creation, use, storage, etc. of knowledge, or the management of knowledge, are anchored in the industrial or machine age way of thinking. They assume a predictable world rather than one in which uncertainty, if not chaos, is commonplace.

This raises the question of how to place value on intellectual assets. There is no question that intellectual assets have value, but the attempt to assign values to each of them separately fails seriously because the "assets" interact and form a system. And, if a system is anything, it is a whole that cannot be divided into independent parts. In terms of this notion, a business or organization is a system.

The management of change

Managers are in much of the same position as an old farmer who, when he was confronted by a young county agriculture agent who told him how to modernize his farm, said, "Go away, young man, and stop bothering me. I'm already not doing as well as I know how." If organizations are reluctant to do as well as they know how, it seems clear that they are even more reluctant to do better than they know how.

Resistance to change

There are many explanations for the resistance to organizational change. Unfortunately, many of them are superficial. They do not yield

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meaningful ways of reducing or eliminating resistance. Accordingly, we want present a way of addressing the issue that we have found helpful.

To put it as directly as we can, there are only two sources of learning: (1) from one's own experience, and (2) from the experiences of others. The others from whom we learn have either learned from their own experience or from others who have learned from their experience, and so on. All learning ultimately derives from experience, but it is not based entirely on experience alone. As the great German philosopher Immanuel Kant showed, one has to have an innate, inborn capability of being able to learn from experience or one cannot have any experience at all. If he were alive today, Kant would probably use the idea of a computer to argue that the mind is like a computer. Unless a computer has the right internal hardware and software, it can't get any form of external inputs into it. It has to have a built-in internal capability of receiving external inputs. By analogy, our minds wouldn't be capable of having experience from the outside world unless we had the "appropriate hardware and software" built into us.

One learns little if anything from doing something right because presumably one already knows how to do it. At best, it confirms what one believes is right, or one gets better at doing it. In short, one learns from one's mistakes and those of others.

While he was working at Wang, John Chambers, Cisco's president and CEO, learned an important lesson about the need for open and clear communication. Chambers tried to encourage Wang to move to PCs while the company still had the opportunity to do it.

Chambers knew that he was in a better position to challenge Dr. Wang than anyone else in the organization. In fact, he raised the issue with him, causing Dr. Wang to get mad at Chambers for the first time. However, because of his enormous respect and admiration for Dr. Wang, Chambers chose to back off and not to push harder. He was also influenced heavily by his position within Wang's leadership team.

By not changing Dr. Wang's resistance towards moving to a PC platform, Chambers had to go through the personally painful experience of eventually laying-off 5,000 people. The lesson Chambers learned from this experience stayed with him forever. It's reflected in the manner in which he leads Cisco by constantly encouraging, indeed demanding, open and frank communication throughout the entire company.

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Two kinds of mistakes: errors of commission and omission

Mistakes are of two types: doing something that should not have been done in the first place (errors of commission), and not doing something that should have been done (errors of omission). Whether they have recovered or not, the root of the trouble of those corporations that have been in serious difficulties is more a matter of what they didn't do rather than what they did. For example, IBM got into trouble in the 1980s because it didn't develop and produce small computers. Apple got into trouble because it didn't permit the cloning of its computers; Sears, because it did not react to the emergence of Walmart. And, Kodak because it didn't take the lead in developing electronic cameras.

Despite the greater importance of errors of omission, corporate accounting systems only reveal errors of commission. Supposedly managers needn't worry about errors of omission since they don't show up on the books. If, in addition, an organization looks askance at mistakes, as is so often the case, the best strategy for a manager who seeks security is to avoid only errors of commission. As a result, avoiding punishable mistakes is best assured by doing as little as possible; hence, the reluctance to change.

If an organization is to encourage change, it needs to record and evaluate *its decisions NOT TO DO things* as well as its *decisions to DO things*. It must rise up to consciousness and acknowledge its errors of omission. This is one of the most effective ways of overcoming an organization's reluctance to change. It requires the development of a system that encourages and facilitates learning from mistakes of both types.

From data to wisdom

Learning primarily by relying on others runs the significant risk that what is obtained from others is ignorance disguised as knowledge. There is no amount of ignorance which, when shared, that produces knowledge. (Like everything, this depends on the context. Shared ignorance is effective if and only if it is for the purpose of learning from one's mistakes and ignorance.)

A major obstruction to organizational learning is the exclusive focus on information—as in Management Information Systems—or even the more recent extension of these systems to include knowledge.

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Information and knowledge do not exhaust the full contents or capabilities of the human mind. They are not even the most important. The mind cannot only capture data, information, and knowledge, but more importantly, at its best, it's capable of understanding, and wisdom.

Information is more valuable than data; knowledge more valuable than information; understanding more valuable than knowledge; and wisdom more valuable than understanding. Nevertheless, the attention and effort that most organizations spend on acquiring each of them are inversely related to their importance. This is due in part to the fact that they are not aware of the differences between them, let alone the differences in their value. Unfortunately, the difficulty in obtaining information, knowledge, understanding, or wisdom is proportional to their value. There is no easy way out.

Data consist of symbols that represent the properties of objects and events. In general, data (like iron ore) are useless until processed into information (like iron). *Information is contained in descriptions, answers to questions that begin with words such as who, where, when, what, and how many.* (For instance, how many young people voted in the last Presidential election?) *Knowledge is contained in instructions, in answers to how questions.* (How do you operate a voting machine or fill out a ballot?) *Understanding is contained in explanations, answers to why questions.* (Why did more young people vote for President Obama than Governor Romney?)

Data, information, knowledge, and understanding are concerned with efficiency—for example, the likelihood of attaining one's objectives or the amount of resources consumed in obtaining them, *but they are not concerned with effectiveness. The difference is that effectiveness takes into account the value of the outcomes of one's behavior. This is precisely what wisdom does.* Peter Drucker got it exactly right when he said that there was a big difference between doing things right (efficiency) and doing the right things (effectiveness). He went on to say that managers do given things right whereas leaders ask, "What are the right things to do?"

The "righter" one does the wrong things, the "wronger" one becomes. If one makes a mistake doing the wrong thing and corrects it, then he/she becomes "wronger." However, correcting a mistake while doing the right thing makes things "righter." *As Ackoff put it, "it is better to do the right things wrong than the wrong things right!"* In other words, why solve the wrong problems precisely?

Information reveals the properties or behavior of a system—for example, the properties of a system's stakeholders; knowledge reveals how it works—for

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example, how a system or organization works; understanding reveals why it works the way it does; and wisdom reveals how it ought to work. Wisdom also reveals the value in pursuing something versus not undertaking it at all.

Learning should focus on understanding and wisdom as well as information and knowledge. Unfortunately, understanding and wisdom are rarely generated by the current, dominant mode of thought—analysis.

Changing our patterns of thought

Organizations are systems and understanding systems cannot be obtained by analyzing them. A different way of thinking is required. Einstein saw this clearly when he wrote: "Without changing our pattern[s] of thought, we will not be able to solve the problems we created with our current pattern[s] of thought." To understand this, we need a more precise understanding of analysis and systems.

Analysis is a three-step process.

1. Take the entity or event to be understood apart, that is, disassemble it.
2. Explain the behavior or properties of each part taken separately.
3. Aggregate the understanding of the parts into an understanding of the whole.

For example, business schools tacitly assume that the way to understand a business is first to understand each of its parts: Production, Marketing, Finance, Human Resources/Personnel, etc. The atomic theory in physics, the periodic table in chemistry, the cell in biology, all the way up to the phoneme in linguistics are the products of taking things apart until their alleged indivisible parts are reached. However, no amount of analysis of a system can explain its properties or behavior.

For example, no amount of the disassembly of an American automobile will explain why, until recently, it was designed for six passengers. The explanation lies outside the system, not inside of it. The six-passenger car was designed and manufactured in order to serve the average American family, which contained 5.6 people at the time. Today, it contains only between three and four people. Explanations of a system's behavior or properties always lie outside of the system. They are to be found in its functions and in its containing systems. To understand this, we need to know about systems.

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Systems

Every system has a function or functions that lie in one or more containing systems. The automobile—a prime example of a mechanical system—is defined by its ability to carry things external to it from one place to another. It is part of a larger transportation system.

A system is a whole that consists of two or more essential parts. Essential parts are ones without which a system cannot perform its defining function. For example, a motor and battery are essential for an automobile. The ashtray and cigarette lighter are not.

The essential parts of a system must satisfy three conditions.

1. Every essential part of a system affects the properties or behavior of the entire system of which it is a part.
2. No essential part has an independent effect on the whole system; its effects depend on the behavior/functions of at least one other essential part. The essential parts form a completely connected set.
3. Every possible subgrouping of essential parts has the same properties as an essential part: they affect the properties or behavior of the whole, but they cannot do so independently of other essential parts.

In short, *a system is a whole that cannot be divided into independent parts. The defining properties and behavior of a system derive from the interactions of its essential parts, and not from their actions considered separately. When a system is disassembled it loses all of its defining properties and behavior, and so do its parts.*

A disassembled automobile cannot move people from one place to another. Its motor, without which it cannot move people, when separated from the automobile cannot move anything, including itself.

Now we can see why analysis cannot explain the properties or behavior of a system: analysis begins by taking a system apart. When this is done to a system it loses all its essential properties, and hence cannot be explained. A different pattern of thought is required—synthetic thinking. It too involves three steps, but ones that are the complete opposite of those in analysis.

1. Synthetic thinking identifies one or more containing wholes of which the system to be explained is a part. For example, an automobile is part of a transportation system. The transportation system is part of the financial system, and so on.

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2. Synthetic thinking identifies the functions of the containing whole. For example, the transportation system has the function of moving things from one place to another.
3. Synthetic thinking disaggregates the functions of the containing wholes and identifies the roles or functions of the system(s) to be explained. For example, an automobile has the function of transporting people from one place to another under the control of their operators.

Analysis of a system yields knowledge. It reveals how it works, its structure. When a system stops working properly analysis can be used to identify the defective part(s). Synthetic thinking is used to reveal a system's function, its role in one or more containing systems: why it works the way it does. Evaluation of a function, which is wisdom, reveals whether or not the system is doing the right thing; that is, how it ought to work. For example, an automobile ought to be less energy consuming, less polluting, and safer. It could be all of these if it were designed wisely. *Design is to synthetic thinking what research is to analysis.*

Required support for organizational learning

A system that encourages and facilitates organizational learning—and thus produces a Learning Organization—must enable it to acquire and transmit understanding and wisdom as well as data, information, and knowledge. To do so, it must perform the following steps:

1. Identify every decision of significance (including the decision not to do something) and produce a record that contains its expected effect: when the effect is expected, the assumptions on which the expectation is based, the inputs to the decision (information, knowledge, etc.), the way the decision was made, and by whom. In other words, it must keep track of important Toulmin Arguments and the decisions that were taken with respect to them.
2. The decision should then be monitored to reveal whether the assumptions on which it is based turn out to be incorrect, or the expectation is not realized.
3. Such deviations from expectations and assumptions are errors, which should then be diagnosed—their causes determined—and

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corrected. The correction of such errors constitutes learning. However, the correction itself involves a decision that should be treated as the decision from which the error derives. Then, if these "second order" decisions are corrected, the system learns how to learn. This enables it to increase the speed and effectiveness of learning.

4 What is learned from any decision should be available to anyone in the organization who needs it. It should be made available to those who have a relevant interest whether or not they need it at the time. Organizational learning, in contrast to individual learning, takes place when whatever an individual in an organization learns is available to others when they need or want it, even after the person who learned it is no longer available.

5 The organization and its environment should be under continuous surveillance to determine when either one changes in ways that require responses from the organization.

6 Finally it should be a system such that those who use it can learn to use it more effectively over time.

Messes

The preceding allows us to turn finally to one of the most critical and important concepts in this book: messes.

A mess is a whole system of problems that is poorly organized, even disorganized. In fact, some of the disorganization is both intentional and unintentional. None of the problems that constitute a mess even exist, and hence cannot be defined, independently of all of the other problems that are integral parts of the mess. A mess also contains the various parties—stakeholders in general—that play a major hand in defining the mess and who are affected by it. All the parties—stakeholders—who affect and are affected by a mess are NOT independent of it.

Since a mess contains stakeholders, it automatically contains all of their underlying anxieties, dreams, emotions, fears, hopes, and accompanying assumptions, beliefs, and myths, both conscious and unconscious. Furthermore, it contains the history associated with the mess, and potentially all other messes as well. As part of its history, it contains both strong conscious and unconscious memories of previous attempts, successful and otherwise, to manage the mess.

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In short, messes *potentially* contain everything pertaining to the human condition. (Even though a mess is not completely synonymous with the concept of "culture," a mess certainly contains the culture in which it is embedded and thus embeds.) This is precisely why they are messy.

Similar to the definition of a system, a mess consists of at least two different problems. If there is only one problem, then it is neither a system nor a mess.

But, something else even stronger holds as well. At least one of the problems in every mess is one of the problems from at least one other mess. The same holds true of assumptions, beliefs, myths, stakeholders, etc. Every mess thus contains at least one assumption, belief, etc. from at least one other mess. In addition, every mess contains at least one powerful underlying emotion from at least one other mess. *In this way, every mess is in principle related to and a part of every other mess.* Thus, the Educational Mess is not independent of the Financial Mess, the Energy Mess, the Crime Mess, the Housing Mess, the Unemployment Mess, and so on.

A mess is also similar to a system in that no subset has an independent effect on the mess as a whole. In addition, the whole of a mess has properties that none of the "individual elements" have.

A mess thus raises the stakes even higher. It is a system but at a higher level of complexity. In brief, it is a "messier system."

Messes are also like fractals in the sense that the deeper and the further one digs down, one still encounters messes. (Simply put, fractals are mathematical entities that repeat the same complex pattern endlessly no matter how much one magnifies and examines or blows up parts of the pattern in detail.) It is messes all the way down and all the way up. Messes do not begin and end at any particular level of "reality." "Messiness" is an inherent property of all messes.

Depending upon the number and types of wicked problems they contain—and each mess contains *at least one* wicked problem—there are different types of messes. (A wicked problem is a problem that cannot be completely defined, let alone "solved," by any known, that is, currently existing, academic discipline or profession either solely by itself or in combination with the others. Furthermore, wicked problems do not have clear "stopping rules." That is, it's never fully clear when a wicked problems has been "tamed" and thus "solved.") A "wicked mess" is where "all or nearly all" of its problems are wicked. *Messes can thus be differentiated by their "degrees of wickedness."* And yet, because of their extreme

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importance, one cannot wait for new disciplines and professions to be invented before one copes with wicked messes or any mess for that matter. One must in other words manage (cope with) messes, wicked or not, in some way, where "copes with" means "to resolve," not "solve" them.

Thus, for example, the Education Mess is not only a mess, but a prime issue is its degree of wickedness. It is certainly not a well-structured problem. No mess is.

Finally, there are no neutral terms in a mess. While not all of the terms may be emotionally or value loaded to the same degree, values play a central role in their definition.

Exercises versus problems

Lastly, to appreciate messes, we also need to understand the differences between exercises and problems.

The following is certainly an exercise, but it is not a problem: If Dick and Jane together have $6, and Dick has twice as much money as Jane, then how much money do each of them have? By means of simple algebra, or trial-and-error, one can easily show that Dick has $4 and Jane has $2.

More importantly, if the amount of money Dick and Jane changed every time they tried to count it, as well as the respective amounts that each of them had, then this simple exercise begins to have the some of the essential characteristics of problems.

Exercises and problems are positively not the same. Problems seldom possess any, let alone all, of the supposedly "desirable characteristics of exercises."

First, problems do not have one and only one "right answer." In large part, this stems from the fact that problems do not have one and only one way of being defined or formulated, certainly not to the satisfaction of every stakeholder who has a "stake" (bearing, interest, etc.) in the problem. In effect, every stakeholder potentially sees the "same" problem differently, if not a different problem altogether. (Recall the case of the drug company in Chapter 3.) In contrast, everyone is expected to get the "single, right answer" that every exercise possesses.

Second, as opposed to exercises, problems are never completely or perfectly well defined. Many, if not nearly all, of the basic elements of a problem are ambiguous or possess a strong degree of ambiguity, some

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obviously more than others. Once again, it is not possible to define every aspect of a problem to the satisfaction of every stakeholder, either prior or subsequently to working on it. (Again, recall the drug company.)

Third, the definition(s) and meaning(s) of problems change as a direct result of our working on them. As opposed to exercises, problems do not stay put. They are not fixed or static in their definition(s), meaning(s), and resultant solutions.

Four, problem formulation or definition is one of the most important and critical aspects of problem solving. How a problem is defined initially is a critical part of its solution, and especially, whether it has a solution or not, and which kinds if any. To turn it around, something is not a problem if it has one and only one definition. Instead, it is an exercise. A true problem always possesses more than one definition and an accompanying sense of meaning.

Five, as in the case of the drug company at least two or more of the definitions of a problem—and hence, solutions—conflict sharply.

All of the preceding conditions mean that different stakeholders entertain very different assumptions with regard to the basic definition(s), meaning(s), and solutions to a problem.

In addition to the five conditions above, something else equally important and fundamental also operates. One of the most important characteristics of problems is that invariably, they are not independent of one another. In contradistinction to exercises that are typically *in*dependent of one another, problems are typically *inter*dependent. More often than not, they are inseparable from the host of other problems with which they are linked in complex and thorny ways. For instance, the problem of gun violence is the U.S. is inseparable from the problems of mental health, movies, video games, TV, poverty, the economy, etc. Thus, in one way or another, problems are parts of messes.

Heuristics for coping with complex, messy systems

If messes are the epitome of systems that are composed of highly interactive and extremely unstructured problems, then they cannot be dealt with in the ways that we typically dispose of exercises, which by definition are well structured. We cannot apply algorithms that guarantee a solution, let alone, a single, exact solution for the reason that by their very nature, there are no algorithms for messes.

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In short, messes don't admit of nice, neat, bounded, and well-contained "solutions." As a result, they have to be handled in very different ways. As the quote from Ackoff at the start of this chapter indicates, we don't necessarily "solve" the individual problems that compose messes, let alone "'solve' messes in their entirety." Instead, we "manage" and "cope with" them as best we can.

In sharp contrast to exercises, all one has for managing messes are various "rules of thumb" or heuristics, none of which guarantee *a* solution, or *any* solution for that matter. This fact alone is one of the things that strongly differentiate this book from the vast majority of popular books on business. To put it another way, because of the unbounded and messy nature of the subject matter, virtually all books on management use heuristics. The difference is that most of them don't know that they are using them. As a result, they don't make them explicit.

Let us list and discuss very briefly some of the heuristics that we have used in coping with and managing messes (Table 5.1).

TABLE 5.1 *Heuristics for coping with messes*

Avoid the Silo Problem. Be careful not to let your particular area of expertise restrict your willingness and ability to interact with and learn from others who are experienced in fields in which you are not. More often than not, others see improbable, strange, and weak interactions between the problems in a mess that you cannot and thereby do not.
Avoid starting out with a specific point of view that more often than not causes one to look for and find only that information which supports one's initial position. Take special heed to avoid selective perception, cognitive dissonance, and converging too quickly on a single preferred definition of a problem, and hence, solution.
When presenting your point of view, do everything in your power to ensure that as much as possible, all aspects of the underlying arguments are revealed and understood.
Do not put the variables of which you are uncertain into a box labeled "Ceteris Paribus," that is, "all things being equal." Make the things of which you are uncertain as explicit as possible. Recognize the paradox that if you could make everything "explicit," then you might not have the same degree of "uncertainty." In other words, live with paradox.
Communicate effectively the results of the information you've collected especially when for the all the wrong reasons, the information is not likely to be well received.
Continually test and assess the extent to which things that worked in the past will work in the future. In other words, don't assume and take continuity for granted. In fact, be particularly critical of extrapolating past successes into the future.
Step back and take a holistic look at the conditions surrounding what you're working on. One important way of doing this is to examine any problem and mess from each of the four Jungian quadrants.

Continued

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TABLE 5.1 *Continued*

Go beyond and get beneath the surface answers that people in an organization give to questions about the problems and messes they face. What are the answers beneath the answers? Walk in the shoes of the respondents.
Are there technologies, old or new, that will help augment, but not necessarily, replace, the application of what is already known?
In the development of strategic concepts that they will have to implement, the top leadership of an organization needs to be involved in every step of the Jungian, SAST, and Toulmin processes.
Help those who are more competent than one is to apply their special skills to improve the overall capability of the entire organization. In the words of Ackoff, "Manage the interactions of the parts and not the parts taken separately."
Engage those academics, and only those, who prize opportunities to engage with and learn from the so-called "real world." In other words, engage those who do ***not*** believe in the hard and strict dividing line between so-called "pure" and "applied research." These are the ones who are willing to test, under severe conditions, new ideas that address both current and past problems.
Conversely, engage those practitioners who are willing to learn and work with academics.
Design inventions so that those whom you want to adopt the inventions can reinvent them for their purposes.
Engage mid-level management in the process of ensuring that the information gathered and analyzed is relevant to the needs of the organization. Ensure that they assist in preparing their senior managers for receiving, accepting, and acting on the results.
Make sure that the understanding and appreciation of business conditions exist throughout the organization and reach deeply into the places where specialists, engineers, and scientists formulate and assess ideas.
Whenever possible, make sure that the users of market information can see the effects of alternative strategies. Do not limit yourself to observations and analyses that are based on the averages of all customers or market segments.
Surface and make explicit the underlying assumptions that would have to be true for your particular problem-solving approach to prevail, especially in courts of law.

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6

Synthesis—Putting It All Together

Abstract: *Throughout the book, we have tried to draw connections between the various ideas and tools that we've developed. Still, for the most part, the ideas and tools have been presented relatively independently of one another. However, in the process of their development, we've used them in conjunction with one another. Furthermore, we believe this is how they should be used. The concepts and tools not only complement one another, but they give a richer, more integrated view of complex problems and messy systems, which both require. In short, this chapter not only shows how all of the tools relate to, but need to be used in conjunction with one another.*

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Throughout this book, we have tried to draw connections between the various ideas and tools we've developed. Still, for the most part, the ideas and tools have been presented relatively independently of one another. However, in the process of their development, we've used them in conjunction with one another. Furthermore, we believe this is how they should be used. The concepts and tools not only complement one another, but they give a richer, more integrated view of complex problems and messy systems, which both require.

While we could use any of the concepts and tools on which to overlay the others, we want to use the idea of an Enterprise Operating Design as the framework for our discussion. The reason is that it is people acting within enterprises that not only create, but use fundamental concepts and tools. And, different types of people within different types of operating designs use them differently. To see this, we want to relate the tools we have discussed to the characteristics of three different, general Enterprise Operating Systems.

Enterprise operating design

First of all, we need to define an Enterprise Operating Design. An Enterprise Operating Design is the totality of how an enterprise, whether it's a for-profit business, a non-profit enterprise, or a governmental agency, identifies the primary stakeholders and organizations it wants to serve. It also defines and differentiates the major products or services it intends to offer. It includes as well how it defines the tasks it will perform itself, those it will outsource, organize its resources, describe its products or services, create benefits for customers, and create profits and/or covers its costs. In short, it is the entire system for delivering benefits to people plus the entities it chooses to serve. Enterprises—more generally organizations—may offer products, develop technologies, and provide services, but whatever they offer are embedded in a comprehensive system of activities and relationships that represents the Enterprise's Operating Design.[1]

The range of enterprise operating designs

One of the prime characteristics of the 21st century is that the digital world has multiplied the designs of businesses and organizations

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considerably. In particular, it has created the possibility of a broader range of enterprise designs within which innovations can take place.[2]

In order to show the current range of operating design alternatives, we describe three prototypes that span current thinking.

Three short descriptive labels capture the characteristics of the designs:

- Make-and-sell
- Sense-and-respond
- Anticipate-and-lead.

The following descriptions are merely illustrative. For example, in *Adaptive Enterprise*,[3] Steve Haeckel provides a more complete description and broader insight into the sense-and-respond business design than that which is presented here.

I. Make-and-sell

A *make-and-sell* operating design does just what its name implies: Based on its past experience and current market research, the firm predicts what the market will demand.

Make-and-sell consists of providing goods and services that satisfy needs or desires that consumers currently have and are aware of. The success of this design is the ability to predict demand correctly over the period of time within which the enterprise aims to gain expected returns on its capital investments or achieve its goals based on the resources necessary to deliver its products and/or services.

A *make-and-sell* enterprise relies primarily on interchangeable parts and economies of scale. It views itself as an efficient mechanism—literally a machine—for making products and/or services. It depends on people who can execute pre-defined procedures in accordance with a prescribed operating plan. Performance is based on benchmarking and best practices.

Dominant leadership personality: the "inner directed" producers[4]

Industrious and dedicated, driven by their "psychological gyroscope," those who best fit with a *make-and-sell* enterprise run their lives by a daily routine that focuses on doing what they have always done, only

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better. Believing strongly that change is evolutionary, they assure success by continual improvement in how they have conducted business over the years. They challenge all claims of radical change, and they possess the right set of interpersonal skills to persuade others they are on the right path. Others see them as conservative traditionalists.

Jungian Framework

It doesn't take much to see that this design appeals primarily to Sensing-Thinking Types (STs).

Strategic Assumption Surfacing and Testing (SAST)

This design uses the SAST process, with a primary emphasis on identifying the critical assumptions that need to be considered within each of its stakeholder operating groups.

The TAS

This design uses the TAS process, with a primary emphasis on determining the validity of issues within their operating group.

II. Sense-and-respond

A *sense-and-respond* operating design starts with the basic belief that the future is neither predictable nor controllable. Therefore, it organizes itself to respond to what is actually happening, as opposed to what was forecasted to happen. *Sense-and-respond* seeks to provide products or services that satisfy needs or desires that customers are aware of but are not being satisfied by the current market. It starts by reaching out to selected markets or constituencies. It asks them, "Help us to identify your needs and let's work together to satisfy them."

A *sense-and-respond* organization sees itself as an adaptive system for responding to an ever-changing and ever-widening range of requests. It is built around dynamically linked sub-processes. It relies primarily on economies of scope, rather than economies of scale to operate profitably.

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The people in a *sense-and-respond* environment are empowered and accountable and spend their time producing customized outcomes in accordance with an adaptive business design.

Dominant leadership personality: the "other directed" adapters

With their "psychological radar" always on, those in a *sense-and-respond* organization recognize that as the environment becomes increasingly unpredictable, it becomes necessary to give up the belief in the complete control of procedures and processes. Instead, one needs to design and control the right organizational settings within which people who are empowered can improvise and adapt to changing circumstances.[5]

The people who are attracted to a *sense-and-respond* organization want to be part of a team that prides itself on knowing sooner and responding faster to changing customer needs. Alert and vigilant, they seek at all times to know the current needs of individual customers. They invest deeply in understanding the underlying values that drive them. Like a bow-and-arrow game hunter, they aim just ahead of market, basing their aim on a pattern of emerging knowledge about customers, society, and business practice. Others see them as externally driven internal-change agents.

Jungian Framework

Obviously, this design appeals to NTs and NFs.

We leave it as a problem for the reader to figure out how this type would use the TAS and SAST.

III. Anticipate-and-lead

An *anticipate-and-lead* operating design assumes the future is largely determined by what an enterprise purposefully creates in order to change things, not by how it responds to signals from the people or entities it wants to serve. The mind-set is different from *make-and-sell* and more like *sense-and respond* in that the *anticipate-and-lead* enterprise accepts the fact that it cannot predict what the market is likely to want. *The*

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anticipate-and-lead enterprise focuses on the future it wants to create. Once that future is specified, the enterprise attempts to lead people or entities to new ideas based on identifying both articulated and unarticulated needs. The deep understanding of these needs are sometimes gleaned from direct observation of the behavior, including what people or entities would prefer that is not now available from among the existing list of current and future products and services.

The ability to *anticipate-and-lead* is facilitated by emerging digital technologies. Observing real-time market and actual consumer behavior and tying those findings directly to the decision process of an enterprise enable timely and effective decision-making. Although the techniques used may be similar to those used in a *sense-and-respond* operating design, the purpose to which they are used is very different. The purpose is to go beyond what is being asked for and to cause a future condition more favorable to the enterprise and the people or entities it chooses to serve. Performance is measured by the enterprise's share of truly new and well-accepted products or services. Evaluation of best practices is replaced by the determination to develop the next best practice.

Dominant leadership personality: *Visionary designers*

Their broad interests in both topics and people help those who are attracted to *anticipate-and-lead* organizations draw seemingly unrelated things together, yielding unforeseen synergies. The manner with which they sense possibilities and how to address them makes them enthusiastic and confident about their solutions. They seize upon the most viable ideas and attempt to make them real. They possess a high degree of both introspective and interpersonal abilities and are comfortable both within the solitude of their own ideas and in the social world. They rely on their own judgments in the face of doubt from others and it is the power of their convictions that gets them through even the rockiest of times. Others see them as adventurous inventors.

Jungian Framework

Once again, NTs and NFs are attracted to this design. But, it especially appeals to those who are balanced on Introversion and Extraversion

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as they have to be comfortable with worlds inside and outside of them.

We also leave it to the reader as a problem to figure out how this type would use the TAS and SAST.

Concluding remarks

That the world is more complex and becoming increasingly more complex with every passing day is by now a commonplace idea. What is not commonplace and not likely to be so is the continual search and development of ideas and tools to cope with increased complexity. We hope that the ideas and tools discussed in this book are a fruitful place with which to start.

Notes

1 This definition is an adaptation of a Business Design developed by Slywotzky, Adrian, *Value Migration*, Harvard Business School Press, Boston, 1996, p. 4.

2 Prahalad, C.K., and Ramaswamy, Venkat, *The Future of Competition: Co Creating Unique Value with Customers*, Harvard Business School Press, Boston, 2004; Kotler, Philip, Jain, Dipak, and Maesincee, Suvit, *Marketing Moves*, Harvard Business School Press, Boston, 2002; Wind, Jerry, Mahajan, Vijay, and Gunther, Robert, *Convergence Marketing*, Prentice Hall, Upper Saddle River, New Jersey; Slywotzky, Adrian, and Morrison, David, *How Digital Is Your Business?* Crown Business, New York, 2000.

3 Haeckel, Stephan, *The Adaptive Enterprise*, Harvard Business School Press, Boston, 1999.

4 Riesman, David, *The Lonely Crowd*, Yale University Press, 1950, New Haven, issued as Yale Paperbound, June 1961, pp. 15–16. In his penetrating review of 20th century social character, Riesman identified a range of personality types. Among them were a group he described as inner directed that had "one thing in common: the source of direction for the individual is 'inner' in the sense that it is implanted early in life by the elders and directed toward generalized but nonetheless inescapably destined goals." Riesman used the metaphor of a psychological gyroscope, which once set by external forces keeps the inner directed person on course. In discussing the metaphor Riesman commented, "This metaphor of the gyroscope, like any other, must not be taken literally. I would be a mistake to see the inner directed man as incapable of learning from experience or as insensitive to public

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opinion in matter of external conformity. He can receive and utilize certain signals from outside, provided that they can be reconciled with the limited maneuverability that his gyroscope permits him. His pilot is not quite automatic."

5 Riesman, David, *The Lonely Crowd*, p. 21. Riesman uses the metaphor of radar to distinguish between the "other directed" and "inner directed" personality types. "What is common to all the other-directed people is that their contemporaries are the source of direction for the individual—either those known to him or those with whom he is indirectly acquainted, through friends and through the mass media. This source is of course 'internalized' in the sense that dependence on it for guidance in life is implanted early. The goals toward which the other directed person strives shift with that guidance; it is only the process of striving itself and the process paying close attention to the signals from others that remain un-altered throughout life."

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Appendix: The Census Privacy and Data Use Workshop

Abstract: *Appendix is a description of a special SAST workshop that the Census Bureau held with regard to the issue of privacy.*

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The following is a description of a special SAST workshop that the Census Bureau held with regard to the issue of privacy.

In 2002, on two occasions, the Department of Homeland Security (DHS) called the Census Bureau and asked for data.

In the first instance, after discussing its request, the Census Bureau gave DHS a table providing estimated counts of persons of Middle-Eastern ethnicity who were living in locales of 10,000 or more. In the second instance, the Census Bureau provided estimates of various Middle-Eastern ethnic communities by ZIP code areas of approximately 8,500 people. In both instances, the data provided were already available to the public on the Census Bureau's website.

In 2004, the Electronic Privacy Information Center, EPIC, issued a Freedom of Information Act request. When the Census Bureau's response to DHS became public, the data provided by the Bureau raised serious concerns that affected perceptions about the Bureau's practices. Because of these concerns, Director Louis Kincannon asked Barabba to conduct a meeting similar to the Census Undercount meetings to help the Bureau determine how to address the concerns that were raised.

Since U.S. society as a whole and virtually all companies and institutions are grappling with privacy, the relevance of the workshop extends far beyond the Bureau. Indeed, it raises many of the same issues and questions with which many organizations and institutions are struggling.

Introduction

In a democracy like the United States, protection of the rights of individuals, and, at the same time, ensuring their ease of access to vital information are fundamental. In this context, the U.S. Census Bureau has two important tasks:

1. Recognize and respect the rights of individuals, and
2. Provide important information so that individuals, government agencies, and private-sector organizations are able to make well-informed decisions.

A Privacy and Data Use Workshop was held on March 2–4, 2005, in Santa Cruz, California. The participants included a wide variety of individuals from diverse fields who were experienced in privacy issues and the use of data. It also included executives from the Census Bureau. In

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addition there were participants from both the Arab American League and the Civil Liberties Union.

Starting points

Three different teams were formed to represent diverse perspectives with regard to the issue of privacy and the use of data. Each participant was assigned to one of three teams and was required to defend his or her team's position in accordance with the nature of Dialectic Inquiry. That is, each person was to do everything in his or her power to make the strongest case they could for their team's position.

One of the prime features of Dialectic Inquiry is that the positions that are developed need to be as strongly opposed as possible. This helps to make for the strongest possible resulting debate. In this regard, it is important to note that the participants did not have to agree with the position of the team to which they were assigned or with any of the three for that matter. Furthermore, in order to enhance participation, develop a greater sense of identity with a particular position, and thus to role-play it as much as possible, members were asked to give their team a short, descriptive name that captured the "spirit" of their position.

The following is a brief summary of the starting positions that were used by the teams in their initial discussions.

Group A—"Publish or perish"

This group strongly supported and defended the position that the value of knowledge—being able to know—overwhelmed any concerns that individuals might have that they might be negatively affected by being identified, either directly or indirectly by inference, that they were members of or associated with a particular group, geographical area, or philosophical position. The basic focus of this position was on ensuring that relevant and useful information was provided to the public and private sectors for the purpose of greater understanding and effective actions to help improve social and economic conditions.

Group B—"Don't ask, can't tell"

This group defended the position that "when things are perceived as real, they are real in their consequences." Even those individuals who

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were identified only by indirect inferences would still believe that the information they provided to the Census Bureau under the promise of strict confidentially was breached and therefore released without their permission. As a consequence, the inevitable anecdotes and stories of what happened to them would discourage future participation in the collection activities of the Bureau. (The same is obviously true of companies and organizations in the private sector.)

The primary focus of this position was on the efficient and effective collection of accurate information. A central belief was that complete access to incomplete and inaccurate information does not lead to greater understanding that benefits either individuals or society. In other words, one needs as much complete and accurate information as possible to help improve individuals and society.

Group C—"Trust US (ultimate stewards)"

This group's position was that the Census Bureau would address reality as well as the perceptions of reality. The reality is that the law protects individual responses to census forms. Rules of access to aggregated information allow important information to be accessed without having a direct negative effect on individual respondents. The Census Bureau will use and communicate procedures designed to overcome the fears of individuals that arise from perceptions that participating in the census can have negative personal consequences.

Assumption surfacing

Each group developed a list of stakeholders that it thought had any bearing on decisions related to privacy and the dissemination of data. Team members were also asked to think of other persons or groups that might have an interest in decisions related to privacy and data use but had not made themselves known or whose interests had not yet been recognized.

During the process of identifying stakeholders, the groups also identified assumptions that were necessary to support their group's position. The final list of assumptions was limited to those that were deemed to be the most critical. They were ranked according to their importance and degree of certainty.

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Debate

Each group's assumptions along with their associated rankings of relative importance and certainty were presented in a plenary session. Before the debate of assumptions was undertaken, the only questions allowed at this point were those that clarified the meanings of the assumptions. No arguments were allowed at this point in order to facilitate the presentations.

Mixing the presentation of assumptions and the debate only confounds and confuses matters. Thus, we have found it best to separate them.

After all of the assumptions were presented, the groups met individually to determine which assumptions from each of the other groups that if true would be the most damaging to their group's position. The most damaging assumptions were identified and debated in a plenary session.

Although the nature of the damaging assumptions, as well as their importance and certainty rankings, was the basis of the debate, the discussion focused primarily on how to address privacy concerns, the content of censuses and surveys, and the dissemination of important data. As a result of the discussion, five issues that surfaced continually during the debate were identified as crucial.

1. What is the process by which the Census Bureau exercises discretion in determining how and what to collect, and to distribute it?

Experience has shown that as long as the Census Bureau operates in a manner that is neither arbitrary nor capricious, the Administration, Congress, the Courts, and the general population have given it wide latitude to operate in the manner in which it performs its functions. In order to fulfill the constitutional mandate of taking a Census of the Inhabitants of the U.S. and to gather reliable information to assist society in improving economic and social conditions, the Census Bureau is in this context a steward of the public trust. Current law within which the Census Bureau operates provides it with sufficient direction and protection to perform its function.

The Census Bureau has more discretion in some matters than in others. In the context of the decennial and economic censuses, the Census Bureau may not have discretion on whether to include or exclude a particular topic, but it has some discretion about how to phrase or design a question or questions with regard to a topic.

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Some of the methods that the Census Bureau has used in exercising discretion include:

- Review of best practices from outside entities.
- Consultation with stakeholders—Congress, state, and local governments, advisory committees, non-government organizations, and so forth.
- Testing and reporting—Evaluating alternative wordings that may improve the quality of reporting and reporting.
- Tabulation plans—Extensive consultation with over eighty federal agencies, all state governments, local governmental representatives through various associations or their membership in advisory groups, and so forth.
- Notices in the Federal Register—Formal notices on questionnaires, with the opportunity to comment.
- Implementation of internal policies.

Suggestions to clarify the issue of discretion that emerged included:

- Maintain a sufficiently high public profile so that the public knows the work of the Bureau.
- Develop a typology of those areas where the Census Bureau has degrees of discretion and the methods used to exercise that discretion, including professional and ethical standards/principles/guidelines.
- Discuss distribution of content and geographic detail.
- Create illustrative tabulations.
- Obviously, other non-governmental organizations and institutions do not necessarily face the same operating conditions and stringent mandates of the Bureau, but in the spirit of innovation (NT/NF), every organization and institution can learn from the Bureau. Indeed, it needs to ask, "What activities and procedures can we modify and adapt?"

2. Does the Census Bureau need to address inferential harm?

Inferential harm occurs when an individual is identified with a group of other individuals (either as a specific type of person or one who is living within a specific geographical area) and someone or some organization takes an action against that group that is seen as harmful both by the group and the individuals within it. The Census Bureau uses every

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possible means to ensure that no single individual is identified, although aggregate information could result in harm to groups, and hence to the individuals in those groups. Alternatively, the same practices are used when actions are taken that are beneficial to the same individuals that make up the specific group.

3. If the Census Bureau collects information, is it thereby compelled to report it?

Allowing the Census Bureau to make judgments on the release of information based on whether it would be used poorly or not would, in effect, provide a mechanism to control sensitive areas. Ideally, democratic processes have ways to address what are good and bad uses of information. The Census Bureau's mission is to be an impartial provider of data and information about the people and the economy of the United States to a wide range of users, subject of course to the obligation to protect the confidentiality of individual respondents. The best option available to the Census Bureau to avoid inferential harm is to not collect the information in the first place.

However careful the Census Bureau is in dealing with the collection and dissemination of information from which inferential identification can be made, it is imperative that the Bureau continue to take whatever actions are necessary to ensure that no individual data are identified directly from census records or reports.

Suggestions for clarifying this issue included:

- Develop a preparedness plan to deal quickly and transparently with real or perceived violations of the pledge of confidentiality. (In effect, this is a Crisis Management plan.)
- Increase internal awareness of how respondents interpret concepts such as privacy, confidentiality, disclosure, and statistical purposes.
- Obtain input from appropriate advocacy groups to understand respondents' expectations of the Census Bureau's promise of confidentiality.
- Develop and maintain a list of data uses that have resulted in benefits to specific groups.

4. How can the dialogue between the Census Bureau and its stakeholders be enhanced?

Hopefully, by improving the quality and distribution of census information, the Census Bureau can motivate individuals and groups to realize

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that the benefits of participating in the census outweigh any potential harm. The issue of real or perceived harm to a group or individual is important to the Census Bureau in that media coverage of "harmful" events can affect respondents who may also feel they can be harmed by inferential identification when they participate voluntarily, either by sending in their census form or by making themselves available to follow-ups due to their nonresponse.

It is imperative that the Census Bureau design systematic outreach programs for groups that may consider themselves at risk. The distribution of compelling stories about how census information has been used in ways that have benefited groups and individuals could reflect positively on the Census. It is also important that individuals and groups understand the benefits and risks associated with census participation as well as Census Bureau privacy-related principles and procedures that ensure minimal intrusion and protect data confidentiality.

Possible measures to be taken to clarify this issue:

- Attitude-behavior research on privacy, confidentiality, sensitive topics, modes of collection (including online), and other areas that may affect response and how these attitudes vary by race and ethnic group, age, socioeconomic status, and so forth.
- As an alternative to the above, which could be expensive and require extensive research and analysis over time, use private-sector research on attitude and behavior to create proxy studies on response rates and use results to design more effective publicity campaigns and outreach activities.
- Explore the use of in-depth, one-on-one interviews to understand respondents' attitudes and behavior better and apply the results from such interviews to the design of questionnaires and communication strategies.
- Explore the use of continuous partnerships with schools and private corporations, essay competitions, incentives, and so forth.

Some of the suggestions for enhancing dialogue included:

- Explore opportunities for greater diversity and additional engagements by the Advisory Committees, including expanding the role of members that represent specific groups to serve as liaisons with those communities.

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- Develop a mechanism that would allow for in-depth discussions of privacy issues.
- Explore alternate mechanisms for input on issues of importance to the Census Bureau.
- Expand the use of electronic links by Census Information Centers (CIC) to include organizations and communities of interest.
- Examine literature on emerging mechanisms for identifying key social networks (points-of-contact) of communities of interest.

5. How can we ensure that technology has positive and not negative effects?

The users of private and public data have successfully related the aggregated information of the Census Bureau with their own information on individuals through advanced statistical techniques. For example, if an organization's data correlate with census characteristics, then an organization relates its data to the census's by assigning the averages of census income or education statistics to individuals in the organization's data.

There is the danger that some data users may attempt to use special software and their own information about specific individuals to attach personal identifiers to Census data. The Census Bureau needs to reach out to these groups and attempt to persuade them of the long-term negative consequences of their actions especially if the respondents who provided information on the promise of confidentiality believe such firms can actually identify an individual's specific census information.

Suggested measures to help clarify the issue included:

- Continue research and development of new, enterprising methods of maintaining confidentiality, such as synthetic data.
- Review applications of technological solutions to privacy issues by industry, other government agencies, and other countries.

6. How does the Census Bureau design robustness into operations to address future conditions and unintended consequences?

Time and again, the Census Bureau has conducted the enormous tasks associated with the conduct of the decennial censuses while keeping pace with changing times and technology. In doing so, it has addressed confidentiality, privacy, and data access. In planning for future censuses,

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the Census Bureau needs to address the current environment, including terrorist threats, and security issues.

The American Community Survey (ACS) is the latest example of the Census Bureau's efforts to keep pace with the nation's changing needs and increasing demands for data. The ACS brought about significant changes to the way the Census Bureau does business.

Possible measures to be taken to clarify this issue included:

- Use systems thinking, including the use of tools such as SAST, to achieve an idealized design for future censuses.
- Study the implementation of the ACS to gain greater insight into the broader implications of evolutionary change based on idealized design.
- Develop a plan for a minimalist census in case of a catastrophic event; include the use of alternate technologies and the role of partnership organizations, such as schools.
- Increase awareness that internal support or resistance might not result in the expected outcome. For example, how responders interpret concepts like privacy and confidentiality may change over time, regardless of dissemination or other constraints to protect privacy.

Conclusion

The Privacy and Data Use Workshop succeeded in surfacing assumptions that had been implicit prior to it. As a result of the exercise, the Census Bureau achieved a better understanding of the issues, assumptions, and concerns related to privacy and data use.

The SAST exercise began by looking at the relative importance of factors related to privacy and data use. The Census Bureau now plans to conduct an assessment of the current state of knowledge for each issue and prepare a list of information needs and sources that would help address current and emerging concerns related to privacy and data use. The list would also include information needed to address privacy and data use issues in the context of data collection, census/survey content, data dissemination, and so forth. The list of information needs will then be examined to determine the feasibility of specific items in light of available staff and financial resources.

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