

Activity 5. Forecast Futures and Prepare Scenarios

"... the potential for mass future shock has crystallized." Alvin Toffler, *Future Shock*, p. 372

Introduction

At this point in the TSMP, management is in transition. The first four activities were mainly oriented to the past and present. Forecasting and preparing scenarios are clearly oriented to the future, although managers are always guided by the history of the organization and their past experiences. The situational analyses of the previous Activity, augmented by the on-going search for intelligence and information, are major inputs into forecasting and scenario preparation. In turn, forecasts and scenarios provide valuable inputs for the activities that follow, notably setting objectives and goals and the various time-based range of planning.

One of the fundamental principles of management is to be anticipatory, to be prepared for what is ahead. Management, whether strategic or tactical, is constantly sensing and attempting to envision and anticipate future forces and conditions. Managers and staff are constantly connected to the search intelligence and information gleaned from monitoring the environment and analyzing situations, especially for critical forces and conditions. A review of futures studies, reports and other works shows that "... most approaches to understanding the future focus on identifying driving forces rather than on predicting scenarios." Editors, "What futurists believe", *Journal of Management Consulting*, volume 9, issue 3, May, 1997, pp. 49-50. For the purposes of this tactical and strategic process, consideration will be given to forecasting futures, including the preparation of scenarios.

Because of the pervasive influence and development of demographic and other statistics, economic forecasting has been used for a century or more in various private and public-sector organizations. Early economic forecasting was crude, relying heavily, if not solely, on the projection of general trends, e.g., Gross National Product, and cycles. Subsequently, projections of markets, natural resources, demographics, economic activities such as housing starts, automotive and retail sales and other frequently reported, statistically-based conditions have become highly refined, accurate and reliable for management purposes. Increasingly, other forces and conditions in the external environment have become bases for forecasting and scenario preparation. Social conditions and indicators, political issues, policies and programs and technological developments, including the tracking of patents, are examples of other foci of forecasting.

From an internal organizational perspective, financial forecasts have a long history and are basic to tactical and strategic management. During its "crisis of 1920", General Motors Corporation forecast a loss of \$800,000 for 1921. Chandler, *Strategy and Structure - Chapters in the History of the Industrial Enterprise*, 1962, p. 128. As a result of the losses, actual and prospective, senior management decided to cut spending on inventories, capital expenditures and payrolls and impose statistical controls. As the environment of organizations has become more variable and greater influences have influenced management, social, political, technological, military, climatic and other "forces" forecasting has been developed, refined and used increasingly in recent decades.

Projections of futures range widely. Some futurists advise organizations on how to prepare for the ways the world will change. Two of them provide a wide range of projections ranging from major trends such as the end of privacy, smart homes with appliances equipped with microchips and growing suspicion about technology. Ira Matathia and Marian Salzman, *Next: Trends for the Future*, New York: Macmillan Publishing Company, 1998. Others predict that volcanoes and earthquakes will hit specified regions like the Northwestern United States, that technology will help to extend lifetimes, blur gender differences and create the "androgynous family" and that the future of computers cannot be predicted but people will be implanted with Internet services within 25 years. Tom Griffin, "The world of 2088", *Columns*, Seattle: University of Washington, June, 1998, pp. 24-29. Industrial sectors and organizations foresee futures more focussed and aligned to environments and circumstances relevant to them. Experts foresee two types of retailers surviving the current shakeout in the photofinishing business, ie, large, full service stores and small specialty kiosks. Susan Bourette, "A clear picture emerges as photo industry develops", *The Globe and Mail*, May 26, 1998, p. B8. Investment companies frequently make economic and financial forecasts for periods of various durations. Based on one-year forecasts, such organizations make short-term, tactical projections and plans. In the late 1990s, many industrial sectors and governments focussed their forecasts, projections and scenario formulation on the looming Year 2000 (Y2K) problem. The Gartner Group estimated the global cost of this problem to run as high as U.S.\$600 billion. Editors, *Journal of Management Consulting*, op.cit., p. 50. The list of forecasters, futurists and strategists is long and growing every day.

Futurists, forecasters and strategists realize that the future is unpredictable and "the chances are high that our best forecast will turn out to be wrong to some degree." Jim Allworth, "A Difficult Year Ahead Demands a Cautious Approach", *The Wealth Management Review*, Toronto: RBC Dominion Securities, volume 3, number 1, Winter 1998, p. 1. The challenge to forecasters is to minimize the degree of error. During the past three decades, dramatic progress has been made in the accuracy and the reliability of forecasting even as management's situations become more turbulent, complex and risky.

As much as they are capable and inclined to do so, managers make reasoned projections of and assumptions about the future. "... we subscribe to the view that a disciplined approach, followed diligently, will produce reliable investment results over the long haul." Ibid. Clearly defined goals and objectives, substantive information and expert intelligence, logical approaches and processes (and some good luck) are needed for successfully anticipating, planning and otherwise preparing for future conditions and forces of change. "Forecasting ... provides the basis for almost all planning and control. If the forecasts are unreliable, it is most difficult to make the right tactical or strategic decision." David A. Aaker and George S. Day, *Marketing Research*, New York: John Wiley and Sons, Third Edition, 1986, p. 594. Countless aspects of an organization are the subject or focus of forecasts. In marketing, forecasts are prepared for sales, cash flows and promotions by time period(s), products, services and market factors, e.g., consumer variables, economic conditions, by market segment, product life cycle and other vital market variables. Financial forecasts are developed from sets of weighted macro-economic factors such as Gross Domestic Product (GDP), employment levels, incomes, interest rates, consumer spending, vehicle sales, housing starts and many more categories of valid and reliable statistics. (such

statistics do not exist in developing countries.) In addition, the organization's financial condition, e.g., cash flow, profits, debt-equity, capitalization and budget requirements are essential inputs into the forecasts. Other organizational forecasts are made for personnel or human resources management, production or services to be provided, technological requirements, physical facilities and equipment and other key operating units of organizations.

As a consequence, projections and assumptions are based on a range of inputs, including scientifically researched, analyzed and reported data, on-going records, specially mandated reports, experience, public and expert opinion. Such inputs are processed with degrees of sophistication, ranging from highly technical, complex forecasting methods and techniques, to various kinds of projections and modelling, expert analyses, personal experiences, observations and intuition.

The main reason for forecasting and developing scenarios is to assist managers in anticipating conditions, diminish uncertainty and prevent "surprises", i.e., unexpected circumstances, from impacting adversely in the future. Like good Boy Scouts, they must "Be Prepared". Forecasting and "scenarioizing" help to lessen the range and degree of risk in which managers function as decision makers; decisions that they make today with many implications and consequences for tomorrow (and beyond). Another caution: no matter how much valid and reliable information and expert intelligence is contained in the forecasts and scenarios, some strong winds will blow and clouds of uncertainty and doubt will hang over them. Consequently, even though a central tendency, pattern or trend may be evident and useable in a forecast, management is well advised to have a range of alternative futures, i.e., scenarios, with probabilities of occurrence assigned to them, available as "optional futures".

Organizing Forecasts

Two main categories of factors and sources of change, ultimately combined and integrated, are commonly used to organize the forecasting of future situations. Not surprisingly, the categories are external or environmental and internal or organizational. Management needs to utilize the intelligence and information gleaned from the on-going monitoring activities or processes of the organization as well as preparing issue-oriented forecasts and scenarios. As the TSMP illustrates, the search for intelligence and information (Activity 2) links directly into the forecasting Activity.

Timing is another, complementary basis for organizing forecasts. Common categories include short term (e.g., less than three years), medium term (e.g., three to five years) and long term (e.g., more than five years). Since forecasts have various strategic and tactical uses, their time parameters will be varied. For example, making forecasts for consumer product sales may be short, e.g., six months to a year. By contrast, forecasts for large capital decisions, such as building new production plants, hydro-electric dams or researching and developing a new biotechnology may require forecast periods of 10 to 25 years or longer. The Technology Scenario following projects major developments in ten areas of science and technology.

Organizational history, perceptions, attitudes and biases commonly underlie future forecasts and the scenarios that are derived therefrom. Consequently, management and its experts need to seek objective information and intelligence. Beware of functional stereotypes. Finance personnel and inventory managers are not necessarily pessimistic. Nor are marketing and production people always overly optimistic. If the managers involved in forecasting have reasoned, negative dispositions and supporting evidence toward major determinants of an organization's future, e.g., declining economic conditions, non-competitiveness in the marketplace, lagging technological capabilities or obsolete senior management, then the scenario will likely be *pessimistic*. By contrast, if managers and their expert staff envision conditions to be pervasively positive, e.g., growing revenues and profits or surpluses, growing economy, significant competitive advantages, technology that sets or meets industry standards and progressive management, then scenarios will tend to be *optimistic*. While both the optimistic and the pessimistic scenarios may be useful and beneficial to managers, particularly in establishing the bounds and range of forecasts and scenarios, what they need most is *realistic* scenarios. The key question is: realistically, what is most likely to happen during a specified period, given the best intelligence and information available, complete, systematic analyses, reasoned opinions, justified assumptions and sound judgment?

Approaches

Forecasts and scenario are developed in various ways. In authoritarian type, "top down" organizations, senior management will set "corporate" targets and then demand that others in the organization develop compatible forecasts and find ways of achieving them. Unless the organization is a military one in a war, this is not a recommended approach. However, Partners in an international accounting and management consulting firm experienced such an approach. A new Managing Partner, call him Mr. Aggressive, wanted to make a favorable impression by increasing the productivity and profitability of the management consulting practices across the country. Despite the best, most rational efforts by practice managers to forecast sales, billable hours, billing rates, personnel requirements, margins and profits, Mr. A repeatedly rejected their forecasts and demanded higher projections so that they would meet his targets and impress the Management Committee of the firm. The rational forecasting efforts of the practice managers gave away to them "plugging in" numbers just to satisfy the new Managing Partner. Through the following year, the fabricated forecasts became meaningless. However, the first forecasts were useful for the management of the practices during the first and subsequent years. (Mr. A had a short tenure as Managing Partner of the national management consulting practices.)

Probably the best way to approach forecasting is in progressive stages or steps. Such a progression often starts at the operative level and proceeds to middle and then senior management, i.e., the "bottom up" approach. Meaningful participation is urged and beneficial to forecasting. At the operative level, e.g., finance, marketing, production, human resources and research and development, geographical, products, services, consulting practices or other organization units often provide a natural, established basis

for groups of people, i.e., managers and staff, to think projectively and communicate forecasts about the future conditions and forces impacting on their unit. Basic questions such as “what can we do better” and “how will that improve performance and pay off for employees and other stakeholders” provide a positive, constructive mindset for forecasting. Sequel questions become more definitive and quantitative, e.g., “how many more patients can be served or units produced and/or sold, where, when, by whom, at what costs and benefits?”

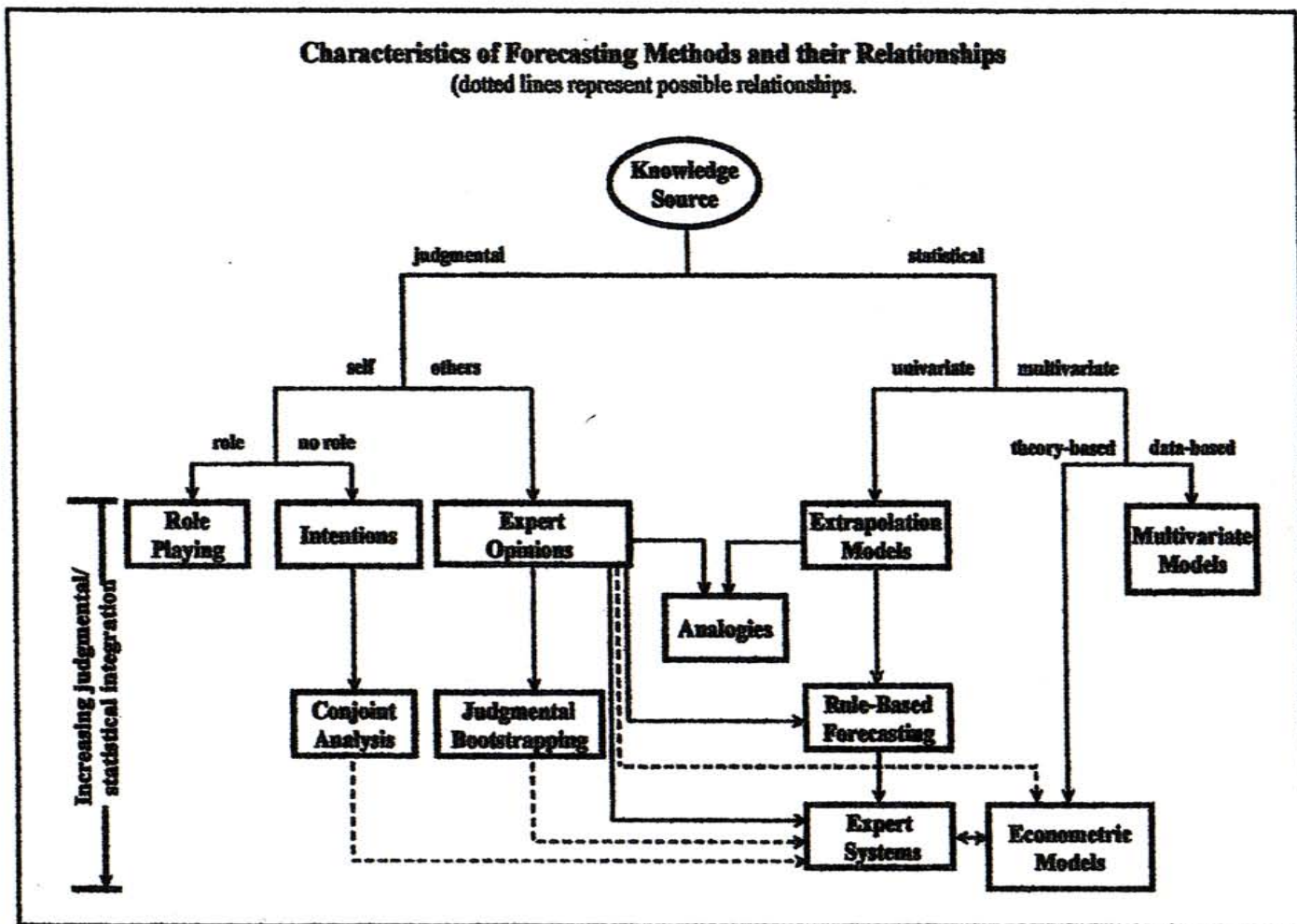
At this level, managers tend to focus on factors that directly impact on their performance. Much of the intelligence and information they need may be gleaned from the environmental monitoring that starts in Activity 2 and continues throughout the TSMP. Naturally, operative level managers tend to focus on forces and conditions that have, do and are likely to impact on their performance. In the key strategic area of marketing, managers focus on increasing sales, building or maintaining market share(s), strengthening market position(s), improving distribution channels, advertising and promotional programs, increasing profitability of products, markets, personnel, assets or investment and other functional components. Such experience and focussed orientation is virtually priceless in developing forecasts and scenarios. Each one of these functional orientations needs to be thought of as a strong fibre that will be woven into stronger, more complete fabrics, i.e., organizational plans, strategies, tactics, programs, activities and budgets.

As forecasts and scenarios progress in their development, the scope becomes larger and more integrative. Marketing personnel marry their projections with those of the production, finance, human resources and related departments. Obviously, managerial coordination is imperative. Ultimately, the scope and integration continues until the forecasts and scenarios are sufficient to encompass the set of significant factors that are likely, in probabilistic terms, necessary to provide meaningful projections as inputs into formulating useful strategies and tactics for the future.

Methods and Techniques of Forecasting

Various methods, ranging from highly sophisticated multivariate and econometric models to focus groups and polls of "expert opinion", are used in preparing forecasts and scenarios. (Please see Exhibit 5A for a clear classification of forecasting methods.) The “Methodology Tree” identifies two main orientations to forecasting: judgmental; and statistical. It identifies 11 methods of forecasting, any and all of which may be used in combinations with other methods. Using formal statistical forecasting procedures has been found to improve forecast accuracy and organizational performance. Nada R. Saunders, *Managing the Forecasting Function, Industrial Management and Data Systems*, vol. 95, Issue 4, 1995, pp. 12-18. To simplify, focus and achieve the optimal quality of forecasts, they should be organized into environmental, i.e., independent, variables, and organizational, i.e., dependent, variables and their relative priorities. A matrix format, such as illustrated in Exhibit 5B, provides one way of organizing the key factors in a forecast and depicting their relationships of a priority basis.

Exhibit 5A
Forecasting Methodology Tree



Source: J. Scott Armstrong, "Methodology Tree", *Forecasting Principles*, <http://hops.wharton.upenn.edu/forecast/>, February 20, 2003.

Clearly consumer spending has the greatest influence on a business organization in developed countries. Consumer spending makes up a large part of North American and Western European economies and has a high direct impact on retail sales, distribution, other marketing activities, financial conditions, production and transportation activities. In the illustration following, the power of individuals in government and socio-cultural trends are being forecasted to have the least influence on the organization and its activities. In different sets of circumstances, e.g., different cultures, the forecasted influence of these two and other environmental factors would have to be re-evaluated.

Exhibit 5B

**Forecasting Matrix of Environmental Influences
on Future Organizational Conditions**

Organization Environment	Marketing			Finance			Production		
	Sales	Promotion	Distribution	Cash Flow	Gain/ Loss	Capital	Inventory	Output	Personnel
Economic									
1. G.D.P.	3	3	3	3	2	2	2	2	3
2. employment	2	2	2	2	1	3	2	2	1
3. consumer spending	1	1	1	1	1	2	1	1	1
Governmental									
1. laws, policies	2	2	1	3	3	2	3	2	2
2. power									
a. institutions	2	2	1	2	1	1	3	1	1
b. individuals	3	3	2	3	2	2	3	3	3
3. processes	3	2	1	2	3	2	2	2	2
Socio-cultural									
1. values	2	1	3	3	3	3	3	2	2
2. behavior	1	1	1	2	2	2	2	1	1
3. trends	3	2	2	3	3	3	3	2	3
Technology									
1. major developments	1	2	2	3	3	2	2	1	2
2. innovations	3	3	2	2	1	2	2	1	1
3. trends	2	2	2	3	2	3	3	2	3

Legend: numbers 1, 2 and 3 indicate ranking (from high to low) of influence by environmental forces on organizational conditions

Environmental forces and conditions

Consistent with grouping variables into environmental and organizational sets is the use of these categories for identifying selected forecasting methods that may be used by managers. The technical aspects are dealt with by statistical and other forecasting

experts. Methods and techniques for forecasting environmental forces and conditions include:

1. expert opinion - Various ways are used to gather the opinions of people considered to be experts in specified fields, e.g., economists, stock market brokers, doctors, oil rig operators, farmers, the list is endless. Focus groups, role playing and Delphi surveys are three qualitative approaches with developed methodologies that are used systematically to gather, discuss, analyze and synthesize expert opinions about sets or patterns of future conditions

2. leading indicators - A series of such "barometric measures" may be useful in signalling possible changes in direction of some set of influencing, if not deterministic, variables. Leading economic indicators are used widely as indicators of the future direction of national economies. When leading indicators cause forecasting difficulties, e.g., some indicators signal a change in direction and others do not, then a diffusion index is often used. A diffusion index is designed to show the percentage of the leading indicators that are turning upward or downward during a specified period. Diffusion indexes reduce but rarely eliminate irregularities and the diversity of movements in leading indicators.

3. modelling - To organize and relate the factors that management deems to be important, a range of models or frameworks can be used. Exhibit 5B illustrates a basic matrix of environmental and organizational variables and their important relationships. A *World Dynamics* model has been developed and used to model key global variables, e.g., resources, their changing eco-economic relationships and impacts. Jay W. Forrester., *World Dynamics*, New York: Wright-Allen Press, Inc, 1971. Such models are being developed increasingly through the use of programming languages, software, mathematics and other logic-based methods.

4. trends - They are a common type of time series analyses in which historical data, charted for a period of time, depict general tendencies or more specific patterns. Such patterns can be extrapolated into the future by using various statistical methods to forecast probable future conditions, sometimes with a range of extrapolations based on different sets of assumptions and scenarios. Trends may be correlated with other factors. Trends in employment, consumer spending, automotive sales and housing starts are useful in forecasting retail sales. Trends in manufacturing and wholesale price levels, employment and income levels and interest rates are used to project future inflation rates and sales of products and services sensitive to such variables, e.g., automobile, housing and furniture sales.

5. cross impact analyses - Based on multiple sets of trends, "what if" questions are assessed in terms of their projected *impacts* on other trends (e.g., product sales in a specified market), events (e.g., launching a new product) or conditions (e.g., competitive marketing programs). For example, a company conducted a computerized series of cross impact analyses during its process of deciding whether or not to enter the electronic mail market against established telecommunications companies.

Other methods and techniques are used to forecast environmental forces and conditions and organizational performance in the future. Many of them will be based on situational factors experienced or anticipated by management. Similarly, unique sets of variables will influence the forecasting approach, methods and techniques used for

organizational strategies. Monitoring the organization and its environment helps to identify such unique factors and alert management to their prospective occurrences and the threats, opportunities or other logical consequences resulting therefrom, possibly in varying sets of circumstances or scenarios. Be Prepared! Expect the unexpected!!!

Organizational forces and conditions

Rare are the situations that management does not need to forecast financial, marketing, production, human resources, technological requirements and other vital conditions of the organization. Such projections provide substantive bases for revenue forecasts, expected expenditures, operating and capital budgets. They are fundamental to analyzing and determining the authenticity and feasibility of strategies and their component activities, resource requirements, cash flows and timing. Some of the more widely-used organization-oriented forecasts include:

1. financial - Forecasts of revenues and expenditures are imperative in strategic and tactical management. Operating organizational units, e.g., divisions, departments, strategic business units or whatever the structural designation, need management to look into the future and endeavor to determine what resources will be needed and what source(s) of revenue are likely for each category of funding. Such estimates are then categorized appropriately, e.g., revenue and expenditure items in operating statements, scheduled and evaluated for their feasibility.

2. marketing - Such forecasts are especially important in competitive situations. Marketing managers need a range of market projections, including macro-economic statistics and indicators, measures of industry growth/decline and attractiveness, prospective market shares as well as potential sales from evolving market segments or niches. Sales forecasts are especially important in businesses. Often sales forecasts are developed by product/service, territory, personnel, time periods, separately and in compelling combinations. Competitive conditions influence the forecasts of organizational expenditures for product or service R&D, advertising, promotion, distribution, selling, financing and other marketing-related activities. Industry, technology and product life cycles are used as frameworks to evaluate the longevity of such key components to a business strategy.

3. production or operations - Since most organizations have some type of productive activity, various resources are required to support the performance of such activities. Strategically, the activities and the resources are projected so that management can determine if they are feasible. If so, the activities and their related resources must be planned, organized and coordinated within the TSMP.

4. personnel - People and their requisite capabilities provide one of the main areas of resources forecasts in organizations. Such forecasting may be as basic as planning to have a number of people perform specified jobs during a year. However, since human behavior is dynamic and unpredictable, forecasting human resource requirements can be very difficult. In an age of "right-sizing", personnel forecasting has become a very demanding part of strategic management. The factors are many, the dynamics are infinite and the forecasting methods are rather rudimentary.

5. technology and innovations - As management and other stakeholders realize the importance of technology on their organizations, forecasts are being made of their

future technological and innovative needs and advances. The technology scenario outlined previously identifies a set of projected advances in key areas of technology during the next ten years. Strategic managers do such projections within the context of technological advances generally, market conditions, competitive requirements and by anticipating what technology or other innovations are likely to be beneficial at periodic points in the future.

Preparing Scenarios

Preparing or planning scenarios is based on the thinking that given the impossibility of predicting the future or not knowing precisely how the future will evolve, a sound decision approach to take is one that has the potential to work well in various possible futures. To find that “robust” decision set, sets of scenarios are created. They are specially developed “stories” about the future, “modeling a distinctly plausible world” in which we might someday have to manage an organization and/or its distinctive units. Lawrence Wilkinson, “How to build scenarios”, www.wired.com/wired/scenarios/build.html, February 19, 2003, p. 2. As Mr. Wilkinson states, the purpose of scenario planning is not to pinpoint future events but to highlight large-scale forces that push the future in different directions. *Ibid.*, p. 3. The phrase “different directions” is a vital, even deterministic, way of thinking that needs to be inherent in preparing scenarios.

Thinking in different directions, “outside the box”, beyond natural, even accepted, bounds of rationality and conventional wisdom are crucial to preparing scenarios successfully. “Expect the unexpected” is a common phrase used by experts contemplating the future and preparing scenarios. The national commission investigating the 9/11 disaster repeatedly emphasized the “failure of imagination” as the most important failure in the U.S. intelligence service and national security administration. One major example of thinking “inside the box” was the stereotype profile of the prospective terrorists as “poor, young, single men from the dusty back streets of the Muslim world brainwashed into committing fanatical acts”. Marc Sageman, referred to by Ken Wiwa, “Tackling terrorism requires a brave new imagination”, *The Globe and Mail*, July 24, 2004, A11. Most of the terrorists involved in 9/11 were well-off, well-educated, including pilots, cosmopolitan professionals with good jobs, wives and no history of mental illness from Saudi Arabia.

Preparing scenarios enable managers to approach and deal with complexity, uncertainty and risk by developing more than one alternative future. Kees van der Heijden, “Scenarios, Strategies and the Strategy Process”, www.library.nijenrode.nl/library/publications/nijrep/1997-01/1997-01.html, February 19, 2003, p.3. Considerable progress has been made in creating and using scenarios. This activity has advanced from “story telling” to the state of being well defined and having some structured process.

A scenario is a tool for ordering one’s perceptions about alternative future environments in which today’s decisions might be played out. As a methodology, it has long been used by the military.

Royal Dutch Shell made the tool famous by using it to great effect twice – once to anticipate the Arab oil embargo, and then again to anticipate and prepare for the dramatic drop in oil prices during the 1980s. www.marin.cc.ca.us/scenario/what_is.htm

By contrast, major corporations have been misled by their perceptions of the future. IBM and the PC, AT&T and the Internet, the United States auto industry and the products of its Japanese competitor, and the movie studios and the VCR exemplify missed opportunities and unnecessary failures. Peter Schwartz, "The art of preparing for an uncertain future", www.redherring.com/mag/issue73/mag-scenarios-73.html, p. 1. Such examples lead to a very important, yet basic question: Why are decision makers, especially in large organizations with vast human and other resources, caught unawares of future forces and conditions? The good news is that ever more organizations are developing scenarios in their efforts to be better prepared for their futures.

The process is demanding. First of all, it deals with the unknowns of the future and all of the opportunities, threats, risks and discomforts associated with it. It demands creative thought, insights and knowledge that are in the "zone of proximal development" and can be integrated into purposeful thoughts and actions. van der Heijden, *op. cit.*, p. 8 The process is highly interactive, often with clients, customers or others from outside of the organization and its management sphere of influence and control.

For some scenario planners, the process begins by identifying and even delineating a focal issue or decision, be it the threat of new technology(ies), e.g., self-driving cars or roll up television screens, change in government or public policy, e.g., the implementation of the Kyoto Accord or a major competitive initiative, e.g., the merger of two major banks or breweries.

Generic foci

A common, simple and useful approach to preparing scenarios is to start with a framework of three categories of expectations, i.e., *optimistic, pessimistic and realistic*. (It is more manageable than starting with 10, 20 or more scenarios as some large, sophisticated organizations do.) For each of these categories, managers, staff, "the best and the brightest" employees and consultants brainstorm and creatively think about individual and combinations of future forces and conditions, assuming positive, negative and balanced sets of positive and negative circumstances. After a set or series of plausible futures is framed from macro and micro perspectives, practical details are added to provide more complete and realistic scenarios. Key questions include: What are the major external and internal sources of change? How will they impact on the organization, its strategies, programs, activities and resource allocations? Is the scenario likely to occur and, if so, what are the probabilities of where, when, why and how? Is the scenario likely to influence significantly the organization, its strategies, programs, activities and resource allocations?

Based on its purposes, past and current intelligence and information searches, situational evaluations, environmental and organizational forecasts, strategic management endeavors to envision future sets of circumstances that can be formed into situations or scenarios. Such sets of anticipated circumstances are used to prepare sets of objectives and goals upon which to base and organize plans, programs and activities that it can implement within changing sets of circumstances. Since every organization faces a

distinct set of circumstances, presently and in the future, numerous approaches have been developed to prepare scenarios for strategic management.

One successful scenario planner uses three basic scenarios in evaluating technology-based industries. Schwartz, *op. cit.*, p. 2. His scenarios are the result of years of observing how such industries work, the forces and conditions that shape them and the dynamics of change in them. Mr. Schwartz's three scenarios for technology business are referred to as *momentum*, *singularity* and *pushback*. The first scenario is based on the "inertia of history" and the future is mostly familiar to management. Companies are not overwhelmed by the rate or nature of change and have time to adapt. The world of the mid-1950s to the late 1970s is the model he uses for this scenario. The singularity scenario is more discontinuous and is based on the compounding or "snowballing" of technological change. Each new technology interacts with others to create an ever-faster, deeper, broader and more intense vortex of change. *ibid.* The model for this scenario is the transformation that occurred from 1900 to 1920, when the world was changed by the introduction and application of relativity and quantum theory to the automobile and airplane. The pushback scenario is based on the resistance to change, specifically a new technology. The use of nuclear power is a recent case while genetically modified food is a pushback scenario that is evolving currently.

Various processes are used for scenario planning. Following is an outline of one process that has activities of the TSMP in it. This process also draws on the phases presented in "Scenario Planning", www.marin.cc.ca.us/scenario/what_exactly_is.htm, p. 1.

1. Rigorous challenge of the "conventional wisdom" – Most organizations have a tendency for *homeostasis*, i.e., toward a relatively stable equilibrium. "If it ain't broke don't fix it" is the credo of such organizations and its managements. That mentality has to be challenged if the organization is to be capable of succeeding in the changes of the future.

2. Search for relevant intelligence and information. Activity 2 of the TSMP provides the sub-process for the necessary inputs for the scenarios. This is the stage where "off-the-wall", "far out" and other unorthodox creativity is expressed, discussed, massaged and otherwise used.

3. Evaluating the inputs. The "driving forces", e.g., competitive, governmental, technological, social, are identified and evaluated using some of the models, methods and techniques outlined in the previous Activity, i.e., analyzing situations. From this evaluation and other sources, the parameters or "predetermined elements", i.e., what is inevitable about the future, e.g., demographic factors of a defined society or market segment. Priorities of the factors are set by using criteria such as impacts, importance and risk.

4. Constructing the scenarios. Just like completing a jigsaw puzzle requires putting all of the pieces together, so does the construction of plausible scenarios. In practice, scenarios resemble a set of stories, written or spoken, developed around well-constructed, purposive plots with sound and logical bases and themes.

5. Determine the implications for the organization. A key guiding question is: what are the logical consequences for the organization, a department, service or product and its management? Such consequences require a thorough examination of prospective "trails" of events and activities flowing from the set of scenarios. The trails are expected

to lead to a set of plausible options or courses of action for each scenario. Voila! the vital linkage between scenario thinking or theory and action.

6. Identify and monitor leading indicators of future conditions. Once again managers and their staff utilize Activities 2 and 3 for monitoring the environment and analyzing the *prospective* situations of the organization, its managers and other stakeholders. Management focusses on events, forces and conditions that will indicate which future or combination of futures is evolving.

Situational Specific Scenarios

Every organization has its own unique situation that requires specific or customized approaches to formulating future scenarios. In the TSMP, the previous activity was evaluating situations. From such analysis flow sets of circumstances that pose threats, opportunities, problems and strategic issues. Each of these categories of situations provides a focus for formulating scenarios. Opportunities, threats, problems or issues emanate from combinations of organizational and environmental forces and conditions such as changing economies, markets, social-political changes and technological developments as well as evolving organizational situations.

Some Illustrative Examples

So much for the theory of forecasting and scenario development. Let us consider how these tasks are done. After a review of past planning practices, Southern California Edison decided that the best way to plan for future uncertainties was to prepare a series of 12 plausible scenarios and flexible responses to each prospective situation. The basic reason for preparing so many scenarios was to avoid "tunnel vision" and to provide a sufficiently wide range of alternative futures for management to consider and evaluate.

Following unsatisfactory operating results, many organizations prepare scenarios to help prevent such results in the future. After its first-ever annual drop (\$730 million) in restaurant earnings, Pepsico developed the following two scenarios to help rectify the situation: 1. cut off and reallocate its billion dollar-a-year capital investment and rely on franchisees for expansion; and/or

2. swap ownership from corporate to franchisees within the organization. Richard Martin, "Pepsico Dip could Lift Chain Franchising", *Nation's Restaurant News*, Vol. 29, Issue 16, April, 1995, pp. 3 and 75.

Facing similar circumstances, in addition to providing conventional forecasts, Seagrams presented a series of scenarios in the form of statements about "Where we are going" in regard to its customers and consumers, employees, technology, procedures and performance. The Seagram Corporation, "We are successfully building brands and markets", *Report of the Fiscal Year Ended January 31, 1995*, Montreal, 1995, pp. 3-7 Each scenario provided a frame of reference and perspective for formulating corporate strategies and tactics.

During the middle 1970s, North America, Western Europe, Japan and many other countries were faced with an "energy crisis", ostensibly brought about by price increases and supply management, including embargoes on Israel and United States military bases abroad, by the Organization of Petroleum Exporting Countries (OPEC). National

governments reacted in various ways to the crisis. The United States government hired consultants, did some planning, launched into a market-oriented program of petroleum allocation, printed five billion motor vehicle gasoline rationing coupons and otherwise prepared for emergency energy situations.

Facing similar petroleum shortages, the Government of Canada set up the Energy Supplies Allocation Board (ESAB) and undertook a time-sensitive, systematic approach to the crisis. Futures forecasting, scenario preparation and reasoned times of utilization were integral parts of the contingency planning. For example, if the available reserves of petroleum declined to a specified level, then a program of voluntary cutbacks would be undertaken. The program was planned to be persuasive and carried out predominantly through advertising, public service announcements and other mass communications to the publics of the nation. If available petroleum reserves declined to a lower specified level, then a program of mandatory allocations would be implemented. These allocations involved supplies being assigned on geographical and other national bases of priority. Rationing was the third scenario for the contingency planning. This was the most severe, pessimistic scenario and included contingency plans to cut back supplies of motor vehicle gasoline based on such priorities as national defence, security, medical services and economic uses. Personal use of motor vehicle gasoline was the lowest priority and would be cut back dramatically or, if necessary, eliminated. The perceived petroleum crisis provides a simplified version of a very complex situation but is only intended to illustrate the nature and uses of futures forecasting and scenario preparation. (For a more complete scenario of motor vehicle gasoline rationing, please see Vignette 5A following.)

More currently, two global scenarios have been developed to plan for future energy uncertainties and risk situations. Peter Kassler, "Scenarios for World Energy: Barricades or New Frontiers?", *Long Range Planning*, Vol. 28, Issue 6, December, 1995, pp. 18-27. In the New Frontiers scenario, two of the key assumptions are that:

1. developing countries liberalize their economies and achieve growth; and
2. energy resources are stretched but prove to be adequate as a result of technological advances in exploration and production.

A third assumption might be that the energy resources are allocated by means of pricing and international power and control of energy sources. Early in the 21st century, Russia would be a fitting example of the New Frontier scenario. In the Barricades scenario, economic liberalization and growth is restricted as countries and their rulers strive to maintain their traditional ethnic, national and religious values. The Russian Republic of Chechnya, Kazakhstan and Indonesia exemplify such a scenario.

Vignette 5A

Scenario of Motor Vehicle Gasoline Rationing

Warning to government, business and consumers! Get ready for fuel rationing. We are facing another serious energy crisis.

During the energy crisis of 1974-5, a team of consultants developed a contingency plan for motor vehicle gasoline rationing in Canada. The plan was prepared for the

Energy Supply Allocation Board (ESAB) in the federal government's Department of Energy, Mines and Resources. Donald S. Macdonald was the Minister. At the time, the United States also had a contingency plan for rationing motor vehicle gasoline.

Contingency plans in Canada and the United States were based on actual and projected shortages of crude oil supply, primarily in their domestic markets. Other key factors included global supply, especially from the 11 member OPEC (Oil Producing and Exporting Countries/cartel), supply to American military bases in foreign countries and patterns of consumption, especially in regard to personal use. Now, 25 years later, it's *deja vu* for governments in North America, if not all industrialized nations in the world.

We are approaching a crisis situation regarding the priority uses of crude oil and its distillates. Current conditions indicate shortages in crude oil and its derivatives, most importantly, heating oil, motor vehicle gasoline and diesel fuel. Governments of industrialized nations may or may not be planning for a rationing program. They are not saying. In general, they are relying on pricing to allocate, if not ration petroleum products. Other "band-aid" tactical initiatives are being taken. This month, the U.S.A. is releasing 30 million barrels of oil from its Strategic Petroleum Reserves which are intended for "emergencies" only. Even so, the inventory for home heating oil in the U.S. is 35 percent less than it was a year ago when shortages occurred in northeastern states.

Another indication of the need for contingency planning for petrol rationing is provided by Britain's Home Secretary, Jack Straw. He said that "the government had failed to anticipate the chaos that few thousand peaceful demonstrators could cause." Do members of the federal government remember the problems caused by fuel shortages 25 years ago and even more recently? They should because another crisis is looming and the nation needs to be prepared for the consequences of heating and vehicle fuel shortages. As one commentator has written, "The budding crisis has made a shambles of global strategists' forecasts." A veteran Wall Street analyst claims that "this particular crisis has no short term solution..." There is no evidence that the analyst considered "entitlement" rationing as a short term solution. In reality, pricing is a form of rationing that discriminates against the poor and laboring people of the nation. Let us consider the present critical situation and project it with reason into the short term future.

Demand for Crude Oil: Globally, the demand for crude oil is at historically high levels and increasing. The world consumes roughly 75 million barrels a day. The U.S.A. consumes about 15 million b/d or 20 percent of the total oil used. Economic growth in industrialized economies, record numbers of motor vehicles being operated around the world and increased personal consumption have driven demand to record levels.

A study by Translink in Vancouver showed that more families are buying second and third vehicles, thus increasing the traffic volume by 8 percent in that city, even though the population has grown by just 4 percent. In North America, demand has been especially strong for "gas guzzling" SUVs (sport utility vehicles). In Canada, sales of cars, trucks, SUVs and minivans soared upward by 14 percent in August, 2000. With a 25 percent increase, General Motors reported record truck sales. For the first 8 months of 2000, vehicle sales jumped 6 percent to 1,069,000. By early October, 2000, the automotive industry was continuing to report record levels of sales for vehicles. The largest gains were in SUV sales. They were increasing at "double digit rates" and expected to continue such growth rates for the coming years. Big Three automakers are converting small vehicle production facilities into plants for SUV and similar-sized

vehicles. Makers and buyers of personal vehicles have forgotten the lessons learned during the 1970s. Are we doomed to repeat history at even greater economic and social costs?

In California, the state considered to be the most progressive in dealing with fuel consumption, demand increased by three percent in the first six months of 2000, even before summer driving and peak consumption began. Forecasts for the year indicate that demand in the state with the most population and largest number of vehicles will reach 15 billion gallons, up 5.6 percent from 14.2 billion gallons consumed in 1999. According to Jeffrey Rubin, "At current growth of about 1.5 percent a year, global demand will exhaust supply capacity within two years. Once that point is reached, demand must be rationed..." and he claims "purely by price". Price rationing exists and it is not effective. Entitlement rationing would be less discriminatory and more effective than price rationing.

Supply of Crude Oil: This is the most basic and deterministic factor in the scenario. OPEC produces about 36 percent of the oil in the world, is expected to provide about 60 percent in the foreseeable future and is the largest oil cartel and source of supply. Presently, OPEC is producing crude oil at close to its total capacity. In early September, 2000, OPEC President and Venezuelan Oil Minister warned that "We are approaching a crisis of great proportions because oil production capacity is reaching its limit." Elsewhere, Saudi Arabia's Oil Minister Ali al-Naimi told reporters that "OPEC's unused production capacity was about three million b/d (barrels per day). About 75 percent of that is in Saudi Arabia, while Kuwait and the United Arab Emirates also have some spare capacity. The rest of the cartel is believed to be producing to its limit." Non-OPEC producers have little more capacity and, in North America, crude oil deposits are dwindling.

During one month, i.e., July, 2000, the United States imported 301 million barrels of crude oil. The spare capacity of OPEC would meet the demand of the USA for about 8 *hours* during a day in July. Increased production by OPEC during the first nine months of 2000, i.e., 3.2 million b/d, used up more than half of its total unused capacity. Other oil producing countries are reported to be near their production capacity. Despite a near tripling in spot crude prices, non-OPEC production has increased less than 1 percent a year since the beginning of 1998. By comparison, non-OPEC production rose 4 percent following the 1973/4 crisis and 3 percent following the Iranian revolution.

While Canada is theoretically self-sufficient in oil production, distribution problems and the North American Free Trade Agreement (NAFTA) make the nation interdependent with the United States. Under the terms of NAFTA and energy-sharing agreements with the USA, Canada is forbidden from cutting back its exports of oil and natural gas unless it cuts back proportionately with its production and sales of such products domestically. Therefore, the energy problems of 360+ million Americans are shared by Canada. The United States, the industrial colossus with its huge economy and high mass consumption, continues to use up more crude oil and its distillates every week. Supplies cannot meet the growing demand and inventories are being drawn down to risky levels, e.g., 24 year lows in USA heating oil inventories.

Supplies of alternate fuels: While alternate fuels have been talked about, researched, developed and tested, no fuel has been developed into a feasible alternative for motor vehicle petroleum. Fuel cells and batteries to power motor vehicles are in the experimental stage and not in mass production. They have limited size and range. Such

power sources are not expected to be commercially available until 2004, at least three cold, threatening winters and many months of mass driving by the populous of North America as well as the rest of the world. Other energy alternatives, ranging from coal, nuclear and solar, to burning salt water and dried manure, have not proven to be financially feasible or commercially viable. So the world depends on crude oil and a related fuel, natural gas, for heating homes, offices and industrial plants. The world depends on crude oil for fuelling motor vehicles. Other types of fuel provide no meaningful alternative sources of supply

Inventories: In late September, U.S. government and industry reports showed an unexpected decline in crude oil and gasoline inventories and that inventories of distillates, of which home heating oil is the major component, increased less than expected. Currently, heating oil inventories are 35 percent less than one year ago when shortages occurred in the northeastern U.S.A. Inventories of crude oil and related products such as heating oil and gasoline, reached 24 year lows, despite oil prices that, at US\$37, reached 10 year highs. At their peak in September, oil prices were more than 40 percent higher than they were on January 1st. Clearly, the laws of supply and demand are not working. Rising prices are not increasing supply to meet demand. Inventories are dropping.

On September 24th, President Clinton announced that the United States would sell 30 million barrels of crude oil from its Strategic Petroleum Reserves. Industry observers had expected lower amounts, i.e., between 10 and 20 million barrels, to be released from the Reserve. By law, the Strategic Reserve is to be used only for *national emergencies*.

Pricing of Crude Oil and Related Products: In April, 1999, OPEC launched a year-long program of production cutbacks in an effort to raise prices of crude oil. The supply-driven price increases were compounded by growing demand throughout the world, especially in North America and Western Europe. Major price increases, eg, more than 40 percent during 2000, have not kept consumption from reaching historic high levels. Further, rising prices have been a major cause of industrial and public protests in England, France, Germany, Belgium, other European countries as well as in North America. Increasing oil prices, caused mainly by the growth of demand exceeding the growth of supply, threatens to bring on a global recession.

While the "free market" advocates, e.g., oil industry, a few other industries, conservative economists and business-beholden politicians, would resist most strenuously, a form of rationing other than pricing is needed. At least, an entitlement-based contingency plan for motor vehicle gasoline rationing is needed to diminish the discrimination against low income people, small business and non-profit organizations. It is needed to guide the growth of the automotive maker and buyer. It is needed to manage the dwindling supply of crude oil and its distillates until such time as alternative fuels are financially feasible and accepted by the marketplace.

The scenario is quite clear. Demand is at record levels, prices are moving that way, supplies are reaching their limits and inventories are low. Winter is coming and a war in the Middle East appears likely. This rationing scenario is realistic, at least not for the foreseeable future.

