From scenario planning to scenario network mapping

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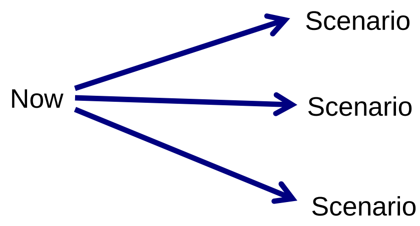
Abstract

This paper describes four approaches to scenario planning - three conventional, and one new. The conventional approaches are expert scenarios, standardized scenarios, and critical uncertainties method. These three methods have minor differences, related to the ways in which the scenarios are developed, but share most characteristics. A new approach, Scenario Network Mapping (developed by the present author over the last few years) attempts to overcome some of the deficiencies of traditional scenario-building methods.

Theoretical basis of scenarios

Scenario planning was developed as one of the family of “alternative futures” methods by forecasters who were dissatisfied with the accuracy of conventional statistical forecasting over periods of more than a few years. Acknowledging that the future is unpredictable, the principle of alternative futures is to develop a number of possible futures in which an organization or other entity might find itself, for consideration of action if that future should eventuate. The possible futures can be shown thus, with time moving toward the right:



Scenario planning was first developed in the 1950s by futurists in the RAND Institute. Herman Kahn (1961) is generally accepted as the originator of the method. However, partly due to military secrecy, little was published in this area until the 1970s. Around the same time, a similar method was developed in France, and referred to as la prospective (de Jouvenel, 1967). Because of this empirical foundation, and perhaps due to the difficulty of applying the academic theoretical foundation of causality to events possibly taking place in the future, theoretical development in this area has not been strong. Bell (1997) attempted to construct a theoretical foundation, anchoring futures studies in values, while List (2005) set out a series of principles for anticipating the future; these provide the basis of scenario network mapping.

Conventional methods of scenario building

This section compares three conventional methods of constructing scenarios: the expert method, standardized scenarios, and (now the commonest) the critical uncertainties method.

Conventional scenario methods share the following attributes:

- Scenarios are always created in ensembles. There are usually 3 or 4 scenarios in an ensemble, with a minimum of 2 (due to the principle of alternative futures), and a maximum of around 7.
- Each scenario is elaborated in quite a lot of detail - typically 5 to 10 pages.
- Each scenario in an ensemble is quite separate; they are designed to contrast, rather than interlink.
- Scenarios are generally (though not always) derived as snapshots of future states. Though Kahn developed some scenarios as chains, modern scenarios generally begin with the endstate. Though they sometimes explain partly how that endstate could eventuate, this is not a rigorous process. (In fact, the whole concept of rigour is in many ways not applicable to scenarios: rigour implies comprehensiveness, and that is not possible in anticipating the future, except at a trivial level..)

Thus in diagrammatic form, an ensemble of conventional scenarios would look like this (with time flowing from left to right, and the leftmost dot marking the present situation), We now consider each of the three methods of building standard scenarios.

Expert scenarios
This is an 8-step method made famous in the 1970s by Shell Oil (which anticipated and thus profited from the oil crisis of 1973), and described in detail by Schwartz (1991). The steps are as follows.

Step 1. Identify the issue or entity whose future is to be studied. This seems obvious, the scope of scenario ensembles has tended to often prove too narrow, in retrospect - as in a study of scenarios for the year 2000 made by the present author (List, 2004b).
Step 2. Identify key factors in the future of that entity or issue. This is done in consultation with those who work in the industry or the firm.
Step 3. Identify broad driving forces, such as demographics, social trends, and new technologies. These can be regarded as unstoppable forces.
Step 4. Rank the key factors and the driving forces on uncertainty and potential impact. The most uncertain and the highest-impact elements will be focused on in scenario construction.
Step 5. Develop the scenario logics. This is a trial and error process, iterated until each broad scenario is logically cohesive.
Step 6. When the outlines of the ensemble are settled, develop the details of each scenario, fleshing out the scenarios in relation to steps 2 and 3 above. It is important to ensure plausibility. Each scenario "world" must be presented as internally consistent.
Step 7. Consider the implications of the scenario ensemble. Run current possibilities for the inquiring entity through each scenario. In which scenarios is the possibility feasible? In which is the entity vulnerable? Which scenarios present the highest risks? For a large investment with a long payback period (such as the construction of an oil refinery in an unstable country) the investment may not go ahead unless all scenarios display favourable outcomes.
Step 8. Identify a set of leading indicators that will provide early warning if an anticipated scenario begins to unfold.

As the title "expert scenarios" implies, most of the above eight steps are carried out by experts. Typically they are specialists in scenario work, with experience in creating scenarios for a range of different entities.

Standardized scenarios
In scenario work, some sets of scenarios occur over and over again. Thus the principle of standardized scenarios (as in Dator, 1998) begins with three or four end-state scenarios, and explores the antecedents and consequences of each for the entity under study. Dator's four standard scenarios are (a) continuation of the relevant status quo, (b) collapse, (c) disciplined society (organized around some set of overarching values or authority), and (d) transformational society (with emergence of new forms of beliefs, behaviour, etc.).

The critical uncertainties method
This has become the most common method, perhaps because simple instructions exist (such as the manual by South Wind Design, 2001), and thus the scenarios can be constructed without experts - who are thin on the ground, with around only a few hundred in the entire world. The steps in construction of critical uncertainties scenarios are:

Step 1. List trends and situations likely to affect the entity being studied.
Step 2. Group them in a 2 x 2 matrix: critical / not critical BY more certain / uncertain
Step 3. From the uncertain & critical quadrant, choose the 2 or 3 most important trends etc. These form the axes for the scenarios.
Step 4. If you chose 2 variables (A and B), now create a 2x2 matrix of these, with 4 quadrants...
Step 5. The outer corner of each quadrant then represents a scenario, which is fleshed out.

Sometimes some of the four (or eight) scenarios are not logically consistent, so fewer scenarios are derived. Again there is a strong emphasis on plausibility.

An instructive example is a study of the future of information technology in 2000, by Randall (1997). Four scenarios were derived, from two axial variables: (a) interactive vs passive computing, and (b) mass use vs minority use

Randall's four scenarios were:

- "Web Worlds": wide popular appeal with entertainment, such as multi-player games (interactive, mass use)
- "Nano-segmentation": catering to specialized minority interests, mainly providing information (passive, minority use)
- "Crumbling walls": integration of content with media, equivalent to televison programs online (passive, mass use)
- "Wild wild web": chaotic and lawless, thus off-putting to many potential users (interactive, minority use)

The outcome - which should be obvious to all with an interest in the development of the Internet - is clearly that all four scenarios applied. The Web is both interactive (in some ways) and passive (in others). It has elements that appeal to the majority and to minorities. Thus what was presented as a set of possibilities became simply a two-dimensional categorization. This example was chosen because of the short time-span involved, and the clearly delineated possibilities. For most other examples of scenario planning, the outcome is more hazy and longer delayed.

Difficulties with conventional scenario methods
The Randall (1997) example is not unusual, in that often all scenarios apply simultaneously, and the method has been criticized by writers such as Bood and Postma (1997) and Liebl (2002). Two key criticisms are:

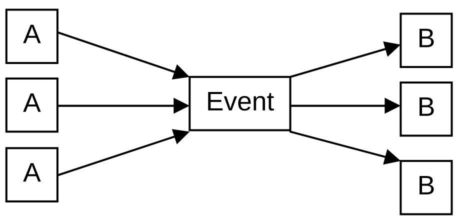
1. That no interconnections are delineated between scenarios - each scenario is a completely independent "world".
2. Development is cumbersome and slow. For example, Shell Oil takes more than a year to develop. Though this is not in itself a problem, it makes the process very expensive, and scenarios developed in any of the above three ways are not easily changed to match unexpected circumstances, without beginning completely *ab initio.*

Scenario network mapping

Considering these problems led to the development of a quite different method of scenario planning: scenario network mapping (SNM). Instead of (as with the above conventional methods) developing a few scenarios in detail, a much larger number is developed, each in much less detail. These small components are thus more easily replaced or modified. Instead of each scenario being treated as a stand-alone entity, they are deliberately linked. there is no implication that only one of the ensuing scenarios will "come true".

The process for creating scenario network maps was designed from the beginning to be one that is suitable for development by inexperienced scenario planners. The network maps are relatively quick and easy to develop, and are designed to be done in a series of four half-day workshops, typically involving around 20 people, from the widest possible range of stakeholder groups for an entity.

The heart of SNM is the event tree; a concept that was adapted from development evaluation, in particular from ZOPP (Ziel-Orienterte Projekt Planung, or "goal-oriented project planning"), a method developed as a variation on the Logical Framework Approach by the German aid agency GTZ. (Helming and Gobel, 1997). One element of ZOPP is the problem tree: when a social problem is depicted as the trunk of a tree, the roots can represent a hierarchy of causes, while the branches represent a hierarchy of effects. In scenario network mapping, the problem tree is converted into an event tree. There is a central event (the trunk), a hierarchy of causes (the roots), and a hierarchy of outcomes (the branches). A central principle is that nothing ever happens for a single reason, and that an event rarely has only a single outcome. Often a set of prerequisites is necessary, with several conditions all needing to apply before the event can occur - cf. the military concept that a successful attack requires opportunity, capability, and intention. An event tree can be shown thus - again with time moving from left to right:



In SNM, time-related chaining is an important element: the event trees are usually linked in some way - that is, the output from one possible event becomes the input to another. As the present can be uncertain, scenarios can usefully begin in the recent past. In practice, scenario networks are constructed in three stages: working ahead from the present, back from the future target date, and thirdly by inserting possible events into the near future.

In the first stage, a set of presents is identified, and a futures wheel (Glenn, 1972) constructed out from each one. This is equivalent to the branches (output) of an event tree.

The second stage begins by identifying a set of pathways. These are similar in some ways to standard scenarios, but are simply anchoring points out there at the target date, with routes back from them to the present. For example, when doing scenario network mapping for a group of service clubs, participants proposed three routes to the future: minimal change, a business-like rationalization, and a transformation by reapplying the original purpose of the group of clubs. Though the endpoints were similar, and the perceived presents were much the same, the paths between the two were quite distinct. Backcasting (Robinson, 1988) was carried out back from the endpoint of each path to the present. This is equivalent to the roots (causal part) of an event tree.

At the beginning of the third stage, a scenario map exists with a futures wheel extending forward from the presents, several indicative pathways from the presents to some futures, and backcasting from those futures along those pathways. In the third stage, event trees are generated, and fitted into the network wherever they seem most relevant - or most likely to create trouble for the entity. Event trees can then be linked together, forming a network: so a scenario network map is a linked collection of events. A scenario mapping exercise typically collects about 200 events. However this proves too many to comprehend. It generally proves possible to collapse those several hundred to about 40 or 50, larger scenarios.

In the final stage of SNM, the network is explored using layering. If each event is a node (or box), each link between events is an arc (or arrow). The links are now analysed in detail, bearing in mind the principle that: the human future is driven by humans. For each link, the participants consider "How exactly would event A lead to event B? What actor group could make it happen? What means could they use? And why would they do it?"

In this way, a layer below the events is derived: it consists of motives, intentions, and similar drivers. Usually it turns out that there are fewer of these than there are links between events, with each actor-group's motive applying to a wide range of events.

Having collected the range of motives, by applying these to the event trees, it is often possible to imagine further plausible events. In fact there is no limit to these, but it some seem particularly important, the top-layer network can be extended.

Finally, the bottom layer is derived. Again, there are usually fewer components, corresponding to the number of actor groups. The question that participants ask at this final stage is "Where do this actor's motives come from?" The answer lies in the group's worldviews, values, and perceptions (including misperceptions). The layering process is similar to Causal Layered Analysis (Inayatullah, 1998 and 2004).

Note that the deeper the layer, the slower the change. Events happen quickly, human intentions change more slowly, and the values and worldviews that drive those motives normally change only with a new generation. By working upwards through the set of layers it become possible to anticipate futures that would otherwise be difficult to imagine.

This paper has given the briefest possible outline of scenario network mapping in its context. Further detail is provided in the manual by List (2006).

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