A REVIEW OF SCENARIO PLANNING LITERATURE

by

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INTRODUCTION

As the world progresses further into the knowledge age, organizations are faced with an increasing need to respond quickly to a variety of changes. Uncertainty is becoming an important factor for business leaders and planners to consider. In such a rapidly changing business environment, the ability to adapt quickly to major changes can mean the difference between a thriving business and bankruptcy. These changes are often external to the organization, and coping with them has forced managers and executives to adopt a systems view of business. With global complexities and changes likely to continue on the current path of growth, the future of the global business environment will require an even more thorough ability to examine the forces of change and anticipate possible solutions to potential problems.

A well known method for coping with future changes in organizations has been strategic planning. While this approach has yielded some insight about how organizations can anticipate and cope with change, it has not proven its ability to inform organization leaders about massive political, environmental, economic and/or societal changes. Another school of thought on strategy has emerged in scenario planning. Rather than claiming an ability to predict the future, scenario planners advocate the telling of multiple stories that cover a variety of plausible future occurrences. This method opens organization eyes to a vast future landscape. With a focus on long- and short-term stories about the future, scenario planning forces organizational planners to consider paradigms that challenge their current thinking. Scenario planning encourages organizational leaders to think the unthinkable. Scenario planning has been identified as a useful means of conducting strategic organizational planning. While the area of scenario planning has undergone significant change in the last three decades (Georgantzas and Acar, 1995; Micklethwait and Woolridge, 1997; Ringland, 1998) the development and application of scenarios is just beginning.

Rationale and Methodology

In constant pursuit of methods for increasing organizational ef-

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fectiveness and profitability, business leaders have sought to understand the environments in which they operate. According to Cummings and Worley (2001), because organizations are open systems, they must strive to achieve the best possible fit with the external environment. Several methods, including strategic planning, open systems planning, integrated strategic change and transorganizational development have surfaced to help organizational leaders achieve such alignment. Scenario planning has proven to be an effective method for identifying critical future uncertainties and investigating "blind spots" in the organization (Kahane, 1999).

A conceptual review, analysis and synthesis of related scholarly literature has resulted in the formulation of this manuscript, which is intended to describe the current status of the body of knowledge surrounding scenario planning. There are many aspects of scenario planning that appear to require further research, however, not enough is known about the field to delve immediately into these areas. Some of these aspects are described herein to help frame the topic. These areas include scenario planning's impact on decision-making capabilities, long- and short-term impacts, theory and methodology, and the limited expertise available for conducting scenario planning.
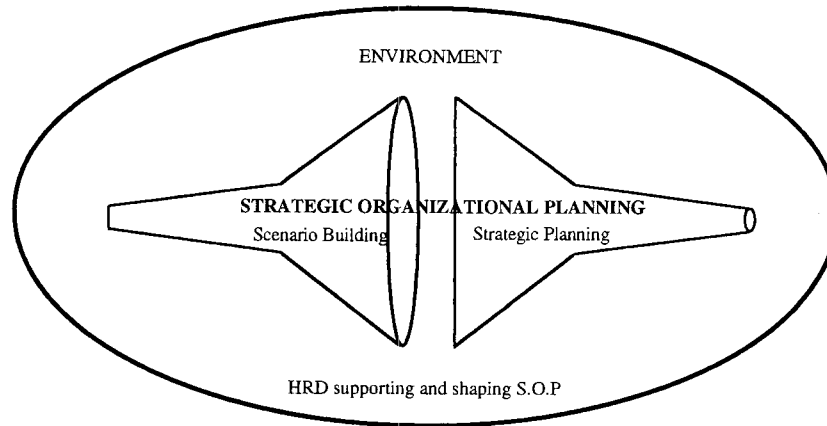
WHAT IS SCENARIO PLANNING?

Scenario planning has been defined in several ways. Michael Porter (1985) defined scenarios as "an internally consistent view of what the future might turn out to be—not a forecast, but one possible future outcome". Schwartz (1991) defined scenarios as "a tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out". Ringland (1998) defined scenario planning as "that part of strategic planning which relates to the tools and technologies for managing the uncertainties of the future". Schoemaker (1995) offers "a disciplined methodology for imagining possible futures in which organizational decisions may be played out" as a definition for scenario planning.

It is necessary to note here that, even among the most prolific writings on scenarios, it was difficult to find crisp definitions that capture the true meaning of scenario planning. The distinguishing factor for scenarios is that they are not predictions or forecasts. Scenarios are not concerned with getting the future "right", rather they aim at challenging current paradigms of thinking and broadcast a series of stories in which attention is directed to aspects that would have been otherwise overlooked (Shoemaker, 1995). Scenario stories can then be filtered into a process such as strategic planning as in the "Strategic Organizational Planning (SOP) model" (Swanson, Lynham, Ruona, and Provo, 1998, see Figure 1) integrating aspects of all of the

developed scenarios, but the process of building scenarios is separate (Mintzberg, 1994).

FIGURE 1 - STRATEGIC ORGANIZATIONAL PLANNING (SOP)

In order to frame the process of scenario planning, a summary of the major themes in the literature is presented here and these themes are explored in greater depth in later sections. It is necessary to determine the impact that participation in scenario planning can have on business members, decision-making capabilities because they are directly related to business results (Schwartz, 1991). Scenario planning requires extensive time and financial resources and has been a coveted art with only a select few understanding the application methodologies. The long- and short-term impacts of scenario planning are not fully understood, and the theory behind scenario planning is not firmly set in place (Georgantzas and Acar, 1995; Ringland, 1998; Schwartz, 1991; van der Heijden, 1997). Scenario planning as a change intervention also has the potential to affect the lives of all employees in entire business systems (Georgantzas and Acar, 1995; van der Merwe, 1994). Because of limited expertise, scenario planning is unavailable to many organizations, and the intensity of involvement, attention to detail and the scope of the methodology have made scenario planning an activity in which only the most financially secure companies can participate (Wack, 1985b).

An understanding of the changes in decision-making capabilities of scenario planning participants is necessary to determine precisely how organizational performance can be enhanced. Little is known about the effects, both short- and long-term, of scenario planning, and how those effects impact the capabilities of business leaders to

make decisions. Furthermore, there are a variety of opinions regarding the construction of the methodology for conducting scenario planning (Georgantzas and Acar, 1995; Ringland, 1998; Schwartz, 1991; van der Heijden, 1997). With business applications developing mainly out of practice (Wack, 1985; Ringland, 1995; van der Heijden, 1997) scenario planning as a field has not had the opportunity to establish strong theoretical roots (Georgantzas and Acar, 1995). The absence of explicit theoretical roots has led to the application of scenario planning as something of a "club members only" philosophy, and there is a strong community of practicing scenario planners who have not the time to reflect upon the implications of their organizational interventions. This predicament is reminiscent of the conditions which led to the collapse of strategic planning in organizations in the 1970s (Mintzberg, 1980; Ringland, 1998). In hopes of gaining some insight to the current status of knowledge around scenario planning, this paper is intended to provide a description of the field through an intense review of the available literature.

An analysis of scenario planning literature has revealed several themes and objectives. Major themes include history, scenarios as stories, the theory of scenarios, the effects of scenarios on decision-making capabilities, creating "future memory" from scenarios, scenarios as tools for organizational learning, and the evaluation of scenario projects. These themes run consistently throughout the available material, although the details are often lacking. It is our intent to examine these themes in as detailed a manner as the literature provides.

HISTORY OF SCENARIO PLANNING

Scenario planning first emerged for application to businesses in a company set up for researching new forms of weapons technology in the RAND corporation. Kahn (1940) of RAND corporation pioneered a technique he titled "future—now" thinking. The intent of this approach was to combine detailed analyses with imagination and produce reports as though they might be written by people in the future. Kahn adopted the name "scenario" when Hollywood determined the term outdated and switched to the label "screenplay". In the mid-1960s, Kahn founded the Hudson Institute, which specialized in writing stories about the future to help people consider the "unthinkable". He gained most notoriety around the idea that the best way to prevent nuclear war was to examine the possible consequences of nuclear war and widely publish the results (Kahn, 1963).

Around the same time, the Stanford Research Institute began offering long-range planning for businesses that considered political,

economic and research forces as primary drivers of business development. The work of organizations such as SRI began shifting toward planning for massive societal changes (Ringland, 1998). When military spending increased to support the Vietnam War, an interest began to grow in finding ways to look into the future and plan for changes in society. These changing views were largely a result of the societal shifts of the time.

The Hudson Institute also began to seek corporate sponsors, which exposed companies such as Shell, Corning, IBM and General Motors to this line of thinking. Kahn then published "The Year 2000" (Kahn and Weiner, 1967), "which clearly demonstrates how one man's thinking was driving a trend in corporate planning" (Ringland, 1998). Ted Newland of Shell, one of the early sponsors, encouraged Shell to start thinking about the future.

The SRI "futures group" was using a variety of methods to create scenarios for the United States education system for the year 2000. Five scenarios were created, and one entitled "Status Quo Extended" was selected as the official future. This scenario suggested that issues such as population growth, ecological destruction, and dissent would resolve themselves. The other scenarios were given little attention once the official future was selected. The official future reached the sponsors, the US Office of Education, at a time when Richard Nixon's election as President was in full swing. The offered scenario was quickly deemed impossible because it was in no way compatible with the values that were advocated by the leader of the country (Ringland, 1998). SRI went on to do work for the Environmental Protection Agency with Willis Harmon, Peter Schwartz, Thomas Mandel and Richard Carlson constructing the scenarios.

Meanwhile, Professor Jay Forrester (1961) of the Massachusetts Institute of Technology was using similar concepts to describe supply and demand chains. The use of scenario concepts in his project was intended more to develop a model which would help people understand the nature of growth and stir up public debate. The results were published by Meadows in 1992 (Meadows et al, 1992). Scenario planning at Shell was well on its way. Ted Newland and Pierre Wack suggested in 1967 that thinking six years ahead was not allowing enough lead time to effectively consider future forces in the oil industry (Wack, 1985a). Shell began planning for the year 2000. When the Yom Kippur war broke out and oil prices plummeted, Shell was prepared. The ability to act quickly has been credited as the primary reason behind the company's lead in the oil industry (van der Heijden, 1997).

Shell's success with the scenario planning process encouraged numerous other organizations to begin thinking about the future. Because the oil shock was so devastating to views of a stable future, by the late 1970s the majority of the Fortune 1000 corporations had

adopted scenario planning in one form or another (Ringland, 1998).

The success of scenario use was short lived. Due to the major recession and corporate staffing reductions of the 1980s, scenario use was on the decline. It is also speculated that planners over-simplified the use of scenarios, confusing the nature of story telling with forecasting (Ringland, 1998; Godet and Roubelat, 1996). According to Kleiner (1996), the time had come for managers to realize that they did not have the answers. Michael Porter (1985) led a "back to the basics" approach, suggesting that corporations use external forces as a platform for planning. In this time of evaluating how planning happens, many consulting firms began developing scenario planning methodologies. Huss and Honton (1987) describe three approaches of the time; 1) intuitive logics, introduced by Pierre Wack 2) trend-impact analysis, the favorite of the Futures Group and 3) cross-impact analysis, implemented by Battelle. Shell continued to have success with scenarios through two more oil incidents in the 1980s and slowly, corporations cautiously began to re-integrate the application of scenarios in planning situations. Scenario planning has been adopted at a national level in some cases, and its methods have been successful in bringing diverse groups of people together (Kahane, 1992; van der Merwe, 1994).

PARADIGMS IN STRATEGY

Because scenarios are closely related to strategic planning, it is necessary to outline the prevailing strategic views. Thinking on strategy within the last few decades has revealed the development of schools of thought in strategic perspectives. In order to place scenario planning in context, it is important to consider the backgrounds of each of these views. Van der Heijden (1997) identifies three overarching paradigms of strategic management and planning: the rationalist, evolutionist and processural.

The Rationalist School

The rationalist school features a tacit and underlying assumption that there is indeed one best solution. The job of the strategist becomes one of producing that one best solution, or the closest possible thing to it. Classic rationalists include Igor Ansoff, Alfred Chandler, Frederick Taylor and Alfred Sloan (Micklethwait and Woolridge, 1997). The rationalist approach to strategy dictates that an elite few of the organization's top managers convene, approximately once each year, and formulate a strategic plan. Mintzberg (1990) lists other assumptions underlying the rationalist school:

- Predictability, no interference from outside

- Clear intentions
- Implementation follows formulation
- Full understanding throughout the organization
- Reasonable people will do reasonable things.

The majority of practitioners and available literature on strategy are of the rationalist perspective (van der Heijden, 1997). Although it is becoming clear that this view is limited, and as the belief in one correct solution wanes, the rationalist perspective is still currently alive and well.

The Evolutionary School

With an emphasis on the complex nature of organizational behavior, the evolutionary school suggests that a winning strategy can only be articulated in retrospect (Mintzberg, 1990). In this context, it is believed that systems can develop a memory of successful previous strategies. In this case, strategy is thought to be a "process of random experimentation and filtering out of the unsuccessful" (van der Heijden, 1997). The issue with this perspective is that it is of little value when considering alternative futures. This view also reduces organization members to characters of chance, influenced by random circumstances.

The Processural School

The processural school asserts that, although it is not possible to deliver optimal strategies through rational thinking alone, organization members can instill and create processes within organizations that make it a more adaptive, whole system, capable of learning from its mistakes (van der Heijden, 1997, 2000). Incorporating change management concepts to influence processes, the processural school supports that successful evolutionary behavior can be analyzed and used to create alternative futures. Van der Heijden (1997, 2000) offers the following examples of metaphors for explaining the three strategic schools:

- The rationalistic paradigm suggests a machine metaphor for the organization
- The evolutionary school suggest an ecology
- The processural school suggests a living organism.

Because van der Heijden views scenarios as a tool for organizational learning, he advocates the integration of these perspectives. "Organizational learning represents a way in which we can integrate these three perspectives, all three playing a key role in describing

reality, and therefore demanding consideration" (van der Heijden, 1997). It is widely accepted that effective scenario building incorporates all three of these perspectives (Ringland, 1998; Georgantzas and Acar, 1995; Schwartz, 1991).

SCENARIO THEORY AND METHODOLOGY

There are three overarching approaches to scenario building and development. Kahn emphasized the application of reasoned judgment and intuition as a very qualitative approach to scenario planning (Kahn and Weiner, 1967). This approach was rooted in the beginnings of the science of futurology. Management scientists Amara and Lipinski (1983) applied a quantitative approach that they labeled operational research/management science (OR/MS) using structural algorithms and mathematical modeling (Georgantzas and Acar, 1995). The process quickly became computer driven. In an attempt to provide a solid middle ground, Millet and Randles (1986) generated procedural scenarios that incorporated intuitive and quantitative techniques.

Because it is the most detailed account of building scenarios, this section will concentrate on the theory and methodology proposed by van der Heijden (1997). Many established scenario planners are reluctant to completely disclose their methodologies, and perhaps rightly so. An overview of other methodologies is given in this section following a more detailed description of the process advocated by van der Heijden.

At the core of scenario planning, Kees van der Heijden (1997) identifies the concept of the business idea. "The business idea is the organization's mental model of the forces behind its current and future success". The business idea is constructed of principles, namely, profit potential and distinctive competencies. Profit potential refers to 1) creating a surplus for stakeholders, and 2) creating the expectation that a surplus will exist and grow in the future. Distinctive competencies are not "strengths"; rather, they are unique competencies "based on tacit uncodified knowledge that cannot be copied". Based on Rumelt's (1987) work, van der Heijden identifies a list of five main sources of distinctiveness in two categories:

- Uncodified institutional knowledge
  In networked people
  In embedded processes.

- Sunk costs/irreversible investments
  Investments in reputation
  In legal protection
  In specialized assets.

Realized uniqueness in two of these sources can combine to form a competitive advantage, or unique capabilities that cannot be copied which contribute to profit potential. The business idea is mapped as a systemic structure specifying the customer value created, the nature of the competitive advantage, the distinctive competencies and a positive feedback loop (Figure 2).

The articulation of the business idea brings out the current position of the organization and specifies the conditions required in order to create a surplus of resources. The business idea also makes explicit the constraints to creating the surplus. In the process of mapping the business idea, organizations may encounter "limits to growth". Porter (1980) identifies five limiting elements in his Five Force competitive model: 1) demand limits, 2) supply limits, 3) competition limits, 4) limits imposed by the possibility of new entrants, and 5) limits imposed by possible alternative and product or service substitutes. The business idea provides a powerful tool as it makes internal view of the organization explicit and does so in a holistic concept showing how the organization fits with the external environment (van der Heijden, 1997).

FIGURE 2 - THE GENERIC BUSINESS IDEA
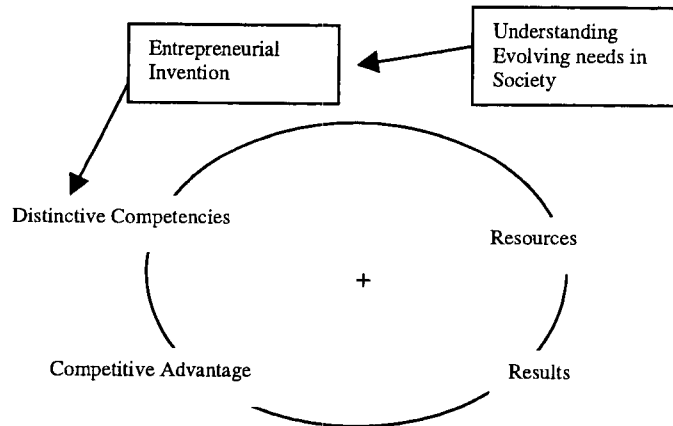
Once the business idea has been articulated, attention can be focused on uncertainty. Van der Heijden offers three categories of uncertainty: risks, structural uncertainties and unknowables (1997). An assessment of risks recounts past events of a similar nature to estimate probabilities of outcomes. Structural uncertainties are concerned with possible events for which there is no evidence to judge the likelihood of a given outcome. Unknowables represent

events that cannot even be imagined. "Scenarios can provide powerful help here, and many would argue that this is the most important use of scenarios" (Schwartz, 1991). Uncertainties are most commonly compiled based on a series of in-depth, open-ended interviews (van der Heijden, 1997).
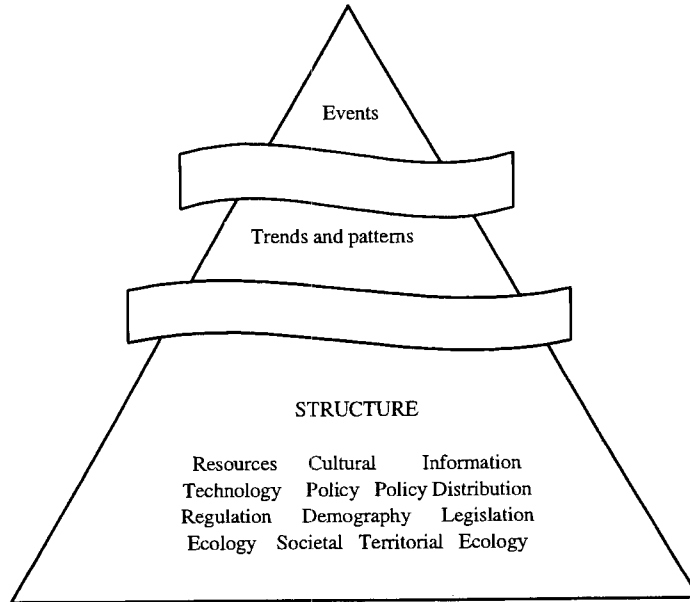
With the business idea mapped and uncertainties documented, the focus can shift to the outside world in which the business idea must perform. This is the beginning of scenario construction. Van der Heijden suggests the formation of a scenario team, made up of members whom are able to "think the unthinkable," follow intuition, let their imaginations run wild and suspend disbelief. The team begins to study and analyze the industry, seeking "remarkable people". Van der Heijden defines remarkable people as "those experts who are not in regular contact with the client organization, such that an original contribution may be expected. They could be academics, commercial researchers, writers, artists, consultants, or other perceptive business people." These "remarkable people" present a workshop to organization members, detailing an outside perspective eliciting a first contribution. A discussion is then held in which organization members may dialogue, challenge and develop the unexpected views. It is natural for discomfort to emerge throughout these dialogues. "In scenario planning, if you frustrate people for a few days, the subconscious takes over and you awake to find the scenario is there. The subconscious is more powerful than the conscious mind, however, it will not intervene until it has been frustrated" (Wack, 1985a). Van der Heijden (1997) presents five criteria for these early scenarios:

- At least two scenarios are needed to reflect uncertainty
- Each of the scenarios must be plausible
- The scenarios must be internally consistent
- The scenarios must be relevant to the client's concern
- The scenarios must produce a new and original perspective on client issues.

Through a series of workshops, an overview of the sometimes seemingly chaotic first scenarios should be created. This is helpful in establishing links and connections between variables and data in the system. From this point, scenario building is largely a process of brainstorming, checking for plausibility, and playing the driving forces into different positions. Some common methods for fleshing out scenarios are: listing key patterns and trends, mapping causal relationships in influence diagrams, listing underlying driving forces and ranking driving forces by unpredictability and impact. A popular metaphor for thinking through the scenario building process is the "iceberg" metaphor (Figure 3). There are many methods for

the process of building scenarios and, while authors give hints, a crisp, detailed, step-by-step methodology is not documented.

FIGURE 3 - THE "ICEBERG" METAPHOR

Events

Trends and patterns

STRUCTURE

Resources	Cultural	Information
Technology	Policy	Policy Distribution
Regulation	Demography	Legislation
Ecology	Societal	Territorial Ecology

Global Business Network

The overarching view utilized by the Global Business Network was born out of Shell's application of scenario technology. Pierre Wack first began applying Kahn's concepts in the 1960s and refined them into a proprietary framework stressing the big picture first, then zooming in on the details. Wack believed that to begin with the details was to miss some key dimensions of the building process (Wack, 1985a). Peter Schwartz took over as the head of Shell's planning division and eventually established his own company offering a variety of strategic business services worldwide. Schwartz (1991) offers a conceptual overview of the scenario building process in *The Art of the Long View*. This forms the basis of the approach used by the Global Business Network.

According to Schwartz (1991), step one is to identify a focal issue or decision. Scenarios are built around a central issue outward toward the external environment. He asserts that scenarios based on external environmental issues such as high versus low growth may fail to capture company specific information that makes a difference in how the organization will deal with such issues.

The second step is to identify the key forces in the local environment. This is logical following the selection of a key issue. Step two examines the factors that influence the success or failure of the decision or issue identified in the first step. Analyses of the internal environment and strengths and weaknesses are commonly conducted in this step.

Once the key factors have been identified, the third step involves brainstorming the driving forces in the macro-environment. These include political, economic, technological, environmental and social forces. Driving forces may also be considered the forces behind the key factors in step two.

Step four consists of ranking the key factors (from step two) and the driving forces (from step three) on the basis of two criteria: 1) the degree of importance for success and 2) the degree of uncertainty surrounding the forces themselves. "Scenarios cannot differ over predetermined elements because predetermined elements are bound to be the same in all scenarios."

The results of the ranking exercise are two axes along which the eventual scenarios will differ. Step five, then, is the development and selection of the general scenario logics according to the matrix resulting from the ranking exercise. The logic of a given scenario will be characterized by its location in the matrix. "It is more like playing with a set of issues until you have reshaped and regrouped them in such a way that a logic emerges and a story can be told."

Step six, fleshing out the scenarios, returns to steps two and three. Each key factor and driving force is given attention and manipulated within the matrix developed in the scenario logics of step four. Plausibility should be constantly checked from this point, for example, "if two scenarios differ over protectionist or non-protectionist policies, it makes intuitive sense to put a high inflation rate with the protectionist scenario and a low inflation rate with the non-protectionist scenario."

Step seven examines the implications of the developed scenarios. The initial issue or decision is "wind tunneled" through the scenarios. It is important to examine the robustness of each scenario through questions such as: Does the decision look good across only one or two scenarios? What vulnerabilities have been revealed? Does a specific scenario require a high-risk, bet-the-farm strategy?

The final step is to select "leading indicators" that will signify that actual events may be unfolding according to a developed

scenario. Once the scenarios have been developed, it's worth spending some time selecting identifiers that will assist planners in monitoring the course of unfolding events and how they might impact the organization.

The French School

When he took over the Department of Future Studies with SEMA group in 1974, Michel Godet began conducting scenario planning. His methodology was extended at the Conservatoire Nationale des Arts et Metiers with the support of several sponsors. Godet's work is based on the use of "perspective," advocated by the French philosopher, Gaston Berger (Ringland, 1998). Godet's approach began by dividing scenarios into two categories: situational scenarios, which describe future situations, and development scenarios, which describe a sequence of events that lead to a future situation (Georgantzas and Acar, 1995). Godet also identifies three types of scenarios that may exist in either category. Trend-based scenarios follow what is most likely, contrasted scenarios that explore purposefully extreme themes, and horizon/normative scenarios that examine the feasibility of a desirable future by working backward from the future to the present. Godet's approach has evolved and now includes several computer-based tools that help highlight interdependencies between interrelated variables that may be ignored by more simple procedures (Ringland, 1998). The French School approach is a structural analysis that is divided into three phases.

Phase one, according to Godet (1992), begins the process by studying internal and external variables to create a system of interrelated elements. This approach focuses on a detailed and quantified study of the elements and compilation of data into a database. A cross-impact matrix is constructed to study the influence of each variable on the others.

Phase two scans the range of possibilities and reduces uncertainty through the identification of key variables and strategies. Future possibilities are listed through a set of hypotheses that may point to a trend in the data. Advanced software reduces uncertainty by estimating the subjective probabilities of different combinations of the variables.

Phase three is the development of the scenarios themselves. Scenarios are restricted to sets of hypotheses and, once the data have been compiled and analyzed, scenarios are built describing the route from the current situation to the future vision.

The Futures Group

The Futures Group is a Connecticut-based consulting firm that developed a trend-impact analysis approach to scenario planning. This approach requires three phases, namely, preparation, development, and reporting and utilizing (Ringland, 1998).

The preparation phase includes defining a focus, issue or decision, and then charting the driving forces. There are several questions that should be answered in this phase, such as: What possible future developments need to be probed? What variables need to be looked at for assistance in decision-making? What forces and developments have the greatest ability to shape future characteristics of the organization? (Thomas, 1997).

The development phase includes constructing a scenario space, selecting alternative worlds to be detailed, and preparing scenario-contingent forecasts. Selecting a scenario space means examining the various future states that the drivers could produce. Illogical and non-plausible situations should be rejected. Selecting alternative worlds to be detailed involves limiting the number of future stories, since it would be impossible to explore every option. The key is to select *plausible* futures that will challenge current thinking. Preparing scenario-contingent forecasts involves listing trends and events that would be required for the plausible future to exist. Depending on the assumptions of each alternative world, indicators are selected that might "signal" the direction in which the organization is heading.

Reference Scenarios

Ackoff (1970, 1978, 1981) identifies four modes for organizations to cope with external change. *Inactivity* involves ignoring changes and continuing with business as usual. *Reactivity* waits for changes to happen and then develops a response. *Preactivity* involves trying to predict changes and establishing organizational positions before they happen, and *proactivity* calls for interactive involvement with the external environment in order to "create the future for stakeholders" (Georgantzas and Acar, 1995). Within these four modes, Ackoff uses the term *reference scenario* to mean the reference projections a firm would have if there were no significant changes in the environment. Ackoff's call for strategic turnaround starts with an idealized scenario of a desirable future. To be effective, such a scenario should be interesting and *provocative* – it should show what to change to evade the mess of problems in an organization's given strategic situation.

Decision Strategies International

Single point estimate approaches to strategy have not fared well

within the last decade (Schnaars, 1989). Shoemaker (1993) emphasizes that scenarios are not point estimates. Georgantzas and Acar (1995) argue that Shoemaker correctly emphasizes an actual outcome, "because, oddly enough, there is no longer any probability concerning whether a point estimate lies in a confidence range or not. Either it does or it does not". Shoemaker (1995) outlines an approach to scenario planning with many similarities to the methodology used by the Global Business Network.

Step one defines the scope of the project. This includes setting a time frame, examining the past to identify rates of change, and roughly estimate the expected future rate of change. "The unstructured concerns and anxieties of managers are good places to start".

Step two is to identify the key stakeholders. Obvious stakeholders include customers, suppliers, competitors, employees, shareholders, and government. The identification of the roles that each of these groups might play, how the roles have changed in past years, and the distribution of power according to the issue, are all factors to be examined in this step.

Basic trends are identified in step three. The political, economic, societal, technological, legal, environmental, and industry trends are analyzed in connection with the issues from step one. "Briefly explain the trend, including how and why it exerts its influence on your organization". Trends can be charted in influence diagrams or matrices to help make relationships explicit.

Step four considers the key uncertainties. What events, whose outcomes are uncertain, will significantly affect the issues of concern to the organization? A further examination of political, societal, economic, environmental, legal and industry forces emphasizing the most uncertain elements "will reveal the most turbulent areas". Relationships among the uncertainties should also be identified, for example, "if one economic uncertainty is 'level of unemployment' and the other 'level of inflation,' then the combination of full employment and zero inflation may be ruled out as impossible".

Once the trends and uncertainties have been identified, initial scenario construction can begin. A simple approach is to identify extreme worlds by putting all positive elements in one, and all negatives in another. Alternatively, various strings of outcomes can be clustered around high or low continuity, finding themes or by degree of uncertainty. The most common technique is to cross the top two uncertainties of a given issue.

Step six checks the initial scenarios for plausibility. Shoemaker identifies three tests for internal consistency, dealing with the trends, the outcome combinations, and the reactions of major stakeholders. The trends must be compatible with the chosen time frame, scenarios must combine outcomes that fit—for example, full employment and zero inflation do not fit—and the major stakeholders must not be

placed in situations they do not like but have the power to change, for example, OPEC will not tolerate low oil prices for very long.

From the process of developing initial scenarios and checking them for plausibility, general themes should emerge. Step seven is to develop learning scenarios by manipulating plausible outcomes. The trends may be the same in each scenario, but the outcomes, once considered plausible, can be shifted and given more or less weight in different scenarios. These scenarios "are tools for research and study rather than for decision-making".

After constructing learning scenarios, areas that require further research are identified. These are commonly referred to as "blind spots" (Schwartz, 1991; Shoemaker, 1995; Georgantzas and Acar, 1995; van der Heijden, 1997). Companies can use these scenarios to study other industries, for example, to consider plausible outcomes of advances in multi-media and then study current research in that area.

Step nine reexamines the internal consistencies after completing additional research. Quantitative models are commonly developed in this stage. For example, Royal Dutch/Shell has developed a model that keeps oil prices, inflation, GNP, growth, taxes and interest rates in plausible balances. Formal models can be used to flesh out possible secondary effects and also serve as another check for plausibility (Shoemaker, 1995). The models can also help to quantify the consequences of various scenarios.

Step ten is to determine the scenarios to be used for decisions. Trends will have arisen that may or may not affect or address the real issues of the organization. Shoemaker identifies four criteria for effective decision scenarios. First, scenarios must have relevance to be effective, but also challenge current thinking in the organization (Shoemaker, 1995; Schwartz, 1991). Second, scenarios must be internally consistent and plausible. Third, scenarios must be archetypal, or should describe fundamentally different futures, rather than simply vary on one theme. Finally, each scenario should describe an eventual state of equilibrium. "It does an organization little good to prepare for a plausible future that will be quite short" (Shoemaker, 1995).

Shoemaker defines three classes of knowledge as useful when considering the future: things we know we know, things we know we don't know, and things we don't know we don't know.

Procedural Scenarios

Amara and Lipinski (1983) and Chandler and Cokle (1982) use very similar methods for constructing scenarios, but prepare separate forecasts for each principal factor or variable. Chandler and Cokle "also define scenarios as the coherent pictures of different possible

events in the environment whose effect on a set of businesses should be tested through linked models". The manipulation of macro-economic models is a mechanism by which vague assumptions are translated into projected values of wholesale prices, GDP, or consumer expenditures for an entire industry. The models used in these approaches are computer-driven (Georgantzas and Acar, 1995) and provide a good example of procedural scenarios incorporating intuitive and quantitative techniques.

Industry Scenarios

Porter (1985) asserts that scenarios traditionally used in strategic planning have stressed macroeconomic and macropolitical issues. He further claims that, in competitive strategy, the proper unit of analysis is the industry and defines industry scenarios as the primary, internally consistent views of how the world will look in the future. The essence of this view holds that there are two loops in building these industry scenarios. In this approach, industry analysis is within the larger unit of building industry scenarios. Industry focus scenarios can help an organization in analyzing particular aspects of a business, but Wack (1985a) argues that beginning with a narrow focus will miss key dimensions.

Soft Creative Methods Approach

Brauers and Weber (1988) have formulated an approach with three basic phases: analysis, descriptions of the future states, and synthesis. The analysis phase brings organization members to a common understanding of the problem. Based on this consensus, the problem can be further bounded and structured. Brauers and Weber recommend the use of soft creative methods for the analysis phase, including morphological analysis, brainstorming, brain-writing, and the Delphi technique. The second phase examines the possible development paths of the variables chosen in the analysis. The synthesis phase considers interdependencies among the variable factors to build different situations for the future states. These eventual scenarios are then fed through a complex computer program for linear programming and cluster analysis.

CHARACTERISTICS OF EFFECTIVE SCENARIOS

From this review of scenario methodologies, it is clear that some common themes run throughout. The following paragraphs outline the critical characteristics of scenarios and scenario planning. These themes are: the use of systems thinking, challenging the microcosm of decision-makers, the telling of multiple stories, broad-based scope,

examining seemingly unrelated forces, requiring knowledge of management's deepest concerns, and focusing on re-perceiving reality.

All of the examined methodologies incorporate some form of information as inputs, the information is manipulated into varying states through processes, and eventually a scenario is built that tells a story. Most of these methodologies then feed the information back for refining the stories. Because they require inputs, processes, outputs and feedback, scenario planning can be framed as a system (Von Bertalanffy, 1967; Senge, 1990). Although it is not explicit in any of the approaches reviewed, a systems perspective is applicable.

The methodologies examined here all assert that scenarios must challenge the microcosm of decision-makers. Wack (1985a) asserts that "scenarios must come alive in 'inner space,' the manager's microcosm where choices are played out and judgment exercised".

Scenarios tell multiple stories. A scenario with more than three stories becomes unmanageable and the ideal number "is one plus two; that is, first, the surprise-free view (showing explicitly why and where it is fragile), and then two other worlds or different ways of seeing the world that focus on critical uncertainties" (Wack, 1985b). Van der Heijden suggests that more than two stories, but fewer than five, are particularly helpful because they: 1) reflect the uncertainty inherent in the future, 2) allow a multi-disciplinary approach to developing and discussing theories about the world, 3) present findings in a tangible real-world context, and 4) use a causal mode of thinking, which is intuitively comfortable.

Scenarios are broad-based, not point-in-time projections. "Because scenario-driven planning does not solicit single-point forecasts from participants, it eliminates the need for any face-saving strategies" (Georgantzas and Acar, 1995). Managers who can adjust their thinking to see a wider range of possible futures will be in a much better position to take advantage of unexpected opportunities (Shoemaker, 1995). One of the most basic characteristics of scenario planning, the idea of multiple plausible outcomes, is critical in order to challenge the assumptions of management.

The methodologies examined here all integrate seemingly unrelated forces. Economic, technological, environmental, competitive, political and societal forces are examined to develop what are called critical uncertainties and predetermined elements (Schwartz, 1991; van der Heijden, 1997; Ringland, 1998; Wack, 1985b; Shoemaker, 1995; Georgantzas and Acar, 1995). Wack (1985b) identifies predetermined elements as "those events that have already occurred (or that almost certainly will occur) but whose consequences have not yet unfolded". Critical uncertainties are those events that can only be imagined (van der Heijden, 1997).

Scenarios require knowledge of the deepest concerns of managers

and executives. Wack (1985a) notes, "We hit planning pay dirt with the 1973 scenarios because they met the deepest concerns of managers". Georgantzas and Acar (1995) assert that the overriding goal of scenario planning is to enrich the way managers think, learn, and feel about strategic situations by investigating what they are most concerned about. A standard question offered by Schwartz (1991) is: "What keeps managers and executives awake at night?"

Wack (1985a) offers "the reperception of reality and the discovery of strategic openings that follow the breaking of the manager's assumptions (many of which are so taken for granted that the manager no longer is aware of them) are, after all, the essence of entrepreneurship". In many ways, scenario planning advocates the return to the sort of thinking required to start-up a business. The entrepreneurial element is advantageous when considering how to "begin again". This concept is evident in all of the methodologies reviewed.

Scenarios as Tools for Organizational Learning

De Geus (1988) defines organizational learning as "the process whereby management teams change their shared mental models of their company, their markets, and their competitors". Although it was originally developed as a tool for strategic decision-making, scenario planning is increasingly noted as an important tool for learning (De Geus, 1988; Georgantzas and Acar, 1995; Kleiner, 1994; Schwartz, 1991; van der Heijden, 1997). Senge (1992) identifies three stages of an effective organizational learning process: 1) mapping mental models, 2) challenging mental models, and 3) improving mental models. Scenario planning has been shown to meet all three of these stages (Georgantzas and Acar, 1995). Scenario planning has also been titled a tool for inquiry, reflection, and construction of mental models (Senge, Kleiner, Roberts, Ross and Smith, 1994).

De Geus (1997), as the head of planning at Shell, conducted a study on the average lifespan of several Fortune 500 companies. His findings showed that one-third of those listed in 1970 had vanished by 1983. His findings also suggest that companies die because their managers focus on economic activities, and forget that they are a community of humans. The oldest companies all had a striking capacity to institutionalize change and recognized that they had internal strengths that could be used and developed as organizational conditions changed.

With a focus on institutional learning, De Geus has shifted the goal of planning at Shell. In studying how companies learn and adapt to environmental changes, Shell began changing the rules that managers had always known. For example, scenarios were developed that examined the implications of oil prices falling to $15 a

barrel in 1985. (At the time, the price was $28 a barrel and $15 was regarded as the end of the oil industry). At first, managers were reluctant to consider such a serious problem, but they were asked to respond to these three questions: What do you think the government will do? What do you think your competition will do? And what, if anything, will you do? The actual price of oil was rising at the time of the exercise, but on April 1, 1987, the actual price fell to $10 a barrel. The fact that Shell had "already visited the world of the $15 barrel helped a great deal" (De Geus, 1997).

Out of this process, De Geus notes the development of shared language that makes the implicit knowledge of the learner explicit. Advocating that institutional learning begins with the calibration of existing mental models, De Geus believes that "the only competitive advantage the company of the future will have is its managers' ability to learn faster than their competitors".

Galer and van der Heijden (1992) suggest that there are two critical factors in the approach to business planning: organizational culture, and the degree of internal goal alignment. The cultural dimension runs from hierarchical mechanistic organizations on one hand to heterarchical network organizations on the other. Either of these can have a strong or weak goal orientation, according to the alignment of internal purposes.

Galer and van der Heijden assert that the approach to planning is dictated in part by the cultural structure of the organization. A functional, hierarchical organization will tend to engage in planning in the traditional sense, namely in a centralized and bureaucratic way. A network organization, with more divergence in its goals, will tend to approach planning with more emphasis on learning, because a dialogue is required to converge varying goals and purposes. These two factors are charted in a planning matrix (Figure 4).

FIGURE 4 - PLANNING MATRIX

	Goal orientation	
	Strong	Weak
Mechanistic/hierarchical culture	Predict/design/ control	Emergent
Networked/heterarchical culture	Logical increment-alism	Planning as learning

This matrix can be a helpful tool in a snapshot diagnosis of the culture's orientation to planning. Galer and van der Heijden suggest that, according to the culture orientation to planning, different

methods and practices are used. Van der Heijden (1997) also identifies the "strategic conversation" as an effective means for transmitting organizational learning. Most organizations have formal processes for the exchange of ideas and views, and these processes often become events such as meetings, budget systems, strategy reviews, cost-cutting exercises and marketing decision points. "These processes are less effective than informal conversations because they have less relevance for the participants". Van der Heijden (1997) suggests that the strategic conversation happens when people meet by chance outside of scheduled events, in corridors or lunchrooms. Because this conversation happens spontaneously and takes place in the zone of proximal development (De Geus, 1988; van der Heijden, 1997), it affects how individuals make sense of events and trends in the strategic situation.

It is through this informal conversation that learning about the strategic situation takes place (van der Heijden, 1997). Scenarios are particularly effective in transmitting strategic options within this conversation. However, the scenarios filtered into the conversation must meet the following criteria: simplicity and evocativeness, a short name, plausibility, relevance (Schwartz, 1991; van der Heijden, 1997).

Creating "Future Memory"

A strange phenomenon has occurred with the use of scenario planning called "future memory". As Schwartz (1991) notes in the final step of his methodology, the selection of leading indicators and signposts is critical to the realization that a given scenario may be unfolding. Sometimes the direction is obvious, but it can also be very subtle. Indicators and signposts are selected to monitor, in an ongoing sense, the progress of the organization along the lines of a given scenario. As in the study conducted by De Geus (1988), having considered the $15 barrel of oil, and what the company would do in such a situation, Shell was prepared to act based on stories that had circulated throughout the organization. This is future memory—the advantage created by having previously considered critical circumstances when they actually present themselves (Schwartz, 1991).

In essence, individuals create future memory constantly. It unfolds along the lines of logic, for example, if X happens, then I will do Y. When this concept is applied to an entire organization, the implications become very powerful. Coupled with the idea that the only competitive advantage of organizations of the future will be the ability of its managers to learn faster than their competitors (De Geus, 1988), future memory can decrease the response time of an organization to external changes in the environment because the situations have been considered (De Geus, 1998; Schwartz, 1991; van der Heijden, 1997).

EVALUATING SCENARIO PLANNING

The evaluation component is nearly absent from the literature of scenario planning. One study conducted by Shoemaker (1995) at the University of Chicago revealed some insights. Sixty-eight MBA students were asked to identify critical issues in their daytime jobs. They were then asked to provide confidence ranges. Shoemaker describes the following:

> For example, a student might estimate that sales for her company would be 50,000 units per year five years hence. Then she would determine that she was 90% sure that the actual sales volume would be between 30,000 and 70,000 and 50% sure that it would be between 40,000 and 60,000. Each student also asked a colleague at work who was familiar with the issues for similar estimates.

Weeks later, the students developed a few scenarios for the initial issues and the guesses and confidence ranges were taken again. New estimates were also gathered from a colleague after reviewing the scenarios. Confidence ranges were found to widen about 50%. The scenarios were found to have a greater impact on best guesses than on ranges of confidence.

While this study did not evaluate the effects of an implemented scenario project, it seems to reveal that considering options will have an impact on perceptions of outcomes in the scenario planning process. This was, however, the only study found to evaluate effects of scenario planning in any form. Scenario planning, developed in practice and proprietary in nature, is gaining exposure to academic examination, but has not been thoroughly documented as a discipline or process.

IMPLICATIONS FOR FURTHER RESEARCH

The themes revealed in this paper outline the key characteristics of scenario planning and advocate the use of scenarios for enriching traditional strategic planning. Scenarios have also been suggested as a means for developing organizational learning and decision-making, however, further research is necessary in these areas. Perhaps most critical to the development of scenario planning as a discipline, an evaluation process, or method for measuring the impact of scenario planning on the decision-making and learning processes of organizations is the validity of the approach.

The history of scenario planning is here documented with the intention of outlining the context out of which scenario planning as a process has grown. Lacking in explicit theoretical foundations or the result of proprietary applications, the current state of scenario

planning must move toward the establishment of sound theoretical bases for the rigorous and detailed study of the process.

CONCLUSIONS

While the process of scenario planning has proven itself in some specific situations, without a sound means for measuring the impact of participation in scenario planning, or explicit theoretical foundations, the process cannot be developed further. Furthermore, in the absence of these two critical elements, it is unlikely that the practitioner or scholar will be able to attribute any increases in organizational effectiveness, organizational learning, decision-making capacities, or replicate results. This manuscript has outlined the background and context of scenario planning and has advocated some particular points that, if addressed, could greatly improve scenario planning practice and research.

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