Scenario planning: an alternative way of dealing with uncertainty

15

Introduction

Scenario planning is an alternative way of dealing with uncertainty than that encapsulated in decision analysis. This chapter outlines the conceptual approach, provides a step-by-step guide to scenario construction and shows how decisions can be evaluated against scenarios of plausible futures. Finally, we show how scenario planning can be combined with the SMART approach to decision making with multiple objectives, which we detailed in Chapter 3.

First, consider the following quotation from an article in the magazine *Newsweek* which was published on 28 January 1991. The article was written by a journalist who was analyzing the reasons for US unpreparedness for Saddam Hussein's invasion of Kuwait:

> In the days leading up to the invasion, the intelligence agencies sent President Bush a list of predictions. The list was arranged in order of probability. 'None had as their first choice the prediction that Saddam Hussein would attack,' says one intelligence operative who saw the reports. Prediction No 1 was that Saddam was bluffing. Prediction No 2 was that he might seize part of the Rumaila oilfield that straddles Iraq and Kuwait and possibly Warba and Bubiyan islands, two mudflats blocking Iraq's access to the Persian Gulf. It was assumed that he would pull back from Kuwait once the islands were secured. 'The line we kept hearing around here was that he has just massed there along the Kuwait border to drive up the price of oil,' recalls one senior Pentagon officer. 'If people were saying he is for real and he is going to invade, it was not briefed to us as definite.'
>
> Several sounder voices did predict an invasion but they went unheard. One midlevel Mideast analyst at the CIA got it right, but his warning 'got lost' in the momentum of the opposing consensus. Marine Corps Officers, scanning satellite photos that showed Iraqi air-defence units, tanks and artillery deployed forward at the Kuwait border surmised that this could only mean an invasion, but they kept their silence because of bureaucratic

pressures. The Defence Intelligence Agency's top analyst for the Middle East was convinced that Saddam would invade and warned the Senate Intelligence Committee that the dictator might not be bluffing. His own shop did not buy it. The DIA went along with the pack.

While the Iraqis and the Kuwaitis gathered in Jeda for a final haggle over oil and borders, the House Foreign Affairs Committee summoned John Kelly, the assistant secretary of state covering the Mideast, to explain what was going on. 'If Iraq for example charged into Kuwait for whatever reason, what would our position be with regard to the use of US forces?' chairman Lee Hamilton inquired. 'That, Mr Chairman, is a hypothetical or a contingency question, the kind which I cannot get into,' Kelly replied.

From this journalistic analysis, three major points emerge. The first is that consideration was only devoted to those events seen as most likely. The second is that a process akin to 'groupthink' (see Chapter 12) took place in that once the group of decision makers had made up its mind what was going to happen, even *conclusive* information that the prediction (decision) was poor did not change the prediction. Those individuals who expressed dissenting opinion soon quelled their dissent and 'went along with the pack'. Given such (inappropriate) confidence in the prediction of Saddam Hussein's intent, then contingency planning for events seen as of low probability was minimal, or zero.

How could the invasion have been predicted? Would knowledge that subjective probabilities are often overconfident (cf. Chapter 9) have helped? Would an understanding and appreciation of the nature of the heuristics that can lead to biased estimates of subjective probability be helpful in producing more valid assessments? Perhaps, perhaps not. Consider Figure 15.1 which presents two straight lines of equal length. Next consider the same two lines but with 'arrowheads' attached. The original lines (i.e. the shafts of the 'arrows') now *seem* of unequal length. Your knowledge of their equality of length does *not* reduce the effect of the *visual* illusion. Indeed, the heuristics and resultant biases that we
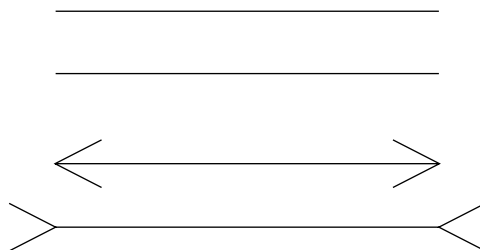

Figure 15.1 – The Müller–Lyer illusion

documented in Chapter 9 were originally characterized by Kahneman and Tversky as 'cognitive illusions'. If *cognitive* illusions share the same nature as visual illusions, then knowledge of the cause of an illusion may not, by itself, reduce or remove the illusory effect.

The practice of scenario planning implicitly accepts that managers are *not* able to make valid assessments of the likelihood of unique future events and that 'best guesses' of what the future may hold may be wrong. This view is in harmony with Gerd Gigerenzer's argument that probability theory does not apply to single events (see Chapter 9). Advocates of scenario planning also argue that it can counter groupthink by allowing minority opinions about the future to have 'airtime', relative to majority opinion.

How do scenarios achieve this? The first point to note is that a scenario is not a forecast of the future. Multiple scenarios are pen-pictures of a range of *plausible* futures. Each individual scenario has an infinitesimal probability of actual occurrence but the *range* of a *set* of individual scenarios can be constructed in such a way as to *bound* the uncertainties that are seen to be inherent in the future – like the edges on the boundaries surrounding a multi-dimensional space.

Scenarios focus on key uncertainties *and* certainties about the future and use this information to construct pen-pictures in an information-rich way in order to provide vivid descriptions of future worlds. By contrast, subjective probabilities entered into a decision tree provide numerical values that can be used in an expected utility calculation. The judgment process that produced such numbers is often not verbalized or recorded. When individuals disagree about their subjective probabilities for a critical event, then decision analysis practice is often to take an average, or weighted average, rather than to explore, in detail, the reasoning processes underlying individuals' assessments. Inherent in such analysis is the assumption that it is useful and possible to attempt to predict the future, whereas scenario planning assumes that the best that can be done is to identify critical future uncertainties and plan for the range of futures that could, plausibly, unfold. Essentially, scenarios highlight the reasoning underlying judgments about the future and give explicit attention to sources of uncertainty *without* trying to turn an uncertainty into a probability. A major focus is *how* the future can evolve from today's point-in-time to the future that has unfolded in the horizon year of the scenario – say 10 years hence. The relationship between the *critical* uncertainties (as they resolve themselves – one way or the other), important predetermined trends (such as demographics, e.g. the proportion of the US population who are in various age bands

in, say, 10 years' time) and the behavior of actors who have a stake in the particular future (and who will tend to act to preserve and enhance their own interests within that future) are thought through in the *process* of scenario planning such that the resultant pen-pictures are, in fact, seen as plausible to those who have constructed the scenarios.

In the next section of this chapter we provide a concrete example of one quick way to construct extreme scenarios. In a subsequent section we introduce a second, more sophisticated, method of scenario construction which produces less extreme and, arguably, more plausible scenarios.

Scenario construction: the extreme-world method

Figure 15.2 gives the eight major steps in the construction of scenarios.

The first step is to identify an issue of concern, around which the scenarios will be constructed. Key issues often concern the survival and viability of an organization, or one of its divisions, in an environment that is known to be changing and which might change in a way as to be inhospitable to that organization with its current competencies and core capabilities.

In the example we will develop now, the key issue of concern is the survival and profitability of a European-based semiconductor manufacturing company.[1] The predetermined elements and trends, as seen by the company's key personnel, are listed in Figure 15.3. The impacts

1. Identify the issue of concern and the horizon year which will be captured in the scenarios.

2. Identify predetermined trends that have some degree of impact on the issue of concern.

3. Identify critical uncertainties, which when resolved (one way or the other) have some degree of impact on the issue of concern.

4. Identify the degree to which the trends and resolved uncertainties have a negative or positive impact on the issue of concern.

5. Create extreme worlds by putting all positively resolved uncertainties in one scenario and all negatively resolved uncertainties in another scenario.

6. Add the predetermined trends to both scenarios.

7. Check for internal coherence. Could the trends and resolved uncertainties coexist in a *plausible* future scenario?

8. Add in the actions of individuals and/or organizations who will be impacted by the future described in a scenario. What actions would they take/have taken to satisfy their own interests?

Figure 15.2 – Steps in scenario construction: the extreme-world method

			Impact
T1	Increased product complexity		+ve
T2	Shortening product life-cycles		+ve
T3	Increasing demand for cheaper packaging		−ve
T4	Customers prefer to buy from European suppliers		+ve
T5	Increasing demand for shorter supply lead time		+ve
T6	Increasing overall demand for integrated circuits		+ve
T7	Far East production costs remain lower		−ve
T8	Low level of local competition		+ve

Figure 15.3 – Predetermined trends

				Impact
U1	EC import duty requirements	u11	Higher	++ve
		u12	As is	+ve
		u13	Lower	−ve
U2	Demand for ceramic device types	u21	Higher	++ve
	(replaced by plastics)	u22	As is	+ve
		u23	Lower	−ve
		u24	V. low	−−ve
U3	Success of new technology	u31	Fast	+ve
		u32	Slow	−ve
U4	Reaction of local competition	u41	Strong	−ve
		u42	Weak	+ve
U5	Internal corporate volumes	u51	High	+ve
		u52	Low	−ve
U6	Internal manufacturing policy	u61	Make	+ve
		u62	Buy	−ve

Figure 15.4 – Key uncertainties

of these trends on the survival and profitability of the semiconductor manufacturing company are also given. Figure 15.4 gives the key uncertainties, the ways in which these uncertainties can resolve themselves, and their impact on the issue of concern.

Next, the positive impact uncertainties and all the predetermineds are clustered together and a 'storyline' is developed that interlinks as many of these elements as possible. The focus is on developing a plausible chain of events that is, to some degree, causally related and which shows how the future will unfold to result in the *end-state* captured within

Positive Scenario: Technology Boom

New packaging technologies are developed rapidly and are widely adopted at the expense of the traditional packing methods of plastic and ceramics. Ceramic packaging all but disappears. The overall market demand increases significantly on the back of the improved capabilities of the new technology.

The manufacturing expertise for the new technology resides with only a few key companies worldwide. The new market entry costs are high. EC imports duties are maintained at high levels to protect local manufacturing of the new technologies. Vendor choice is dependent on technology advantage rather than price.

The corporation is able to exploit this trend by leveraging its established skill base. All new products are manufactured internally with the scope to convert existing products and bring their manufacture back in-house.

Negative Scenario: Plastics Dominate

Plastic packaging technology has resolved power dissipation and high pincount difficulties. Virtually all packaging applications are now in plastic. The overall market volume expands rapidy. Ceramic packaging all but disappears. New technologies such as MCMs and COB are slow to realize their potential.

The manufacturing expertise and infrastructure to manufacture the new plastic packages reside only in the Far East. EC regulations abolish import duties on packaged semiconductor devices. Customers would prefer to buy in Europe but can't; virtually all subcontract assembly is carried out in the Far East.

Faced with an erosion of the competitive advantage of its ceramic manufacturing expertise the Corporation has no choice but to switch to plastic packaging for all products. All package manufacturing is subcontracted out to Far East operators. The internal skill base and manufacturing infrastructure disappears.

Status Quo Scenario: Business as Usual

The overall demand for semiconductor devices continues to increase at the current rate. The demand for ceramic packages remains at the current levels with moderate increases in the higher pincount package styles. The remainder of the market is dominated by plastic packages, especially small outline products. Opportunities for new packaging technologies such as Multi-Chip Modules (MCM) and Chip on Board (COB) remain limited.

There is no significant change in EC import duty regulations and therefore little change in the cost differential between manufacturing in Europe and the Far East. European subcontractors are used for prototyping and low volume work with the larger, production volumes being sent to the Far East. Entry barriers for new competitors remain high. The Corporation continues to manufacture its complex, leading edge products internally. The remainder is assembled either internally or externally, dependent on cost. Overall volumes are maintained at current levels.

Figure 15.5 – Three scenarios

the horizon year of the particular scenario. The same process is then repeated for a negative scenario.

Figure 15.5 gives two illustrative short scenarios which are based on the trends and uncertainties listed in Figures 15.3 and 15.4. The third scenario detailed in Figure 15.5 is an extrapolation of the present and is often called the 'status quo' scenario.

Notice that uncertainty u11 and uncertainty u42 in Figure 15.4 are to some degree internally incoherent, i.e. incompatible, with one another. For example, if EC import duties were high then reaction of *local* competition (i.e. from within the EC) will *not* be weak. Therefore, this particular combination of resolved uncertainties is not described in the scenarios since it is implausible.

The example scenarios in Figure 15.5 are not fully developed since the reaction of the Far East producers of plastic packing to the 'Technology Boom' scenario has not been thought through and incorporated. Given the scenarios were more fully developed – we will detail a fully developed one later in this chapter – then the next stage after the construction of the scenarios is complete is to utilize them in a decision-making process.

Using scenarios in decision making

There are two ways in which scenarios can be used in decision making. The first is to test the viability of a current 'business idea' against the plausible futures represented in the scenarios. In the abstract analytical sense, a business can be thought of as a business idea. A business idea is the *systemic* linking of the business's competencies and strengths. For example, a business idea for a business school could be that illustrated in Figure 15.6.

Here the *strengths* that the business school possesses are summarized in short statements. The impact of the deployment of these strengths produces revenue and the reinvestment of the revenue produced produces a self-reinforcing cycle or positive feedback loop that would, in a stable environment, be a *robust* business idea that would become less and less replicable by competitors – without serious investment from a competitor school – over a period of time.

Overall, a business idea should specify three major elements of a business's attempt to be successful:

(1) The *competitive advantage* which is aimed for – in the case of the business school this is a product that is differentiated from its competitors.
(2) The *distinctive competencies* on which (1) is based – for example, an ability to attract top national academics.
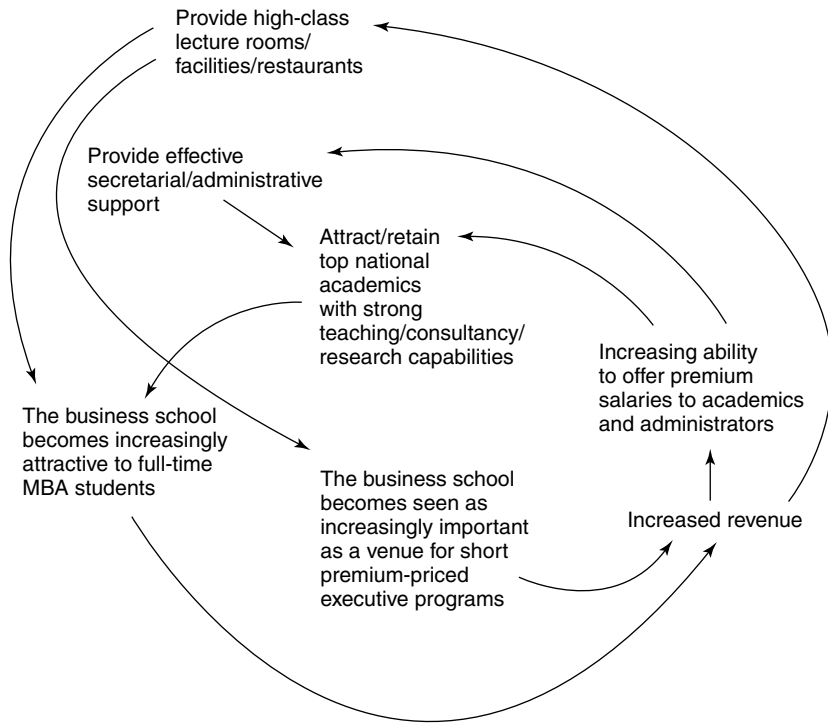(3) The *growth* mechanism – a positive feedback loop.

Figure 15.6 – An illustrative business idea for a business school

If the business school was part of a wider university, then utilization of the school's revenue to support financially weaker academic areas would, of course, weaken the positive feedback loop for the school itself.

However, notice that if the external environment were to change – say that technological developments enabled students to engage in video conferencing with *internationally* recognized academics across the world and that these new technologies were easy to deploy into the students' own homes – then, *perhaps*, the *current* business idea – with its emphasis on employing full-time academics and providing attractive learning environments for students who are able to physically attend the business school – would appear less robust. Creating such plausible futures and testing the essence of the business – the business idea – against them is one use of scenario planning in a decision process.

Kees van der Heijden[2] has likened the testing of business ideas against scenarios as 'windtunneling'. Here the business idea is analogous to a design of an airplane. The scenarios are analogous to wind conditions – some are more extreme than others but all are plausible

conditions within which the airplane must be able to fly. Under some wind conditions the airplane may be harder to keep airborne than others but, essentially, its airframe (i.e. business idea) must be robust.

The second way to utilize the scenarios in a decision process is to evaluate lower-level strategies or decisions. In the business school example, this might be an evaluation of a decision option to focus R&D investment in producing CD ROM versions of course materials. In the semiconductor manufacturing company example, it might be the decision option of maintaining or increasing investment in new ceramic packaging production technology. Essentially, a current strategy, a contemplated strategy, or a range of alternative strategies can be evaluated for robustness against constructed scenarios. Figure 15.7 gives a matrix representation of this evaluation process.

Often no one strategy performs well against the whole range of constructed scenarios. If you consider strategies 1, 2 and 3 it can be seen that strategy 1 maximizes the minimum payoff (cf. the maximin criterion which we discussed in Chapter 5). Given a simple choice between strategies 1, 2 and 3, then strategy 1 would seem the most robust choice *if* we felt it was not possible to say that one scenario was more likely than another – recall that this is an explicit assumption underpinning scenario

	SCENARIO 1	SCENARIO 2	SCENARIO 3
STRATEGY 1	✓✓✓	✓	✗
STRATEGY 2	✗ ✗	✓	✓
STRATEGY 3	✓✓	✗ ✗	✓✓✓
NEW STRATEGY	✓✓✓	✓✓✓	✓✓✓

Figure 15.7 – Testing the robustness of strategies against scenarios

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'PLENTY FOR ALL'

</div>

I. Global Perspective

World economic growth picked up appreciably from 1997 onwards – driven by the success in bilateral trade talks, a surge in US exports, a strengthening employment situation in Europe and lowering real cost of oil.

The signs of economic recovery were reflected in a rapid growth in global trade. The trade among developed economies continues to dominate, but an increasing proportion of the expanding markets involve developing countries. Institutions, frustrated by low interest rates in the developed countries and encouraged by opportunities in the less developed countries, invest many billions of dollars of their managed funds in the newly created financial institutions and ventures around the world. Latin America and central Europe (increasingly integrated with the European Community) are the major beneficiaries.

Japan's new found market liberalism and détente with the US reinforce general optimism about the future. Japan's proximity to the potentially massive consumer markets in Russia and China led the Japanese government to sanction heavy investment in these countries and to build up the commercial infrastructure around Maizuru, facing the expanding container port of Vostochny on Russia's east coast.

Western Europe's high direct production costs continue to reduce its competitiveness in the world. Lower direct costs in central and eastern Europe offer a competitive lifeline for western European manufacturers, a lifeline they take with some alacrity. Foreign direct investment increases significantly in terms of increased joint ventures and wholly owned subsidiaries. Pressure is successfully applied to speed up the process of integration of Poland, Hungary and the Czech Republic. Western exports to Russia of consumer goods also increase rapidly. Belarussia and the Baltic states benefit from their geographic siting in attracting infrastructure investment and aid from the West.

Hungary continues to attract the majority of investment from the US, but its partners in the Vise–Grad–Triangle rapidly close the gap opened up in the first half of the decade.

The EC and US axis (which successfully argued concessions in addition to GATT from their G7 partners) resolve to further reduce market access barriers. G7 initiated gilt edged guarantees to the developing countries, and attractive non-reciprocal trade arrangements persuade many of the less developed countries to reduce their own trade barriers. This has mutual benefits, but more importantly promotes an atmosphere of trust and the first real moves toward comprehensive credit union agreement.

II. Regional Perspective

Since the necessary constitutional and legislative reforms have been carried out in the first half of the decade, the more advanced developing countries in central and eastern Europe achieve acceptable political stability and continue to maintain tight fiscal policies under guidelines set by the IMF. The situation continues to improve in the second half of the decade. There is a general commitment of the governments of the countries to liberalization policies and the move to democracy continues, thus speeding up the accomplishment of the privatization process. This results in expansion of the private sector into the majority of services and industries before the turn of the century.

Though aid provided by the industrialized countries remains weak due to their own internal problems during the recession, EC aid increased from the second half of the decade. Germany, in particular, provides aid for Hungary and the Czech Republic.

Institutional investment and foreign direct investment also pick up considerably in the second half of the decade as the emerging financial system and markets of Vise–Grad–Triangle countries, Belarussia and Russia, became more attractive to the investors as compared with the traditional markets in developed countries. The EC brings forward negotiations for a free trade agreement with the Vise–Grad–Triangle and Russia since it was willing to open up its market to exports from these countries. This increases their ability to pay for their imports and restructuring.

In central Europe, consumer confidence grows rapidly as clear indications are seen of increased prosperity in the region. In the East, Russia recovers its economic balance and growth in GDP and again begins to grow in importance to the countries in eastern Europe, particularly in terms of consumer markets.

Figure 15.8 – A 'real' scenario of future trading patterns

planning as a technique for dealing with uncertainty (we will discuss a more formal approach to evaluating strategies at the end of the chapter). Note, however, that there is an additional row in Figure 15.4, entitled 'new strategy', which the very act of scenario planning may incubate in the mind of the decision maker as he or she ponders the set of plausible futures encapsulated in the scenarios. This ability of scenario planning to stimulate creative thinking is perhaps best illustrated by a 'real' scenario contained in Figure 15.8. This scenario was one of several constructed for a corporation which was involved in moving raw materials and finished goods around the globe.[3] The company was concerned with the (re)location of its major depots, so that they would be at the hubs of future trading networks. It follows that the scenarios were constructed to represent plausible future trading patterns in the EC and the rest of the world. The corporation tested the robustness of choice of alternative countries and cities against the scenarios. Several cities which were not in the choice set *prior* to the scenario construction became favorites in the *subsequent* decision process since they were found to be robust against a range of plausible future world trading patterns. These trading patterns were encapsulated and bounded by the scenarios that were constructed to capture the range of plausible futures.

So far we have described one method to bound these futures – a simplified method that uses an extreme positive scenario, an extreme negative scenario, and a more neutral, status quo or 'business as usual' scenario. Some practitioners of scenario planning caution against presenting the decision maker with such extreme worlds since their very extremeness may cause doubts among their clients – the business managers – about their plausibility. Another way to construct scenarios that has found favor among practitioners is described next.

Scenario construction: the driving forces method

This method shares much in common with the first method that we introduced, in that the critical elements in the decomposition process are predetermineds and uncertainties. However, in the driving forces method, *degrees* of predictability and uncertainty are allowable and the outputs of the scenario construction process are not, usually, extreme scenarios. Nevertheless, the output scenarios from this method also bound the perceived uncertainties in a similar way to the scenarios produced in the extreme-world scenario construction method that we discussed earlier.
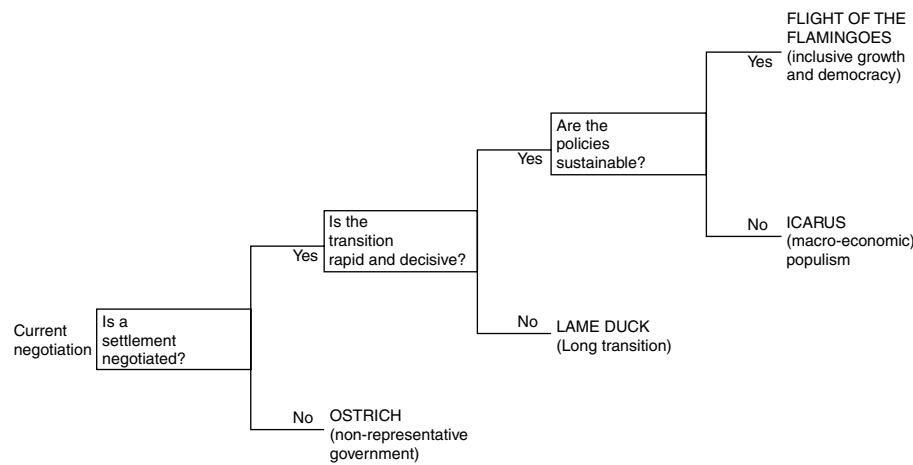
Figure 15.9 – An output of a 'driving forces' scenario structuring methodology

Figure 15.9 gives an example structure of four scenarios for the (then) future of South Africa which are *driven* by the *forces* whether or not there is a negotiated settlement, whether or not the transition to majority rule is rapid, and whether or not the economic policies of a majority government are short or long term. Figure 15.10 details the scenarios that were constructed by a team led by Adam Kahane in mid-1991. The horizon year of the scenarios is 2002. These scenarios of the social and political environment in South Africa would be useful to an international company which was considering three decision options: whether to maintain/reduce or increase its investments and overall presence in South Africa.[4] Figure 15.11 gives the key steps in the driving forces method.

Within the 12 steps contained within Figure 15.11, note that step 1 is analogous to step 1 in the extreme-world methodology that we described earlier in Figure 15.2. At step 2 in the driving forces scenario structuring method, a multitude of elements will emerge from a group 'brainstorm' about the issue of concern. Many of the elements that emerge will address the *external* environment, in that the predetermineds and uncertainties are *not* under the control of the individual, group or organization whom they will affect. These are the elements that it may be appropriate to incorporate in the scenarios and these elements should be carried forward to step 3. Other elements will have to do with areas where the individual/group/organization *has* control, i.e. they are decision or strategy options. Since decisions and strategies are to be evaluated *against* the scenarios at the final step, these decision options should be *removed*

Scenario 1: Ostrich

As a result of the steps taken by the De Klerk Government and the outcome of the white referendum, the international community becomes more tolerant towards white South Africa, and the National Party in particular.

In the light of this, the government hardens its negotiation position. At the same time the liberation movement is perceived to be too radical and loses support internationally. The liberation movements maintained their bottom line. A stand-off results and constitutional negotiations break down.

The government decides to form a new 'moderate alliance' government which is unacceptable to the liberation movements. This results in mass resistance which the state suppresses by force.

Although large-scale sanctions are not reimposed, the economy remains in the doldrums because of massive resistance to the new constitution. This resistance leads to escalating repression and violence, and the business climate worsens. This in turn leads to economic stagnation and decline, accompanied by a flight of capital and skills.

The government also fails to deliver on the social front. Resistance and unrest rendered effective social spending impossible and large outlays are required merely to maintain the status quo. Because society's major inequalities are not addressed the vicious cycle continues. Eventually the various parties are forced back to the negotiation table, but under worse social, political and economic conditions than before.

Scenario 2: Lame Duck

Various forces and considerations drive the major parties towards a negotiated settlement. The present government, for example, recognizes the necessity or inevitability of extending full political rights to the disenfranchised but fears irresponsible government. This fear is shared by some of the major international actors.

On the other hand, the liberation movement fears the return to repressive minority rule if they do not make significant compromises. Such considerations lead to a transitional arrangement with a variety of sunset clauses, slowly phasing out elements of the present system, as well as minority vetoes and other checks and balances aimed at preventing 'irresponsible' government.

Such a long transition of enforced coalition incapacitates the government because of lowest common denominator decision making, which results in indecisive policies. It purports to respond to all, but satisfies none. In consequence the social and economic crises are inadequately addressed.

Although the transitional government succeeds in being goal directed and effective, it is incapacitated because of the logic of a long transition. Uncertainty grows on the nature of the government that will emerge after the transition.

Regardless of how moderate the declarations of the majority parties in the coalition may be, fears of radical economic policies after the period of a long transition remain. Investors hold back, and there is insufficient growth and development.

Scenario 3: Icarus

In this scenario, a popularly elected democratic government tries to achieve too much too quickly. It had noble origins and good intentions but pays insufficient attention to economic forces.

The government embarks on a massive spending spree to meet all the backlogs inherited from the past. It implements food subsidies, price and exchange controls and institutes other 'quick fix' policies.

The initial results are spectacular growth, increased living standards, improved social conditions, little or no increase in inflation and increased political support.

Figure 15.10 – Adam Kahane's four South African scenarios

But after a year or two the program runs into budgetary, monetary and balance of payments constraints. The budget deficit well exceeded 10%. Depreciations, inflation, economic uncertainty and collapse follow. The country experiences an economic crisis of hitherto unknown proportions which results in social collapse and political chaos.

At this point, the government either does a 180 degree about-turn (while appealing to the International Monetary Fund and the World Bank for assistance) or it is removed from office. The result is a return to authoritarianism and an abandonment of the noble intentions that originally prevailed.

Scenario 4: Flight of the Flamingoes

Flamingoes characteristically take off slowly, fly high and fly together.

A decisive political settlement, followed by good government, creates conditions in which an initially slow but sustainable economic and social take-off become possible. The key to the government's success is its ability to combine strategies that lead to significant improvements in social delivery with policies that create confidence in the economy.

Access to world markets and relative regional stability are gained but South Africa does not receive massive overseas investments or aid on the scale of a Marshall Plan.

The government adopts sound social and economic policies and observes macroeconomic constraints. It succeeds in curbing corruption in government and raises efficiency levels.

It makes well-targeted social investments which lead to a decrease in violence and give people confidence that many of the social needs will be met in the longer term.

Once business is convinced that policies will remain consistent in the years ahead, investment grows and employment increases. Initially, this growth is slow, because confidence does not return overnight, but over the years higher rates of growth are attained, and an average rate of growth of close to 5% is realized over the period.

The overall income of the upper income groups grows between 1 and 3% a year.
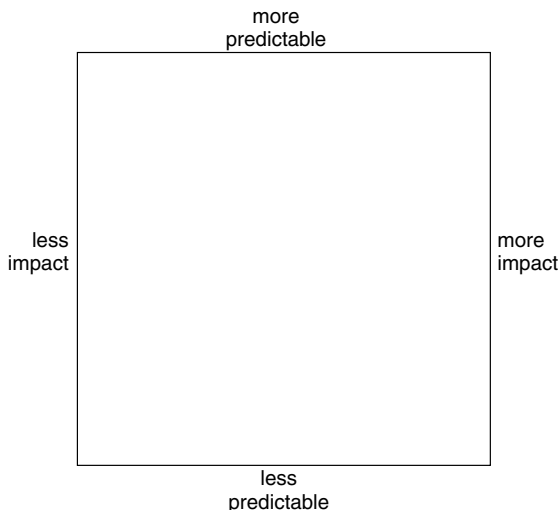
Figure 15.10 – (*continued*)

at step 2 and reconsidered in the final step of the scenario planning process – when such options are evaluated for robustness against the range of constructed futures.

In our *first* method for constructing scenarios (see Figure 15.2) we described, in step 8, a method of including those individuals/organizations who would be impacted by the futures described in the scenarios and would, therefore, act in their own interests as particular futures started to unfold. Another way of capturing *degrees* of such 'stakeholder' involvement and intervention is to construct a matrix such as that shown in Figure 15.12.

One of the outputs of step 2 of the driving forces method will be the names of stakeholders. Those elements can be placed on the 'stakeholder structuring space' of Figure 15.12 and consulted again after step 9.

As we saw in Figure 15.7, the outcome of the decision process in scenario planning is *not* the selection of the option with the highest

1. Identify the issue of concern and the horizon year which will be captured in the scenarios.
2. List anything that seems related to the issue of concern. Write each element on a 'post-it'.
3. Place each 'post-it' on the scenario structuring space, below, in relation to its perceived predictability/unpredictability and low impact/high impact on the issue of concern.

```
                          more
                       predictable
        ┌─────────────────────────────────┐
        │                                 │
        │                                 │
 less   │                                 │   more
impact   │                                 │  impact
        │                                 │
        │                                 │
        │                                 │
        │                                 │
        │                                 │
        │                                 │
        └─────────────────────────────────┘
                          less
                       predictable
```

4. Focus on the 'post-its' in the bottom right-hand corner, i.e. high impact/low predictability events. Try to cluster these 'post-its' into groups of *interrelated* events such that the 'post-its' in one grouping are interrelated among themselves but unrelated to the 'post-its' in other groupings.
5. From these clusters, try to identify a smaller number of underlying 'driving forces' that link these uncertainties/events at a deeper level.
6. Of the driving forces identified, which two or three really would make a difference to the decision maker and his/her business?
7. For each driving force try to capture the range of outcomes by two extremes.
8. Experiment by thinking of combinations of the extremes of one of the driving forces with the extremes of each of the other driving forces. From these 'thought experiments', develop the skeletons of three or four scenarios. Select short 'catchy' names that encapsulate the essence of the scenarios.
9. Inspect 'post-its' in the three other quadrants of the scenario structuring space. Place these elements into one or more of the skeleton scenarios created in step 8, in order to 'flesh' them out. Check that elements contained in the top left quadrant could, in principle, appear in any of the skeleton scenarios. If not, reconsider the coherence of the elements of each scenario.
10. Begin to develop each scenario 'storyline'. One way to start this process is to place all the elements within a scenario along a 'timeline' that starts at today's point in time and ends at the point in time captured in the scenario horizon year. Look for *causality* between elements. Storylines are more plausible when (some) elements are causally related. Time precedence is often a good cue to *potential* causality.
11. Review the scenarios in light of their utilization of the original elements in the bottom right-hand quadrant of the scenario structuring space. Are all the high impact/low predictability elements *bounded* by the range of scenarios that have been constructed?. If not, consider creating more scenarios to capture and structure the remaining elements in the quadrant.
12. Evaluate the business idea *or* strategic options against the futures represented in the scenarios.

Figure 15.11 – Steps in scenario construction: the driving force method

interest

low   high
power   power
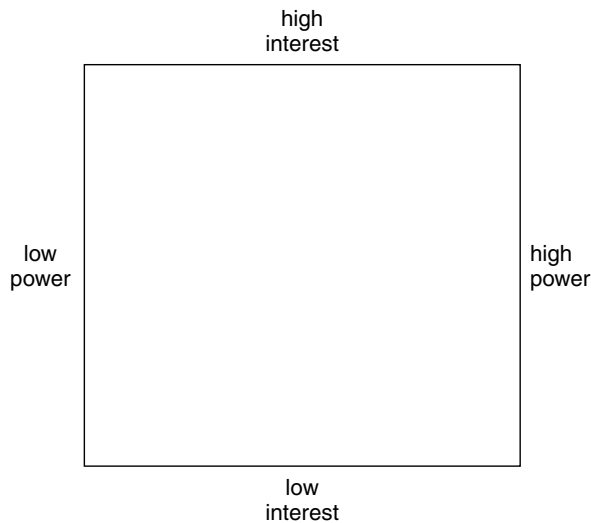
low
interest

Figure 15.12 – Stakeholder structuring space

expected value or utility but the selection of the most 'robust' decision in the face of an unpredictable future. This is also the focus of step 12 in the driving forces method of scenario construction. An additional focus is on the generation of more robust decision options. Generation of such robust options reduces uncertainty which, as we saw in Chapter 14, is psychologically important for decision makers who tend to prefer certainty to choice between risky options.

However, even if a fundamentally robust option cannot be developed, scenario thinking also provides other benefits. World views can be communicated easily in an organization via the medium of the scenario 'stories'. Additionally, once a story has been read, and the reasoning underlying its unfolding understood, a future has been 'rehearsed'. Thus, once the early events in a scenario occur, the decision maker will be able to anticipate how the future will unfold. These 'trigger events' will be seen as *information* among the stream of *data* that impacts upon the decision maker.

Just as the new purchaser of a particular make of car becomes very sensitive to the number of models of that make on the road and the differences in levels of equipment, etc., the scenario thinker becomes sensitive to a scenario starting to unfold and becoming reality. Such sensitivity can lead to *early* contingency action towards an unfavorable future.

Alternatively, new business opportunities can be quickly grasped as soon as favorable scenarios begin to unfold. Such early recognition and

reaction to an emerging future is seen, by some practitioners, as more useful than the creation of robust strategic options.

Typical outcomes of the scenario planning process include:

(i)   confirmation that the business idea is sound or that new strengths need to be added to create more robustness,
(ii) confirmation that lower-level business choices are sound or that alternative new options are more robust,
(iii) recognition that none of the business options are robust and, there-fore, contingency planning against unfavorable futures is necessary,
(iv) sensitivity to the 'early warning' elements that are precursors of desirable and unfavorable futures.

The next case study illustrates the impact that a scenario intervention can have upon an organization – showing that scenario thinking can invoke early contingency action towards avoiding unfavorable futures.

Case study of a scenario intervention in the public sector[5]

In this case study, we were asked to consider the futures facing a local council in the UK. The issue of concern was identified as the role of the council in the developing 'information age' and the horizon year for the scenario was five years hence. The council was being directed by central government to provide 'joined-up services' such that, for example, when a family moved into the council's geographical area, then both the council's (and their public agency partner's) services would be configured around that life event. This meant that service information and provision in areas such as refuse collection, schooling, health service, taxation, etc., would be provided in a tailored way, rather than, as currently, where the citizen has, herself, to achieve the joining up of service provision by initiating contact with each provider on an individual basis.

At the time of the scenario planning intervention, the public was increasingly expecting information and services to be structured and accessible to suit them, *not* the service providers. In parallel, there was an increasing volume of electronic transactions taking place between the public and private sector businesses, such as Internet banking and

Internet-facilitated purchase of goods (including groceries) from local and distant vendors.

In this context, the council was considering introducing call centers to cope with the influx of telephone calls. A general idea was to provide the 'joining up via knowledge of the telephone operators' but this course of action was in the early stages of consideration – driven, in the main, by approaches from a national telecoms company who has expertise in the provision of call centers.

During the scenario intervention, five clusters of high impact/low predictability events were identified. These were:

(i) *partner agendas* – whether partner organizations share the values of the council, the commitment to involvement, willingness to share resources, etc.,

(ii) *information mapping and understanding the basics of the business* – how do current systems relate to knowledge management, can duplicate systems be integrated/eliminated, etc.?

(iii) *public ownership* – is the commitment to involvement a solution or an ideology, will the public be with the council, how does it relate to cultures of youth and the underclasses, will participation be hijacked by pressure groups, etc.?

(iv) *central agencies as help or hindrance* – what is the real agenda of central government, does system centralization conflict with democracy, etc.?

(v) *the opportunities and constraints offered by new technologies* – what *resource implications* are there for the change process, what will be the *macro-economic factors* of relevance, how will change be managed and what will be the new *organizational design* required to implement joined-up government in the future?

Prior to the scenario workshop, further input to the participants' expanding frame of thinking was gained by the invitation of a small number of external experts – remarkable people – to present views on the limits of the future of information and communication technology (ICT), their application to public sector management and the nature of governance and society. Input here from a telecommunications designer put technological capability forecasts into the wider context of the telecommunications industry's then current financial commitments, the global economic situation, etc., while the applications capabilities of ICT were demonstrated by 'virtual visits' to leading-edge developments in Australia. The scenario workshop was structured around our facilitation of the participants' initial identification of the widest possible range of

driving forces that could produce change over the next five years. This was an open-ended process, in that no time limit was placed upon it, and it was conducted initially in round-robin format, such that all 25 members provided input in turn until each ran out of ideas. Over a period of some 90 minutes, over 120 driving forces were identified by individuals and clarified by the group in terms of the plausible polar outcomes within the council's context of operations. The driving forces and polar outcomes were recorded separately and related by number coding (driving force 1 produced polar outcomes 1A and 1B, 2 produced 2A and 2B, etc.) on magnetic hexagons on large wall-mounted boards, so that the entire group could share the content and the process of manipulation of ideas without intervention by us, or without any individual member of the group constraining the thinking according to their own agenda. The driving forces were then clustered by the participants as a group – through a process of manipulation of the hexagons, accompanied by open discussion, argument, negotiation and compromise, again with the aims of investigating perceived casual relationships, and surfacing a manageable number of higher-level concepts without reduction. The participants themselves defined these higher-level concepts by agreeing encapsulating titles for each cluster. These higher-level concepts were then ranked by the participants, first according to the relative impact they were considered likely to have on the business, and second by the perceived relative degree of unpredictability as to what the outcomes of this impact might be over the next five years.

In accordance with the adopted scenario approach, the scenario dimensions were derived from those two higher-level concepts that, while not directly driving each other, were considered to have the combination of greatest impact, with highest degree of unpredictability as to the outcomes. These scenario dimensions related to the fields of:

 (i) *the democratic process* – primarily concerned with the balance between central and local government, and the effect of the balance struck between these upon delivery of services at the local level by the council,
(ii) *value creation* – concerned with the speed of development of new technologies, the capacity for individuals and organizations to internalize these and their use to become more productive.

In relation to the democratic process, the participants saw unpredictability as to whether decision making would rest with individuals and with businesses, with minimum intervention from government and the public sector agencies, or whether society would move towards a

collectivism in which community issues would come into force. In relation to value creation from new technologies, there was unpredictability as to whether technology would be adapted to human needs, unleashing a new productivity through unimpeded uptake, or whether technology uptake would be subject to institutional constraints. The latter situation would see the development of a division between those who have access to and skills to use technologies and those who have either not got access to or cannot use them. In both cases, the impact of the outcomes was considered to have a major impact upon the council.

Through the processes of discussion, negotiation and argument, a combination of the two polar extremes for each of the two identified driving forces enabled the participants to build up four rich, and internally consistent, pictures of each of the possible futures. These four, separable, but yet plausible, futures were recognized by participants as their own creations – rather than descriptions of futures that were favored by the external consultancy team. After the full group had completed this stage, four subgroups then each worked with one member of the facilitation team in order to develop the storyline over time for one of the scenarios. These smaller groups considered the relationship between different factors in terms of perceived cause and effect and chronology. They considered the starting point of the story in relation to aspects of the present, the key events – decisions, developments, exercises of power by key stakeholders, etc. – that would determine and describe its unfolding and the end state that would define it. These short histories of the future were designed, constructed, named and made sense of by the participants themselves, not by us, and were therefore the wholly owned intellectual property of the council and its partners. They were not represented as 'good' or 'bad' worlds, nor was any presented as more or less likely than any other. All four were seen as entirely plausible developments that were worthy of consideration in planning the way forward towards modernizing and joining up government through the adoption of new technologies. However, each presented different challenges and different opportunities to the council.

The scenario titles and key identifiers are as follows:

Forward to the past

In this future, centralization dominates over dispersed and local governance, and central government runs the show. There are real barriers to change, with restricted funding for local government, mismatches in the geographical boundaries of councils in relation to areas of wealth and

employment and a reluctance to share accountability across councils and agencies. The adoption of new technologies and the resultant productivity improvement in the public sector has come at the expense of local councils, with a drive towards centralization at government level and to central or privatization of services at the local level. This future may mark the beginning of the end for local government.

Free enterprise

Here, there is emancipation of the public and a drive away from the paternalism of the old-style bureaucratic governance. The 'customer rules' and market force are delivering – but only for some. For those with access to, and the capability to use, new technologies, there is a public-free spirit, with '24 × 7' access to the 'new public sector trade'. While there are drives towards achieving economies of scale, there is a challenge to the concept of 'one size fits all', with a demand for premium services from those who can afford to pay extra for them. There is, however, serious polarization in society, with exclusion from the new society of the underclass who can either ill-afford, or who are ill-equipped to use the emerging technologies.

People's kailyard[6]

In this scenario, there is increasing interest in the democratic process, but primarily at a superficial level, rather than with the fundamentals. As such, there is a tendency towards seeking the 'quick fix' to immediate problems, with fear of adverse publicity and media reaction to any perceived failure. New technologies open up new channels of communication from citizenry, and there is greater social inclusion at the superficial level with public consultation processes, but a resultant move towards concentration upon dealing with complaints, rather than with serving needs and improving services. As such, there is reinforcement of top-down and fragmented government, lack of real public accountability and an ever-increasing gap between the reality and potential for service effectiveness.

Technology serves

Here, there is a combination of technology facilitating increased access by the citizenry and development of a proactive form of civic governance that is based upon meaningful dialogue between citizens and

government. Elected members of their officers are enabled to act at the local level for all members of society, including the 'invisibles' and the 'excluded'. National government settles the subsidiarity debate in favor of local democracy and supports trailblazing projects that demonstrate the competence of civic governance, for example in the field of social housing. Here, the new technologies facilitate a new form of joined-up government from the bottom up.

Each of the subgroups presented their scenario outline to the full participant group, with the key differences between each clearly differentiating the possibilities for a range of plausible futures. In 'Forward to the past', there is seen a downward spiral, a vicious circle towards greater centralization and limited or no local government in the future. In 'Free enterprise', local government is unencumbered by bureaucracy, but there is delivery of 'premium services' for those who can/will pay, but with increased polarization, disenfranchisement and fallout in society. In the 'People's kailyard', there is mediocrity and, surrounded by legislation, cross-organizational boundary, non-standard protocols, etc.; there is much talk of change, but a continuous finding of new problems to talk about, so no change. 'In Technology serves', there is a future in which the group's common aspirations, visions and desires for change are seen to be enabled.

Through discussion of the underlying trends and major driving forces that underpinned each of the scenarios, the council themselves derived an initial set of key implications that were seen to be fundamental to their immediate thinking/acting, if they were to be effective in exerting whatever influence they might reasonably have over the reality of the future that will unfold over the next five years. These were:

(1) Northshire Council must lead from the front, with bold steps in developing an integrated and inclusive approach to technological innovation. The dangers of the small-step and short-term approach were highlighted in the kailyard scenario – where central government stepped in to take control from local government.

(2) The council must promote democracy in action, by making the new technologies serve the people and by using technology to develop 'civic governance'. They must bring local government closer to the community level, developing high levels of ability to listen and respond to citizen wants and needs. They must develop transparency and accountability in their deeds and actions, with policies that are meaningful to the public.

(3) New technologies must be used to demonstrate the competence of local government, achieving public confidence and support through

the provision of responsive, community-oriented services, more customized services, while at the same time applying the technologies to support inclusion and to reduce inequalities.
(4) Northshire Council must use the new technologies in order to promote itself as the 'home for sustainable value creation'.
(5) The council must proactively promote and lobby for settlement of the subsidiarity debate in favor of governance at the local level.
(6) Finally, in developing short-term solutions to immediate problems, the council must watch out that long-term aspirations remain the guiding light.

Following the outcomes of the scenario project and the resultant debate within Northshire Council on the above implications, there have been strategic decisions taken in support of fostering the concept of joined-up government and seeking to foster the relationship with central government, of whatever political persuasion, while promoting the case of Northshire in the widest political and business arenas. In addition to these strategic decisions, there has been operational action in seeking to establish a web-based knowledge and transaction system that will promote a citizen and business-focused interface between new integrated service demand and provision by the council and its partners.
    Benefits from the scenario interventions were seen to be:

 (i) shared insights for participants in the process,
 (ii) alternative ways forward tested against scenarios,
(iii) motivation for action from these insights,
(iv) agreement on a well-defined way forward,
 (v) agreement on technology choice to support the way forward.

    As such, the pre-intervention concerns with call center provision had been replaced by a focus on developing Internet and intranet capabilities to provide information and services to citizens – in the form of both (i) single service transactions and (ii) integrated transactions involving multiple service delivery.
    In short, the scenario workshop invoked an 'organizational jolt' to routine, 'business-as-usual', thinking. The major insight was that continuing with business-as-usual was a fragile strategy against the constructed futures.
    The scenario approach to decision making in the face of uncertainty contrasts with decision-analytic approaches since participants in the scenario project were able to consider plausible future scenarios *prior* to evaluating strategic options. In decision analysis, options for action

are determined first, and outcomes are predicated upon the selected options – 'if we do this, what might happen?'. Our case example illustrates that the scenario approach opened up the participants' thinking to alternative framings of the nature of the future and they were able to reconsider and redesign strategies in response to these futures.

Scenario thinking can be contrasted with alternative future methodologies such as Delphi. As we saw in Chapter 12, in Delphi applications the focus is, by contrast, on determining the collective opinion of a group of experts on a well-defined issue that is to be *forecast*. Four necessary features characterize a Delphi procedure, namely, anonymity, iteration, controlled feedback of the panelists' judgments and statistical aggregation of group members' responses. Anonymity is achieved using self-administered questionnaires (on either paper or computer). By allowing the group members to express their opinions and judgments privately, one may be able to diminish the effects for social pressures, as from dominant or dogmatic individuals, or from a majority. Ideally, this should allow the individuals to consider each idea based on merit alone, rather than based on potentially invalid criteria (such as the status of an idea's proponent). Furthermore, by iterating the questionnaire over a number of rounds, one gives panelists the opportunity to change their opinions and judgments without fear of losing face in the eyes of the (anonymous) others in the group. By contrast, the participants in scenario workshops interact socially – but the interaction is structured by facilitators – individuals who have expertise in the scenario process.

Our comparative views on scenario planning, decision analysis, and Delphi are given in Table 15.1.

In summary, our case example supports the use of scenario planning as an organizational intervention that enhances individual and team views about the nature of the future. This enhanced understanding is, as we have demonstrated, likely to invoke an action-oriented response from decision makers in the organization.

Combining scenario planning and decision analysis

Despite the advantages of scenario planning, we saw in Figure 15.7 that the evaluation of strategies against objectives was relatively informal. When a number of objectives are involved, there are clear dangers in this approach. We saw in Chapter 2 that unaided decision makers often respond to complex decision problems by using simplifying mental heuristics, such as lexicographic ranking, when evaluating options

Table 15.1 – The components of the futures methodologies

	Scenario planning	Decision analysis	Delphi
Future orientation	Multiple frames of the future are constructed during the process	Decision analysis is conventionally undertaken within a singular general frame of the future	Delphi is usually focused on forecasting the occurrence of a single event or quantity
Structure of judgment inputs	Qualitative decomposition into critical uncertainties and trends. An emphasis on understanding causality	Quantitative decomposition into probabilities, payoffs and decision trees	Structuring is achieved by the controlled exchange of information between anonymous panelists over a number of rounds (iterations)
Information orientation	Scenario team members exchange existing opinions on issues of concern and 'remarkable people' systematically provide insight on issues of critical uncertainty	Fresh information may be sought if the analysis indicates that a decision is sensitive to small changes in judgmental inputs	Expert panelists exchange their existing estimates. Individual experts can hold, or change, their estimates on the basis of feedback of the estimates of other panelists
Process orientation	Dissenting opinions are given 'airtime' which is preserved, and combined with the opinions of others, while maintaining divergence	Focus on combining divergent opinions by averaging and reduction	The statistical average of the estimates on the final Delphi round is taken as the group judgment
Action orientation	The result is shared understanding within the management team, of causally determined futures that can galvanize managerial action to avoid unfavorable futures or facilitate the occurrence of favorable ones	The result of the analysis is a single recommended decision for subsequent implementation	None

against multiple objectives. The result may be that the evaluation of strategies will be incomplete or distorted because undue attention is paid to particular objectives, at the expense of others.

Because of this, we believe that decision analysis techniques based on methods like SMART and SMARTER (see Chapter 3) can usefully complement scenario planning by formalizing the process of evaluating strategies. We believe that the use of these techniques can bring considerable advantages to scenario planning. The decomposition of objectives should sensitize planners to the substantive issues involved with the evaluation of strategies. This may yield deeper insights and possibly enhance the ability of planners to create and design strategies. Moreover, decision analysis provides a common language of communication between different stakeholders, and hence allows the communication of minority views.[7] It allows for specialist inputs into the planning process when problems are multi-faceted so that there are no overall experts.[8] The result should be a common understanding of problems,[9] or at least a common set of terms to discuss a problem,[8] and possibly a resolution of conflicts.

The objective of the approach we outline below is to inform and structure debate and to increase awareness of key issues, rather than to prescribe an 'optimal solution'. The intention is to identify strategies which perform well, or at least acceptably, over the range of plausible scenarios. Consistent with scenario planning, there is no attempt to assess probabilities for the scenarios or to maximize expected values.

The main stages of the approach are shown below:

Stage 1: Formulate scenarios.
Stage 2: Formulate objectives.
Stage 3: Design alternative strategies.
Stage 4: Check strategies for feasibility; remove infeasible strategies.
Stage 5: For each objective:
       (a) rank all the strategy/scenario combinations from best to worst
       (b) allocate a score of 100 to the best strategy/scenario combination and 0 to the worst
       (c) allocate scores between 0 and 100 for intermediate strategy scenario combinations.
Stage 6: Remove strategies whose performance on any objective is such that the strategy is unacceptable.
Stage 7: (a) Consider 0 to 100 swings in strategy/scenario combinations and rank these swings in order of importance.

       (b) Attach a weight of 100 to the most important swing and measure the importance of other swings on this scale. Normalize the weights so that they sum to one.

Stage 8: For each strategy/scenario combination use the attribute scores and weights to determine a weighted aggregate score.

Stage 9: Use the matrix of strategy/scenario aggregate scores to assess and compare the strategies' performance, paying particular attention to the robustness of performance over the range of scenarios.

Stage 10: Perform sensitivity analysis.

While the approach is very similar to SMART (see Chapter 3), a crucial difference is the ordering of the stages of the analysis. The alternative strategies are not considered until the plausible scenarios have been formulated *and* the objectives determined. This latter deviation from SMART reflects Keeney's concern[10] that objectives should be identified before alternatives since this is more likely to facilitate the design of imaginative options and identification of new opportunities. We next use a simplified case study to demonstrate the approach. Note that, in practice, switching backwards and forwards between the stages is likely as an increased understanding of the problem develops.

Illustrative case study

This case study concerns a newly privatized national mail company which needs to formulate strategies with a 10-year planning horizon. To date, the company has been protected by legislation which allows it to operate as a monopoly on letter deliveries. This protection has engendered a culture of muddling through (i.e. minor adjustments to policies in reaction to events, with no clear sense of overall direction). However, the environment within which the company may operate in the future is likely to change fundamentally. For example, there is a possibility that it will lose its monopoly position, while technological developments pose long-term threats to the volume of letter mail.

Stage 1 Formulate scenarios

For simplicity, only two 'extreme-world' scenarios will be used here.

Scenario 1: (DOG FIGHT)   The company loses its monopoly. Rival companies take several years to develop their own delivery systems, but within five years there is keen competition on price, delivery times and reliability. Growth in the usage of electronic communications, particularly by direct marketing organizations leads to a large reduction in the total volume of paper mail which needs to be delivered. This reduction is exacerbated by poor economic conditions.

Scenario 2: (MAIL MOUNTAIN)   The company retains its monopoly on letter delivery. Despite increases in the use of electronic communications, taxes levied on e-mail messages mean that paper mail remains popular. Buoyant economic conditions lead to increases in the volume of mail generated by direct marketing organizations. Increased 'home working' also leads to increases in the number of paper documents which need to be delivered by mail.

Stage 2 Formulate objectives

Value trees (see Chapter 3) can be useful here. The five objectives identified are to maximize (i) short-term profit, (ii) long-term profit, (iii) market share, (iv) growth and (v) the flexibility of any strategy. Flexibility refers here to the extent to which a strategy can be adapted to the different conditions which might prevail *within* a given scenario (e.g. to counter the changing tactics of rival companies).

Stage 3 Design alternative strategies

Alternative strategies are given below.

A Continue with the current strategy of specializing in letter delivery, continuing to take advantage of increased mechanization where appropriate, by buying the technology from foreign suppliers (STATUS QUO).
B Continue specializing in letter delivery, but allocate very large amounts of investment to R&D with the objective of becoming a world leader in letter sorting technology (R&D).
C As A, but also diversify into electronic communications by becoming an Internet service provider and by seeking to merge with a telecommunications company (DIVERSIFY).

Stage 4 Check strategies for feasibility

Strategies need to be screened to check that they are feasible (e.g. capable of being funded or capable of being supported logistically and technologically). In this case it is assumed that all three strategies are feasible.

Stage 5 For each lower level objective in the objectives hierarchy:

(a) *rank all of the strategy-scenario combinations from best (1) to worst (6) in terms of performance against that objective:*

Examples of ranks for two of the objectives are given below.

Objective: Maximize long-term profit

	Scenario	
Strategy	DOG FIGHT	MAIL MOUNTAIN
STATUS QUO	6	2
R&D	5	1
DIVERSIFY	4	3

Thus the R&D strategy, under the MAIL MOUNTAIN scenario, would, it is thought, lead to the best long-term profit, while the STATUS QUO strategy, under the DOG FIGHT scenario, would yield the worst.

Objective: Maximize share of letter market

	Scenario	
Strategy	DOG FIGHT	MAIL MOUNTAIN
STATUS QUO	5 =	1 =
R&D	4	1 =
DIVERSIFY	5 =	1 =

(b) *Allocate a score of 100 to the best strategy-scenario combination and 0 to the worst.*
(c) *Allocate scores between 0 and 100 to represent the performance of intermediate strategy-scenario combinations against the objective.*

These scores do not need to be exact. The process of determining them and the focused thinking that this engenders are likely to be at least as valuable as the quantitative result which is obtained at the end of the analysis. For our two example objectives the scores are shown below.

Objective: Maximize long-term profit

Strategy	Scenario	
	DOG FIGHT	MAIL MOUNTAIN
STATUS QUO	0	80
R&D	30	100
DIVERSIFY	50	60

Objective: Maximize share of letter market

Strategy	Scenario	
	DOG FIGHT	MAIL MOUNTAIN
STATUS QUO	0	100
R&D	80	100
DIVERSIFY	0	100

Stage 6 Remove strategies whose performance on any objective, in any scenario, renders the strategy to be unacceptable

This is an important stage in the analysis. It should serve to alert decision makers to the dangers of pursuing particular strategies. It may also, of course, enable strategies to be modified to avoid such dangers. (Note that removal of a strategy will necessitate a reallocation of scores, where that strategy was the only one to score either 0 or 100 against a given objective.) In this case it is assumed that all strategies are acceptable.

Stage 7 (a) Compare 0 to 100 swings in strategy-scenario combinations for the objectives. Rank these swings in order of importance

In Chapter 3 we argued that swing weights should be used to compare the 'importance' of objectives. Here, this will involve ranking the

importance of the *range* (or 'swing') between the worst and best performances on the different objectives. Comparing these '0 to 100' swings in scores for the objectives of the national mail company leads to the following ranks:

Swing	Rank (1 = most important swing)
Worst long-term profit to best	1
Least market share to highest	2
Least flexibility to most	3
Least growth to highest	4
Worst short-term profit to best	5

(b) *Attach a weight of 100 to the most important swing and compare it with the importance of the other swings on a 0 to 100 scale*

The weights assessed for the mail company are given below. For ease of calculation it is conventional to normalize the weights so that they sum to 100. This is achieved by simply dividing each weight by the sum of the weights and multiplying by 100.

Swing	Weight	Normalized weights
Worst long-term profit to best	100	50
Least market share to highest	40	20
Least flexibility to most	30	15
Least growth to highest	20	10
Worst short-term profit to best	10	5
Sum	200	100

Stage 8 Obtain an aggregate score for each strategy-scenario combination

For each scenario, an aggregate score can now be obtained to measure the performance of a given strategy over all the objectives. This is calculated by multiplying the score for each objective by the normalized weight for that objective, summing the resulting products and dividing by 100. For example, the performance of the STATUS QUO strategy in the MAIL MOUNTAIN scenario is calculated as follows:

Objective	Weight	Score	Weight × score
Short-term profit	5	100	500
Long-term profit	50	80	4000
Market share	20	100	2000
Growth	10	70	700
Flexibility	15	10	150
		Total	7350

Aggregate score = 7350/100 = 73.5.

By repeating this process for all of the other strategy-scenario combinations, the following matrix is obtained.

Aggregate scores

	Scenario	
Strategy	DOG FIGHT	MAIL MOUNTAIN
STATUS QUO	4.5	73.5
R&D	41.5	87.5
DIVERSIFY	42.3	76.0

Stage 9 Use the matrix to compare the strategies' performance

The scores show that the STATUS QUO is dominated by both the R&D and DIVERSIFY strategies. It performs worst under both scenarios and therefore does not appear to be a strategy which is worth considering. While there is little to choose between the R&D and DIVERSIFY strategies in the DOG FIGHT scenario, the R&D strategy is clearly superior in the MAIL MOUNTAIN scenario. Provisionally, the R&D strategy appears to be the most attractive. Of course, it is possible that by fostering new insights into the problem the decision analysis process will enable new and more robust strategies to be designed.

Stage 10 Perform sensitivity analysis

The scores and weights used in the analysis were based in rough and ready judgments. Also, in a group of decision makers there are likely to be different opinions, or minority views, on which scores and weights are appropriate. For these reasons it can be useful to investigate the effect of changes in these values on the aggregate scores of the strategy-scenario

combinations. Often the relative performance of strategies is robust to changes in these judgmental inputs.[3] This can sometimes lead to the resolution of disputes between members of a planning team who, for example, may see that the same strategy is always superior whichever pair of competing weights is attached to an objective.

Conclusion

Scenario thinking can be used as a way of evaluating decision options, as we have described above. As we have seen, used in this way, scenario thinking avoids any need to think probabilistically and allows a variety of viewpoints about the future to be reflected.

However, scenario planning is a practitioner-derived approach to dealing with uncertainty in decision making. It is not based on an axiom system – as is decision analysis – and so different practitioners tend to promote different methodologies to construct scenarios. We have described just two here – the extreme-world method and the driving forces method. As we have seen, scenario thinking emphasizes the construction of causal 'storylines' that describe how the future will unfold. Willem Wagenaar[11] in a study of how judges reach decisions in courtrooms has found, analogously, that judges and juries do not weigh probabilities that a defendant is guilty 'beyond reasonable doubt'. Instead, such decision makers evaluate scenarios that describe *why* and *how* the accused committed the crime. One such scenario is, in principle, contained in the prosecution's indictment. The prosecution tells the story of what happened and the court decides whether that is a true story or not. 'Good' stories provide a context that gives an easy and natural explanation of why the 'actors' behaved in the way they did. So, storytelling via scenario planning may be a natural way of making sense of the world. Kees van der Heijden[12] argues that, because of its focus on causality, scenario planning is intuitively more attractive to managers than approaches such as decision trees, which are essentially ways of choosing between gambles with different expected values (or utilities). Additionally, van der Heijden argues, decision tree analysis requires a rigorous, but yet *static*, definition of a decision problem. By contrast, decision makers experience and acknowledge the continuing fluidity of an emerging decision context and feel, he argues, uncomfortable with any further loss of flexibility introduced by decision analysis. Scenario planning does not evaluate options against uncertainties in a single

process of analysis. Instead, once the range of plausible futures has been defined, these futures can be utilized over an extended time period as and when new decision options are developed and subsequently tested in the 'windtunnel' conditions.[13]

Despite these advantages, we have also argued that some decision analysis methods can usefully complement scenario planning. The use of methods based on multi-attribute value analysis is likely to reduce the complexities of evaluating strategies against multiple objectives in multiple scenarios. A more insightful approach to strategic decision making should be the result.

Discussion questions

(1) Decision trees and scenario planning are two ways of dealing with uncertainty in the business environment. What are the advantages and disadvantages of each approach?

(2) To what extent does the scenario planning process contain components that are likely to prompt the recognition and resolution of the problems of frame-blindness and strategic inertia?

(3) Some commentators argue that scenario planning is best suited to the long-term future and major strategic decisions, whereas decision analysis is focused on short-term operational decisions. Do you agree? In what other ways do the domains of applicability of scenario planning and decision analysis differ?

(4) Consider your organization. What major trends (predetermineds) and uncertainties will have a significant impact, either positive or negative, on its viability in the next 15 years? Create a range of scenarios, using either the extreme-world or driving forces methods, to incorporate these elements. Next, consider your organization's defining strategy (or business idea). Does it perform robustly against the scenarios? If it does not, what aspects of the strategy should be changed?

References

1. Adapted from Irvine, I. W. (1992) *Change Management: How a Manufacturer is Learning to Compete in New Markets*, Strathclyde Graduate Business School MBA dissertation.

2. Van der Heijden, K. (1996) *Scenarios: the Art of Strategic Conversation*, Wiley, Chichester.
3. Adapted from Ng, S. M. W. and McConnell, D. (1993) *Development of a Coherent European Strategy as Part of a Global Strategy for a Multi-national Corporation in Liner Industry*, Strathclyde Graduate Business School MBA dissertation.
4. Adapted from Kahane, A. (1992) The Mont Fleur Scenarios, *Weeky Mail* and *The Guardian Weekly*, Bellville, South Africa.
5. Carins, G., Wright, G., Bradfield, R., van der Heijden, K. and Burt, G. (in press) Exploring E-Government Futures through the Application of Scenario Planning, *Technological Forecasting and Social Change*.
6. 'Kailyard' is an old Scots term for 'cabbage patch' and was selected by participants in the subgroup to describe a level of minimum subsistence for members of society – despite vast amounts of energy expended on tending the 'cabbage patch'.
7. Von Winterfeldt, D. and Edwards, W. (1986) *Decision Analysis and Behavioral Research*, Cambridge University Press, Cambridge.
8. Keeney, R. L. (1982) Decision Analysis: An Overview, *Operations Research*, **30**, 803–838.
9. Phillips, L. D. (1984) A Theory of Requisite Decision Models, *Acta Psychologica*, **56**, 29–48.
10. Keeney, R. L. (1992) *Value Focused Thinking*, Harvard University Press, Cambridge, MA.
11. Wagenaar, W. A. (1994) The Subjective Probability of Guilt, in G. Wright and P. Ayton (eds) *Subjective Probability*, Wiley, Chichester.
12. Van der Heijden, K. (1994) Probabilistic Planning and Scenario Planning, in G. Wright and P. Ayton (eds) *Subjective Probability*, Wiley, Chichester.
13. For further reading on scenario planning see Wack, P. (1985) Scenarios: Uncharted Waters Ahead, *Harvard Business Review*, Sept.–Oct., 73–90.
    Wack, P. (1985) Scenarios: Shooting the Rapids, *Harvard Business Review*, Nov.–Dec., 131–142.
    Schoemaker, P. J. H. (1995) Scenario Planning: A Tool for Strategic Thinking, *Sloan Management Review*, Winter, 25–40.