Scenario Network Mapping

The Development of a Methodology for Social Inquiry

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Glossary

As this thesis is interdisciplinary, I have tried to avoid the unnecessary use of jargon. However, the text makes extensive use of some unfamiliar and new constructs, as well as using several other terms with more specific meanings than usual. The following explanations have been kept brief, serving as reminders rather than full definitions.

Process and Methodology. This thesis is potentially confusing because it involves two methods. First, there is the method of anticipating the future, as developed by this thesis, and secondly there is the method by which the former method was developed. To avoid such confusion, I have labelled the method of anticipating the future as the Process, while the method of developing the Process is referred to as the Methodology. Borrowing a convention from contract law, the specific Process and Methodology are distinguished from any more general uses of those terms by the use of initial capital letters.

Terms related to the future
Proceeding from the most general to the more specific: Anticipation includes all aspects of perceiving the future, whether or not organized as a formal method. Foresight is a general term for considering the future more or less comprehensively, including everything from econometric forecasting to science fiction. Foresighting refers to organized engagement in foresight. Foresightfulness refers to foresight which turns out to have broadly anticipated a future situation.

Futures studies includes scenario planning and a range of other methods, mostly qualitative: in other words, the range of methods covered in journals such as Futures and the Journal of Futures Studies. The use of futures (as opposed to future) follows standard terminology in this area: it implies that "the future" is not fixed; this has no association at all with the trading of commodity futures on an exchange. Scenario is used here in the futures studies sense, not the slightly different meanings used in dramatic production and in information systems. Forecasting (except in the term "technological forecasting") refers only to quantitative methods; thus futures studies and scenario planning are not regarded here as subsets of forecasting.

Entities and Cases
The Process was developed by testing it against a number of different types of entity. An entity is anything that has a future that can be studied, including businesses, organizations,
industries, concepts, and regions. An entity need not be an entire organization; any self-contained part of an organization can be considered an entity.

A case study approach has been used, involving seven cases. Each case is a particular type of entity, while each type of entity is represented by one or more cases. In many contexts, "entity" and "case" are interchangeable, but the term case refers to an entity that was studied. System, as the term is used in general systems theory, often has the same meaning as entity, in this context, but systems are generally considered in terms of inputs, processes, and outputs, which entities need not have.

Holon. A system that can simultaneously be viewed as a collection of smaller systems and as a sub-system of a larger system. The holonic principle deriving from such a perception is that any construct can be viewed as a holon. Though others have used this term in different senses, it is used here in the original sense introduced by Koestler (1967). This is explained in more detail in chapter 4, section 4.5.

Midcasting. A systematic method for anticipating wildcard events in the medium-term future, developed by the present writer. First published under the name of "middlecasting" (List, 2001b and 2004b) and later changed, when that term was found to cause some confusion. See chapter 5, section 5.4.6 for a full explanation.

System impingement. A system impinges on another when it communicates some message that affects the other system in some way. Thus a system impingement diagram can be constructed for any holon. Details can be found in chapter 5, section 5.2.1.

Actors and stakeholders. In some cases it was useful to distinguish between these. The stakeholders of an entity are those who either affect it in some way or are affected by it in some way. The term actors is used here in the same sense as by Godet and his colleagues: to exclude stakeholders who have no ability to affect the future of the entity.

Design criteria and execution criteria When a social inquiry process is being designed, the design criteria are characteristics of the design of the process, inherent in the way it works. Execution criteria are those that cannot be tested until the process is applied. In terms of program theory (Bickman, 1990), design criteria correspond to inputs and activities, while execution criteria correspond to outputs, outcomes and impacts.
The following abbreviations, not commonly found in dictionaries, have been used in several chapters of this thesis.

**FAR**  Field Anomaly Relaxation (Rhyne, 1981) – see section 2.5.1.
**IAF**  International Association of Facilitators (http://www.iaf-world.org)
**ICT**  Information and communications technology – viz, computing and related areas
**IP**  Intellectual property
**NPD**  New product development
**OD**  Organizational development (Holman and Devane, 1999)
**RFS**  Retail financial services: banks, credit unions, and the like
**SNM**  Scenario Network Mapping (the “Process” of this thesis) – see chapter 5
**TQM**  Total quality management (Deming, 1994)
**TRM**  Technology roadmapping (Phaal, Farrukh, and Probert, 2004) – see section 2.6.3

The following abbreviations are used to protect the anonymity of organizations involved in five of the case studies. Several of them explicitly requested anonymity, and one made it a formal condition of participation.

**CU**  A credit union (case 5)
**EM**  An engineering manufacturer (case 2)
**LS**  A community legal services organization (case 4)
**RN**  A radio network in Indonesia (pilot case)
**SC**  A group of service clubs (case 6)

The reason for not naming the entities is that, at some stage, this thesis may become available on the Web, on a site out of my control. It will then be indexed by search engines, and if organizations’ names were listed in full, anybody “trawling” for detailed information about an organization would find out a lot more about these organizations than the latter might prefer.

The other two cases, the Iraq war and the Barossa Valley, are already in the public domain.
Summary of thesis

This thesis records the development of Scenario Network Mapping (or SNM): an integrated process for anticipating the future, derived from scenario planning. It argues that this process amounts to an innovative and comprehensive method of anticipating the future. Compared with traditional scenario planning, it is designed to be carried out on a smaller scale, and can be more readily updated. Since the literature revealed no appropriate process for developing a social inquiry methodology, the thesis also develops such a process, using action research for formative evaluation.

If foresighting methods are regarded as ways of dealing with social change, changing social environments therefore require new forms of anticipation. Following a review of foresighting methodologies and of 15 scenarios for the year 2000, it is argued that the current world social environment requires a method that fulfills different criteria from futures methods used previously. The literatures of foresighting and related social inquiry were used to develop a set of evaluation criteria for a futures method. These criteria were divided into design criteria (against which a methodological design could be evaluated) and execution criteria (evaluable during and following empirical iteration).

Rather than develop a method in a theoretical vacuum, a basic conceptual framework of the future was defined. This was used to underpin the development of SNM, and that development also served to improve the conceptual framework. From that framework, the basis of SNM was developed, so that the design criteria derived from the literature were fulfilled. In summary, SNM is a variant of scenario planning, in which a wide range of stakeholders participate in creating a roadmap-like scenario network (rather than the several discrete scenarios of traditional scenario planning). Such a network begins in the past and may have multiple entry points into the present. Each node in the network can itself be regarded as a scenario and explored in detail if necessary. The network is a layered model, similar to Causal Layered Analysis, but with a more explicit narrative emphasis.

To test and further develop the SNM model, seven cases were studied. Maximum variation sampling was used to exercise the development of SNM, by applying it in a wide range of situations. The case study methodology was action research, making explicit use of repeated cycles, monitoring the development of the methodology so that it could be continuously improved.
Following the case studies, the SNM method has reached a point where it is viable enough to be carried out by others; a brief handbook for potential users is included as an appendix. However, the method still has potential for further development.

As well as developing a new form of scenario planning, and a conceptual framework on which it is based, this thesis also develops an explicit process for formative evaluation, which could be useful in the development of new qualitative methods of social inquiry.
Acknowledgements

Above all, I acknowledge the assistance given by participants in the case studies. However, because this thesis involved the development of a methodology, that development can be separated from the substantive contribution of the case study participants. Though they were generous in supplying substantive content, the development of the methodology itself was my own work. Naturally, though, I have welcomed suggestions and criticisms during the development process. Special thanks are due to fellow doctoral students David Baker, Gary Buttriss, Julia de Roeper, and Evan Yabsley, all of whom made helpful suggestions that improved the theory and the methodology. I also wish to acknowledge the help given – in determining that this method was in fact new – from various members of the World Future Studies Federation, both through email and at the conferences in Romania in 2001 and Japan in 2002. During a workshop on Social and Organisational Systems held at the Australian Defence Science and Technology Organisation in April 2005, several defence experts made contributions, particularly relating to the case study of the war in Iraq. Other most helpful suggestions were made by Professors Richard A Slaughter, Werner Ulrich, and Sohail Inayatullah. Finally, I acknowledge the patience of my wife Katrina, and the assistance given by my supervisor, Professor David Corkindale, my associate supervisor, Professor Richard Blandy, and in particular Associate Professor Mike Metcalfe, whose informal mentoring has been invaluable.

Declaration

I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text.

Signed

[Signature]

Dennis List
1.1 Argument and research question

This thesis documents the development and evaluation of an integrated process of foresight, based on scenario planning. The process has been labelled Scenario Network Mapping (abbreviated to SNM). The thesis presents evidence in support of the argument that this process amounts to a new, comprehensive, and flexible approach to anticipating the future, and that the process can be usefully applied to a wide range of social futures, including those of organizations and geographical areas.

Most theses focus on the content of their subject matter: typically, they set out to explore the relationship between a set of concepts, testing hypotheses and forming theories. This thesis is different, because its purpose is to document the development of a new, scenario-based method for anticipating the future. Scriven's (1967) division between formative and summative evaluation is relevant here. Summative evaluation answers the question "To what extent was the hypothesis supported?" while formative evaluation answers the question "How can this situation be improved?" In most theses using empirical research, the approach is summative. This thesis takes the formative approach.

Thus the central argument is simply that:

a viable Process for Scenario Network Mapping has been developed.

Since the approach is formative, the argument is not assessable by simply saying "Yes, the Process was viable," or "No, it was not viable." (Note the use of "Process" with a capital P to refer to the particular process being developed in this thesis.) In practice, viability was determined by exploring the literature of foresighting and social inquiry, extracting from that literature a set of criteria for a method of studying the future, and monitoring the extent to which the developing Process met those criteria. The focus is more on the improvement of that viability through an iterative dialectic between cases and the conceptual framework that supports the Process.

At some stage in its development, a Process may become viable enough to be usable by others without requiring modification in each case; thus a corollary argument is that, following seven case studies, this stage has now been reached.
Following the main argument as above, the central research question is:

What are the characteristics of a scenario-based anticipation process that best meet emerging needs that were identified from the literature of foresighting?

Given such wording, the answer to the research question will not be a Yes/No response, nor a numerical estimate, but a description of the method that was found most viable.

1.2 Scope of the study

As "the future" is limitless, the process described in this thesis circumscribes the scope of its study of the future in three ways: in terms of time period, in terms of the object of inquiry, and in terms of scale.

In terms of time: The Process uses a time scale extending over a period of (approximately) 1 to 20 years. In general, for a period of less than a year, either linearity can safely be assumed or extrapolative forecasting is adequate. As for the other limit, when a study period exceeds 20 years, there are so many imponderables that only the broadest generalizations can be made in the context of the object of inquiry of this process. The Process developed in this thesis has no inherent restrictions that prevent it from being used outside this time range (in fact, the time range covered in one of the case studies was designed as less than 6 months), but those were its design parameters.

In terms of the object of inquiry: This Process takes an avowedly constructionist view: it is concerned with human futures, not the futures of physical phenomena. Its focus is on "future as current perception" rather than "future as eventual reality." Even though the futures of humans are clearly affected by the futures of their physical environment, the argument here is that (in all but rare cases) the human influences of change overwhelm environmental influences. For example, should there be a huge volcanic eruption in Japan, the focus of this Process would be on the future of the residents of that area, not on the future of that volcano as a geological structure.

In terms of scale: Unlike some other well-known futures studies projects (e.g. Mesarovic and Pestel's Limits to Growth, 1972), this Process is not designed for studying the future of the entire human world. It takes a fine-grained approach, focusing on the futures of a relatively small social unit: a city, a region, a local industry, an organization – but not, perhaps, an entire country, or transnational organization. At the other extreme, it is not designed to anticipate
the future of, say, a work of art, one person’s career, or a marriage. At its minimum extent, it might usefully be applied to a family or a building, while its largest scope might be, for example, the study of a single industry in a geographical region. Those were the design parameters; though the Process may be more generally usable, this was not tested, except by a one case study using secondary geopolitical data.

Thus the Process developed for this thesis has been tested only at an intermediate level: neither very small nor very large, over neither a very long nor a very short period. However, the conceptual framework of the future developed to underpin the process is not by its nature restricted to a particular time period or scale.

1.3 Potential contribution to knowledge

For thousands of years, going back to the earliest recorded times (Lewinsohn, 1961), humans have tried to anticipate the future, partly from curiosity, but mainly because knowledge of the future — even imperfect knowledge — may help to improve decisions in the present. Evidence of the strength of this desire can be found in the many publications on this subject. For example, the OECD Futures Group database (OECD, 2001) has some 9,000 abstracts, but is far from complete; many of the pre-2001 references used in this thesis are not included in that database.

Though many predictions are unsuccessful (as demonstrated by Schnaars, 1989 and Sherden, 1998), much money and time is expended in attempting some degree of prediction. Since the 1950s, after the limitations of quantitative forecasting were recognized, various methods for anticipating (as opposed to predicting) the future have been developed. Scenario planning has been the most widely used of these methods, because of its flexibility and comprehensibility. However, as found in Appendix 1, standard methods of scenario development tend to produce scenarios that reflect their own time better than they do the future. The major purpose of the Process developed in this thesis is to enable views of the future that are both more inclusive and more flexible than is easily possible with traditional scenario planning. If the Process works as designed, it should enable human groups to envisage their possible futures more clearly, so that they can then work towards their preferred futures. The method being developed is a foresighting method rather than a planning method: it is not intended to produce a strategic plan, or any action plan. However, such planning would logically follow the application of SNM, and would be informed by it.
The gap in knowledge addressed by this thesis relates to a different kind of knowledge from most. Umpleby (2002), following Churchman (1971) and Ackoff (1981) argues that knowledge in management can be constructed in the form of methods as well as theories; and Ghoshal (2005) makes a similar observation. Thus the planned contribution to knowledge for this thesis was a different type of knowledge from that found in most theses, which contribute substantive knowledge within a discipline. This contribution is intended to be in the form of methodological knowledge, so that one might claim "Here is a well-founded foresighting method that can be used to develop specific views of the future in a wide variety of situations."

1.4 Structure of this thesis

The thesis is divided into two main parts (not including this introductory chapter). Part 1 (the groundwork: chapters 2 to 8) summarizes the literatures involved and sets out the theoretical basis. Part 2 (the review: chapters 8 to 10) reports on and reviews the empirical investigation. As the structure is not completely linear, Figure 1.1 below should help readers to understand the sequence. The diagram shows the funnel-shaped flow of the argument between chapters, with arrows headed with the letter L denoting input from existing literature. (Instead of a single literature review chapter, a separate literature stream is considered in each of the earlier chapters. Chapter 1 is not included in the diagram, because it is an introduction to all chapters.)

---

**FIGURE 1.1 FLOW BETWEEN CHAPTERS IN THIS THESIS**
Since one of the secondary arguments of this thesis is that, in influence diagrams such as the above, the meaning of the arcs (arrows) is at least as important as the meaning of the nodes (boxes), the following table summarizes the 13 sets of content transmitted from chapter to chapter. These are the labels for the arrows in Figure 1.1.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Content transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature</td>
<td>Chapter 2</td>
<td>Literature of foresighting</td>
</tr>
<tr>
<td>Literature</td>
<td>Chapter 3</td>
<td>Evaluation criteria for a futures method</td>
</tr>
<tr>
<td>Literature</td>
<td>Chapter 4</td>
<td>Theories of futures, change, history, and causation</td>
</tr>
<tr>
<td>Literature</td>
<td>Chapter 6</td>
<td>Literature of social inquiry methodology</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Chapter 3</td>
<td>Characteristics of a likely new futures method</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Chapter 5</td>
<td>Design criteria for the Process design</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Input to Process design from conceptual framework</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>Chapter 7</td>
<td>Characteristics of the development methodology</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Chapter 8</td>
<td>The operation of the Process</td>
</tr>
<tr>
<td>Chapter 7</td>
<td>Chapter 8</td>
<td>Case selection and evaluation method</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Chapter 9</td>
<td>Execution criteria for the Process</td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Chapter 9</td>
<td>Evaluation data from case studies</td>
</tr>
<tr>
<td>Chapter 9</td>
<td>Chapter 10</td>
<td>Conclusions from evaluating the Process</td>
</tr>
</tbody>
</table>

Several appendixes add material too detailed to be presented in the body of the thesis. In particular, appendix 1 reviews scenarios for 2000, providing additional input to chapter 3, and appendix 4 contains the bulk of the material from the case studies, with the corresponding chapter 8 containing only the background and outcome for each case study. To complete the chain of argument, a manual for the Process in its revised form has been included as appendix 5. This draws on chapters 4, 5, 8, and 9.

1.5 Summary of content

This section summarizes the thesis content, in terms of the two divisions shown in Figure 1: the groundwork (chapters 1 to 7) and the case studies and evaluation (chapters 8 to 10).

Part 1: Groundwork

Chapter 2 is an analytical literature review of methods of anticipating, using the latter term in the broadest sense. It discusses the problems with methods of foreseeing the future, and the historical improvement and refocusing of those methods as they have attempted to cope with
social and technological change. The central argument is that a new type of social environment requires a new type of anticipation, and that the current world social environment, with its increasing multiplicity and uncertainty, requires a method that satisfies different criteria from the methods that have been used previously.

Appendix 2 reviews 15 published scenarios for the year 2000, with a view to revealing deficiencies with the various types of scenario planning by comparing the published scenarios with the actual outcomes. Though the appendix is fairly long (hence its relegation to the back) its findings are concise. Several distinct problems were found, of which the most relevant for the development of the Process were: (a) that technological change was expected too quickly, while social change was overlooked; and (b) that many of these studies failed in foresight because their scope was too narrow.

Chapter 3 (with contributions from chapter 2 and appendix 1) selectively reviews the theoretical literatures of futures studies and social inquiry in order to develop a set of criteria against which a new method of foresighting can be assessed. More than 230 criteria were found in the literature of futures studies and qualitative research. These were reduced by grouping and critique to a more manageable number, of which some evaluate the design of a Process and others its execution.

Chapter 4 critically examines the concept of the future, forms a set of axioms, and from those develops a basic conceptual framework. This was both used to guide the development of the Process, and was itself modified by that development.

Chapter 5 uses the theoretical framework from chapter 4 to outline the basis of a new Process, and demonstrates how it fulfils the design criteria developed in chapter 3. In brief, the Process is a variant of scenario planning; one that extends beyond the normal "chain" and "snapshot" scenarios to create network scenarios. To use the metaphor of a road map: if a chain scenario describes the route taken to a single destination, and a snapshot scenario is a set of potential destinations, then a network scenario is a map of the entire network of roads passing through the departure point.

Chapter 6 reviews the literature of social science methodology, seeking a suitable means of developing a social inquiry method such as this Process. No precedent having been found, this chapter then forms a sequence of questions, the answers to which determine the most appropriate methodology. The possibility of a field experiment is explored, but rejected: on the
grounds of time, cost, and likely lack of insight provided. The most suitable method was found to be one that draws on empirical data, mainly (but not solely) from primary sources, using a qualitative, formative method; one that is evidence-based rather than hypothesis-based, and that incorporates multiple sequential cases.

Chapter 7, following from the findings of chapter 6, fleshes out the development method. This is a form of participatory action research, broadly based on the original concept of Lewin (1946), but with highly explicit use of repeating learning cycles. The empirical research design was a series of successive case studies, after each of which the Process was reviewed and modified. In the second part of chapter 7, a sampling frame is developed, based on the population of possible futures. The purpose was to abductively exercise the process being developed by applying to in a wide range of futures situations. From that sampling frame, a number of aspects of particular interest were selected, against which the sample was matched.

**Part 2: Review**

Chapter 8 draws on the three main input strands developed in Part 1: the evaluation criteria set up in chapter 3 (based on the preceding literature reviews), the process outlined in chapter 5, and the methodology described in chapter 7. Chapter 8 (with the associated appendix 4) describes the data collection cycle for each of the seven cases studied. For each case, the background is described, and reflections are formed, resulting from the application of the Process to that case. These reflections are used to modify the Process in subsequent cases.

Chapter 9 reviews the outcomes of the Process, considering each case against the execution criteria in chapter 3, using analytic induction to arrive at conclusions about the Process. The development of the method is reconsidered, with a view to improving the Process: what are its remaining weaknesses, and how might they be overcome? What was the reaction of participants to the Process, and what was the outcome, for each case, of the follow-up research? This chapter also explores the extent to which the findings might be safely generalized.

Concluding the thesis, chapter 10 reviews the development process. It compares the evidence presented in chapter 9 with the literature review in chapter 2. It critically reviews the work carried out: not only the Process itself, but also the evaluation criteria used, the conceptual framework developed in chapter 4, and the development method developed in chapter 7. It discusses the limitations of this research (the sample, possible investigator bias and possible placebo effect), and concludes by clarifying some outstanding issues needing further research.
Appendix 5 provides an initial handbook describing the current version of the Process, for use by others who may be interested in applying it. Until it is used independently, and considered effective by those users, it cannot be regarded as complete.

1.6 Literatures consulted

Two main groups of literatures were used for this thesis: one set of literatures was used to develop the Process, and another to monitor and evaluate its development. The Process was derived by drawing ideas from a wide range of sources and discipline areas: foresighting methodology in particular, but with contributions from operational research and systems thinking, sociology and social psychology, cognitive mapping and visualization, participatory development, and the philosophy of causation.

For the method of evaluating the process, the literatures used most extensively were those of social research methodology (particularly qualitative research and action research), management (focusing on organizational learning), and evaluation (particularly logic modelling and formative evaluation).

1.7 Why this topic?

Why did this thesis develop a method of foresight? This arose from my professional work, which over several decades, has been mainly in media research. From 1989 to 1999, I was the audience research manager for the Australian Broadcasting Corporation, in its Strategic Planning and Research Unit. In that position I planned, managed, and reported on a wide variety of audience studies, as well as developing two new methods of qualitative inquiry, the consensus group technique (List, 2001a; List and Metcalfe, 2004) and the co-discovery conference (List, 2002c and 2004c). During that time I became increasingly aware of the limitations of standard social research methods, particularly survey research; these methods, though time-consuming and expensive, often did not provide helpful information for decision-makers, and were focused on the past rather than the future.

Having long been interested in futures studies, when my research unit was disbanded I embarked on a doctoral thesis with the intention of developing a third method of qualitative inquiry, based loosely on scenario planning. The output format of this method – the concept of scenario networks as a map-like metaphor – had occurred to me several years earlier. My initial intention was to identify an accepted standard procedure for developing a research method, and to use that procedure to develop a process for producing scenario networks.
Having already developed two research methods in an unsystematic and ad hoc way, I hoped to find a rigorous and widely accepted procedure for the development of research methods. It was only after an extensive and ever-broadening search of the literature of the social sciences that I finally realized that not only was there no standard procedure, but also that almost nobody had systematically set out to develop a research method – either in a PhD thesis or in another context. Thus, well into the thesis period, I realized that I was faced with not one task but two: (a) to develop the futures method, and (b) to develop a method for developing that method. Perhaps the magnitude of this dual task was the reason why I found almost no prior theses developing a method. The length of this thesis reflects the fact that two entwined development procedures were involved.

1.8 Publications arising from this thesis

At the time of completion, several papers relating to this thesis have been presented at conferences and later accepted for publication, two of them published in multiple versions: the first (the bases of chapters 2, 4, and 5) as List (2001b and 2004a), and reprinted in Sisodiya (2003). The other paper to be published in multiple versions was on the hemispherical model in chapter 4, section 4.7 (List, 2002a and 2003b, and in Inayatullah, 2004). One of the case studies from chapter 8 is being published by the organization that funded it (List, 2005), and a paper relating to chapter 7 is in press with the journal Futures (List, 2006). Several further papers are planned and under way, as well as a monograph extending the conceptual frameworks presented in chapters 4 and 5.

The following other peer-reviewed papers and book chapters on topics related to this thesis (though not directly part of it) have been published, and presented at conferences:

- List (2001a) and List and Metcalfe (2004) on the consensus group technique;
- List (2003c) on a conceptual framework for human communication systems;
- List (2003d) on scenarios for the globalization of Australian media;
- Corkindale and List (2003a and 2003b) on an empirical evaluation of the Bass model;
- List (2004b) on a method of combining program logic with scenario networks;
- List (2002b and 2004c) on the co-discovery conference.

Several further papers flowing from these topics are currently in preparation.
Chapter 2: A critical review of futures methods

2.1 Introduction

This chapter begins with a broad overview of the seeming human need for anticipation, in the broadest sense of the term – from the pre-scientific use of prophecy, through numerical forecasting, to the qualitative methods of futures studies developed in the late 20th century. It uses the literature to argue that, although humans have long wanted to foresee the future, this has not been achieved satisfactorily, using any of the three types of approach used throughout history: prophecy, forecasting, or futures studies. The focus of the chapter is threefold: informative, integrative, and evaluative. In terms of the five categories of literature review discussed by Baumeister and Leary (1997), this falls mainly into the fourth: a literature review with problem identification as its goal. The particular problem to be identified in this case is to determine the likely direction of methods of anticipation, in terms of the underlying social needs that call forth those methods.

In summary, the argument is proposed that though scenario planning is the most widely used and in some ways the most versatile mode of anticipation, it has some weaknesses that could be addressed by a variant approach: the basis of the Process developed later in this thesis.

Many literature reviews set out to identify gaps in the relevant literature, so that these might be plugged by the ensuing research. But as November (2004, p42) points out, “Some academics talk about ‘gaps’ in the literature as though the literature is a well-built wall with just the occasional gap that needs filling.” This literature review, however, is trend-seeking rather than gap-finding: the gap is invisible, because it would be at the end of the wall.

2.2 Historical approaches to anticipation

Sections 2.3 to 2.6 review the progression of modes of anticipating the future. The underlying argument is that the historically predominant means of regarding the future has arisen from (and been constrained by) epistemologies characteristic of the era, stemming from humans’ knowledge of alternative possibilities and of their perceived current needs. For the purpose of this argument, three historical phases are distinguished:
• The intuitive, or pre-scientific phase, extant until the 19th century (section 2.3.1)
• Quantitative forecasting, beginning during the 19th century in developed countries (section 2.3.2)
• The "alternative futures" movement, beginning in the mid-20th century (section 2.3.3)

All of these are interpreted in terms of the social needs of the times, and the beginning of a possible new phase is anticipated.

2.2.1 The apparent human need for anticipation

Before examining the changing historical conceptions of the future, let us first review what appear to be four near-permanent characteristics of human society, and perhaps of the human brain: optimism, the desire to know the future, attribution of causation, and achievement motivation.

1. Self-positivity: the inherent optimism that spurs human beings on to goals which realistically they have little hope of achieving: everything from buying a lottery ticket to changing the world (Kahneman, Slovic, and Tversky, 1982; Peterson, 2000; Weinstein, 1980 and 1989; Fiske and Taylor, 1991; Menon et al 2002). Though the existence of this phenomenon is widely accepted, authorities disagree about its functions. Freud (1928) maintained that optimism (in its religious aspect, such as life after death) was a type of defence mechanism, the solution to a conflict between instincts and socialization. Tiger (1979) takes the opposite view: that a major function of religion is to support the biological need for optimism.

2. The desire to know the future. That the future is not fully knowable has been widely recognized throughout the course of history; yet fortune-tellers, shamans and seers seem always to have existed (Halpern, 2000). The biologist Jacob (1982) suggests that one of the chief distinctions between humans and other animals is our ability to envisage the future (more than a few minutes ahead); Damasio (1995) suggests that a sense of the future is inherent in the human brain.

3. The seeming need for attribution of causality. Historically, causality seems to have been used as a means of understanding and controlling the environment. However, in the context of individual lives, Bandura (1982) found that chance had played a larger role than respondents acknowledged in their hindsight. This is a process similar to what Weick (1995) labels in a workplace context as "sensemaking." Krantz (1998) summarizes such
arguments, explaining the human tendency to attribution as a way of maintaining the illusion that our lives are planned and under control.

The need for attribution has not been confined to the uneducated: it has been a central focus of philosophers, from Aristotle ("the four causes"; 1993) to Pearl (2000) with his new logical notation. Still, as William James (1907) wrote in *Pragmatism*:

"The word cause is in short, an altar to an unknown god: an empty pedestal still marking the place of a hoped-for statue." (cited by Munton et al, 1999, p7)

The notion of causality is an essential component of the hypothetico-deductive approach to science. Hypotheses are often phrased in terms of "cause" and "effect." Though this seems obvious in the immediate physical world, this approach has not been so successful in the social sciences: 100 years of scientific psychology and sociology have not brought prediction of human behaviour anywhere close to the level of prediction achieved in physics by Newton in the 18th century. Hence, as explained in chapter 5, the Process developed in this thesis incorporates a concept of probabilistic influences rather than of strict causation.

4. Achievement motivation: the drive—stronger in some settings than others—for a general improvement of the condition of an individual, of his or her family, of their community, and of their physical surroundings: an expanding circle that constitutes their social environment (McClelland, 1961; Douglas, 1986). This motive is less widespread than the others discussed above; McClelland found large differences between cultures. It is strongest in North America, as the Pew Research Center (2003) found in a recent international survey, but wide variations are evident there. For example, a Canadian study found that about 50% of owners of small businesses—the supposed hotbed of entrepreneurship—did not want their firms to grow (Blatt and Riding, 1992).

All four of the above motivations have been evident to varying degrees throughout human history (Braudel, 1980; Tainter, 1988; Burrow and Wei, 2000). Accordingly, they have been driving factors in each of the phases discussed below, and are relevant to the historical changes in preferred modes of anticipation, as listed above.
2.3 **Anticipatory methods in relation to social circumstances**

The following sections examine the outcomes of the above conceptions of the future, in terms of a demand-chain model: that is, the principle that a process will become frequent when social demand exists and suppliers are available.

### 2.3.1 The pre-scientific phase

From the beginning of recorded history until the rise of education in the wealthier countries (mainly western Europe and north America) in the mid-nineteenth century, four different modes of dealing with the future can be identified:

1. *Cyclicity*. The cyclical mode was predominantly seasonal. Setting aside the briefer cycles such as day/night and the monthly fertility cycle, the main interest for a predominantly agrarian population lay in the effect of the seasons on cropping and hunting. As well as the annual cycle, there were also cycles of biological generation, all of which required some foresight (Mead and Calas, 1953; Clarke and Hindley, 1975, section 4).

2. *Destiny*. Another reaction to the future, in the face of untamable natural forces, was resigned acceptance: the belief that whatever happened was predetermined, and/or "God's will." There was nothing that could be done to prevent this, either by the individual or the community. This left only the option of how to deal with God's will, as it manifested itself in various forms of destruction, such as crop failure (Vayda, 1969; Lévi-Strauss, 1966). A logical response to destiny was divination. In an attempt to understand God's will, a range of methods was used, often with known limitations. Thus the Oracle at Delphi, though not strictly prophetic (Halpern, 2000) was renowned for giving ambiguous advice.

3. *Chance*. If one response to the apparent meaningless of events was destiny, an alternative response was the concept of chance, or Fortune. This, originating in medieval Europe, seems to have been a more recent development than destiny. Thus Boëthius (525/1943) wrote of the wheel of fortune (implying cyclicity as well as chance), and 1000 years later
Machiavelli (1525/1914, chapter 25) ascribed the course of history as half due to *fortuna,* and the other half to *virtù* (human intention).

4. **Utopianism.** Even before Utopia had a name (More, 1518/1965) this stream of thought was evident in human affairs, both from philosophical works such as Plato’s *Republic* as well as in religious books such as the Bible and the Koran, with their descriptions of Heaven, Paradise, or Nirvana. Such perfection was imagined as either an earth-like place or a state of mind (Manuel and Manuel, 1979; Carey, 1999).

Godet (1983, p184) notes three types of reaction to the future: passivity, adaptation, and voluntarism. In terms of the above four categories, the cyclical approach requires adaptation, the fatalistic approach corresponds to passivity, while the voluntaristic approach— which embodies determining one’s future— could hardly have been common widespread in societies offering no personal freedom of choice. Utopianism is not relevant to Godet’s categories. But, as noted below, the macro-historical trend in attitudes to the future (at least in Western societies) has been a gradual movement across Godet's spectrum, toward voluntarism.

None of the above pre-scientific approaches to anticipation has died out, even in modern societies. Cyclicity is still relevant, particularly when dealing with biological issues, from farming to child-rearing; the cycles can be used as an opportunity for learning— as with the development of the Process in this thesis, described in chapter 7. Dealing with cyclicity involves identifying cycles, detecting indicators, and taking steps to produce desired outcomes.

A fatalistic approach is still found in some US businesses, as noted by Whitney and Trosten-Bloom (2003) in the context of appreciative inquiry. The concept of chance is dealt with— mainly by individuals, rather than organizations— in terms of “luck,” and is the basis of the gambling industry. As for utopianism, a variant form of it is expressed in modern societies as nostalgia for a (perhaps imaginary) past, rather than a perfect future, hence the recent “sea change” movement in Australia, in which mid-career professionals dream of leaving their cities and going to live in rural areas in order to live a better life (Burnley and Murphy, 2003).

**2.3.2 The rise of forecasting**

Though some use the word “forecasting” in a broader sense than the quantitative, in this thesis, to avoid confusion, the term “forecasting” is here restricted to quantitative forecasting. However, it is the output of forecasting that is quantified; the process of reaching that forecast
may include subjective judgement. The Delphi method (Linstone and Turoff, 1975) is for this purpose thus grouped with forecasting; other qualitative aspects of the broadly applied term "technological forecasting" (Martino, 1983) are not discussed in this section.

Though mathematical forecasting originated in renaissance Italy, it was not widely used until the 19th century (Bernstein, 1996; Gigerenzer et al, 1990). The rise in the use of forecasting depended on four preconditions in the demand chain:

1. mathematical skills among those making the forecasts;
2. the existence of a set of numeric data over an extended period in the past;
3. potential users of the forecasts being aware that the method exists;
4. the users accept the credibility of such methods.

Precondition (1) assumes only a moderate level of mathematical capability, among a few members of a population, because forecasting is not a large industry. Precondition (2) requires social stability, the preservation of data, and a methodical, almost obsessive frame of mind among those keeping the data. Among accountants, factors (1) and (2) exist together, hence the initial rise of forecasting among Jewish accountants in cities of northern Italy in the 17th century (Bernstein, 1996, p95).

The adoption of forecasting was restrained by preconditions (3) and (4): awareness and demand from potential users. The first published quantitative forecasts seem to have been made in France circa 1800, perhaps related to the spirit of quantification that arose after the French revolution, which brought the development of the metric system. Early statisticians such as Quetelet published demographic forecasts for a government audience: for example, Pradt's population projections for Russia and the USA (de Jouvenel, 1967, p164).

In the late 20th century, further factors arose which sped the wide adoption of forecasting. These included:

5. The availability of mechanical calculators (and later, computers), which greatly facilitated the computation of forecasts.
6. The accumulation of statistical data by clerical systems – and later, by computers.
7. Pressure on businesses to become more profitable through higher efficiency. One outcome of this drive was statistical quality control; another was increased use of forecasting, partly due to the post-war emphasis on production efficiency: the need to use limited capital well and not tie it up in stock, and forecasting helped reduce stock levels.
Each of these three factors served to facilitate its corresponding precondition: (5) facilitated (1), (6) facilitated (2), and (8) facilitated (3) and (4) - though in practice, data collection (factor 6) occurred in most industries before forecasting gained credibility (factor 4). When Hollerith invented the punched-card machine, it was in response to the urgent needs of the decennial US Census, which because of rapid population growth in the USA had been taking longer and longer to compile (i.e. factor 7). During the first half of the 20th century, punched-card systems and mechanical calculators became more widely diffused in large organizations (Ifrah, 2000), realizing business efficiencies when used on a large scale (factor 7).

Over the last 100 years, numerous methods have emerged for relating the independent variables to the dependent variable/s, progressing from simple extrapolation to econometric modelling. However, as Armstrong (2001) has shown, even the most sophisticated forecasting techniques have proved relatively unsuccessful over more than a short-term period. Collopy and Armstrong (1992) sought options from 49 forecasting experts on guidelines for extrapolation methods. They agreed that discontinuities were one of the most important factors, even though this had been largely overlooked by the academic literature of forecasting. By “discontinuities” they were referring to abrupt changes in the level of a variable, rather than in its relevance or its effective meaning. Other writers on this topic such as van Notten, Sleegers, and van Asselt (2005) attribute a broader meaning to this term, as discussed below.

In the late 20th century, as forecasting became more widely used, it also became more complex, as demonstrated in textbooks, the most widely used of which was that of Makridakis et al (most recent edition, 1997). The introduction of forecasting software made the calculation of forecasts both more convenient and more accurate, while the increased availability of numerical data, specially when it was already in digital form, enabled much greater complexity of models, hence the advent of complex statistical procedures such as Box-Jenkins and ARIMA. A significant step, introduced with the available of mainframe computers and econometric software for multiple regression modelling, was the extension from the use of a single independent variable to a collection of such variables — and later to the use of an entire set of dependent variables, using methods such as rule-based forecasting (Adyaa et al, 2000).

The evaluation of forecasting has until recently used the sole criterion of “accuracy” — namely minimizing the difference between the predicted and the final value/s of the dependent variable/s. Wise (1976) reviewed the accuracy of 1,556 forecasts made in the USA between 1890 and 1940. His main findings were that experts producing forecasts for 10 years or more into the future were wrong more often than they were right, and that experts were not
significantly more accurate than non-experts. His study also found that the effects of technological development were more difficult to forecast accurately than were the developments themselves. In reviewing Wise’s paper, Godet (1983, p. 182) notes that the main factors behind the forecast errors described by Wise are “inaccurate data coupled with unstable models, lack of a global, qualitative approach, and explanation of the future in terms of the past.”

However, the accuracy of the forecasts, though often usefully precise over a short term (Armstrong, 1978, 1986, 2001), despite the introduction of more and more complex methods, is often not sustained in the longer term (Schnaars, 1989). De Jouvenel (1996, p. 10) notes that “although economists and demographers prefer to use increasingly sophisticated models of this sort [i.e. simulation], their initial hypotheses are frequently very crude, arbitrary and weakly argued.” Ascher (1981), reviewing the factors affecting accuracy of forecasts since the 1950s, found that the most accurate forecasts were those in which the same authority controlled supply and demand. He cited the example of electricity usage in the USA. Demand was forecast by the supply agencies, and naturally the demand could not exceed the supply. In a special issue of the International Journal of Forecasting (No. 8 of 1992), 16 papers compared the results of various different forecasting methods, but only one of these used a criterion other than accuracy. In a later study (Yokum and Armstrong, 1995), ease of use and interpretation was consistently the second most important factor for users of forecasts.

From the mid-1980s, writers began questioning whether accuracy should be the sole criterion of merit in a forecast. Part of this trend was due to the realization that forecasts could be self-fulfilling or self-defeating (discussed in most detail by Henshel, 1982, and Henshel and Johnston, 1987). This was a factor to which writers who focused on the technical methods (such as Makridakis et al, 1997) had devoted little attention. Ascher (1989) suggested using a scenario-like approach (as had Godet in 1983), while Robinson (1989, commenting on Ascher’s paper), as well as Makridakis (1986) and Morrison and Metcalfe (1996) all agreed that usefulness (however defined) is a more all-embracing criterion than is maximizing accuracy. Yokum and Armstrong (1995) added the criteria of ease of use and of interpretation.

To summarize the major problems with forecasting, from the point of view of this argument:

1. By its nature, forecasting can predict values and probabilities only for variables already identified – which may not continue to be relevant. In practice, the meaning of many concepts slowly changes with time. For example, the definition of unemployment was changed nine times in the UK between 1979 and 1994, resulting in successively lower recorded lev-
els of unemployment (Ecotec, 1998). Even when, as in this case, definitions were explicitly changed, continuity can be lost due to changes in the ways the data are collected.

2. Forecasts can be dangerous for decision-makers: "What makes forecasts so dangerous is that they are constructed on the assumption that tomorrow's world will be much the same as today's. Consequently, forecasts fail when they are needed most, namely as major changes suddenly occur" (Kenter, 1998, p29).

3. Forecasting encourages an illusion of control. Studies such as those described by Harries (2003, p808) and Langer (1994) have demonstrated that in the presence of forecasts, managers develop over-confidence in their own ability to foresee the future, resulting, in some cases, in the collapse of companies.

4. For anticipating human events that do not form part of a historical series, forecasting offers no objective basis on which to calculate probability (as noted by Keynes, 1921), or for the formation of subjective estimates, even in a rigorous process such as Delphi.

The tentative conclusion is that forecasting does not appear to be on the threshold of developing any breakthroughs in the near future, and its lack of accuracy for issues involving multiple dependent variables and over time periods of longer than a few years has no imminent prospect of solution by using more complex mathematics (Armstrong, 2001). This is not to deny that forecasting is highly useful for some purposes, but rather that it is of limited value when dealing with broad social questions, and with time ranges of more than several years. It was thus decided not to use aspects of forecasting in the Process being developed.

2.3.3 Alternative-futures thinking

This section describes the alternative futures concept that developed in the second half of the 20th century: the concept of anticipating many futures rather than a single one. This idea became the basis of scenario planning, and a group of related methods.

The altered geopolitical conditions of the world during and after World War II were the springboard for the development of alternative futures methods. The large-scale, prolonged war impelled governments to take a much larger role than previously, and this required an emphasis on planning – both for the conduct of the war itself, and for national development following the war. In contrast to the passive approach used by forecasting, which estimates
the likely effects of existing trends, planning takes an active approach to the future, determining goals and working towards them (identified by Godet, 1983, as a “voluntaristic” mode). This was particularly evident in France, in which a tradition of centralized government introduced after the Revolution was further developed after World War II for national reconstruction. However, perhaps due to corporate antipathy to government control, national planning was never as widespread in the USA as in Europe. With the ensuing Cold War came the looming threat of MAD (“mutually assured destruction”) and World War III.

Given the inability of forecasts to make successful predictions for more than a few years ahead, particularly when forecasting a probability rather than a quantity, interest turned to new methods of foresight. In response to these new needs, and the uncertainty that arose in a locally planned but globally uncontrolled environment, the earliest methods of futures studies were developed – mostly in the 1950s and 1960s. These included technological forecasting, præspective, and scenario planning. Another factor was the development of new military technologies, which brought methods such as the Delphi technique (Linstone and Turoff, 1975).

The uncertainties in the Cold War gave rise, around 1960, to scenario planning, both in the USA (through Herman Kahn and the RAND Institute) and in Europe, most notably in the form of the Futuribles movement in France. Bertrand de Jouvenel developed the concept of futuribles, and published a book of that name in 1963, followed by L’Art de la conjecture, published in French in 1964, then in English as The Art of Conjecture in 1967). The term futuribles is based on a contraction of futures possibles, the plurality of which clearly displays the multiplistic basis of the movement. De Jouvenel refers to “conjectures” rather than to “scenarios,” and does not go so far in L’Art de la conjecture as to develop an explicit method for anticipating the future. However, conjectures and futuribles share with Kahn’s term scenarios the concept of a tentative, provisional story: a human construct rather than a historical record.

Herman Kahn is credited by Ringland (1998) and Rubin (2001) with being the inventor of scenario planning, the first of the multiplistic methods to be developed – though the principle is much older: the medieval theologian Molina introduced the idea of futuribles (for use in arguments on free will, according to Paalumäki, 2001), and the philosopher Vaihinger (1924) wrote of Als Ob (“as if”): a form of scenario. The earliest reference I could find to multiple scenarios was by Kahn (1961). The rationale of scenario planning was that if the future cannot be predicted by forecasting – particularly when it comes to forecasting the probability of occurrence of an unprecedented event, such as international nuclear war – an alternative approach was to list some key alternatives, and study the situations under which they could
develop. By the end of the 20th century, scenario work had become the most widely used
method for multiplistic foresight – to judge from the number of references in the OECD
further information on the development of scenario techniques.

Continuing the demand-based approach used above to explain the rise of forecasting, the
growth of planning (and the alternative-futures concept in general) had these prerequisites:

(1) As discussed in section 2.2 above, many people have a strong desire to know the future
(even though they realize it is fundamentally unknowable), and a more generalized desire to
improve their social environment.

(2) Those in positions of authority, both government or business, have not only the desire
to know the future, and a drive toward improvement of their organizations, but also con-
trol enough funding and staff to carry this desire forward. The growth of control systems
in business enabled much more detailed control over the activities of those at lower levels
of hierarchies, and the later growth of ICT systems enhanced that control.

(3) Around the mid 20th century, as the world became seen as less predictable, there was
increased demand for methods of planning the future. The widespread growth of man-
agement education encouraged this trend.

(4) Similarly, Daniel Bell (in Kahn and Wiener, 1967, p.xxivii) notes an emerging tendency
to tip the balance between the fortuna and virtù of Machiavelli (1525/1914) – loosely equiva-
lent to fate and planning, respectively – toward the latter pole, encouraged by the develop-
ment of alternative-futures concepts. In Western societies at least, people have moved
from an attitude of powerlessness in the face of natural forces towards an assumption that
humans now have the upper hand: the “mastery of nature” described by Berry (1988). The
shock now felt at extreme climatic and geological events, such as the Indian Ocean tsunami
of December 2004, highlights this assumption.

The above four factors, taken together, contributed to the growth of planning, particularly
strategic planning, as documented by Mintzberg (1994). The rise of scenario planning (and
related methods) grew from the following three factors:
(5) Given widespread dissatisfaction with the outcomes of quantitative forecasting and strategic planning, some managers, particularly in large corporations and government agencies, decided to try scenario planning – just as they also decided to try a host of other new management tools (Argyris, 2000; Jackson, 2001).

(6) Knowledge of the existence of scenario planning, at first confined to technological and government circles, gradually spread among managers, boost by Wack’s two 1985 papers in the influential Harvard Business Review. Schwartz was another prominent writer: his Art of the Long View was specifically about scenario planning, and is still in print following its first publication in 1991.

(7) Following the widely reported success of Shell Oil with scenario planning (Wack, 1985a and 1985b, Kleiner, 1989, and Schwartz, 1991) many large organizations tried scenario planning. The management consultancy Bain & Co produces an annual index of the use of “management tools” in large corporations. Its 1999 survey reported that 21.5% of the companies surveyed had used scenario planning, placing it in the middle range of tools used (Rigby, 2001b). Scenario planning was also in the middle range in terms of user satisfaction, with a mean rating of 3.70 on a 5-point scale, compared with an average of 3.76 for all the 25 tools studied. In the 2005 survey (Rigby, 2005) the rating for “scenario and contingency planning” had risen to 3.90, marginally above average, with 54% of the 960 participating companies saying they had used it: a possibly massive increase over the 21.5% figure for 1999 – depending on how “contingency planning” was interpreted.

All of the above seven factors – the first four indirectly, and the second three directly – can be seen as instrumental in the rise of the “alternative futures” approach.

2.4 Review of anticipatory methods

This section reviews some of the methods used in futures studies with a view to their adaptation or inclusion in the Process being developed. This review is selective: it does not cover methods that did not appear to be able to be folded into the Process. Nor are those methods reviewed covered in full detail: the focus is on their strengths and weaknesses, and how they might be adapted and improved.

Several classifications of futures studies methods have been made. For example, Inayatullah (2002a) divides futures studies methods into four types: the predictive (e.g. forecasting), the
interpretive (much scenario planning), the critical (e.g. causal layered analysis), and the participatory. However, for the purposes of investigating the incorporation of elements of existing methods into a new method, they are here divided for discussion purposes here into four families:

- Methods of exhaustive comparison: mainly morphological analysis, and its derivatives (section 2.5).
- Methods for sequential projection, such as the futures wheel and backcasting (section 2.6).
- Methods of mental imagery, including scenarios and envisioning (section 2.7)
- Methods of increased understanding: critical approaches that contribute to broader-based insight into mechanisms, such as causal layered analysis (section 2.8).

Each of these families will now be discussed: not in detail, but purely from the perspective of their potential for incorporation into a new integrated Process. Though historical background is provided when relevant, the following section is not intended to be a comprehensive history of futures methods.

### 2.5 Methods of exhaustive comparison

These methods include mainly morphological analysis, its derivatives, the relevance tree, and cross-impact analysis. Only the former will be discussed at this point.

#### 2.5.1 Morphological analysis

In the 1930s (according to Ritchey, 2002) the astronomer Zwicky (1969) developed morphological analysis as a general aid to creativity. The method was not intended for use in futures studies — which as a discipline did not exist at the time — but was used in the 1950s for purposes such as designing new types of jet engines. Morphological analysis works best with a clearly limited number of variables (such as parts of a jet engine), each of which has a clearly limited number of properties. Zwicky’s key principle is that of the morphological box, an n-dimensional hypercube, each cell of which represents one combination of all the relevant variables. Because the number of possible combinations is a power function of the number of variables, there can be millions of possible combinations; thus it requires vastly more work than even cross-impact analysis. This number is collapsed by removing impossible combinations of properties. In practice, many of the combinations turn out to be impossible, and the final reduced number of possibilities is a tiny fraction of the total.
Morphological analysis can be dangerous, because it lulls its users into a false sense of security – that they have foreseen all possibilities. As it can rarely be proved that all potential variables have been included in the morphological box, there is a risk that an overlooked variable – or a completely new factor – may reveal that the original, supposedly complete, set of variables is only a subset of a much larger range of possibilities. Even when dealing with a manufactured item, each variable can be almost endlessly subdivided into other variables. Thus in practice, the variables form a faceted taxonomy (Canter, 1985) rather than a list, and the number of comparisons becomes near-infinite. This number can be reduced using human judgement, but its exercise embodies a risk of dismissing combinations that will later turn out to be important – so the apparent comprehensiveness of morphological analysis may be an illusion.

Morphological analysis has spawned several variants, including Field Anomaly Relaxation (Rhyne, 1981) and the Swedish Morphological Society approach (Ritchey, 1998, 2002). FAR, originated by Rhyne and elaborated by Coyle et al (1994), and Jenkins (1997), is a method of reducing the number of combinations, by “relaxing” (in the mathematical sense) conditions, one at a time. Powell (1997) described an extended version of FAR: EFAR, which derives scenarios from FAR, through a method of mathematically generating traceable scenario sets.

A recent variant is the XLRM Model of Lempert, Popper and Bankes (2002, 2003). This LTPA (long-term policy analysis) model is a method of defining a set of variables, and mathematically generating literally millions of scenarios based on the combinations of those variables. It involves four sets of variables, labelled X (exogenous uncertainties) L (policy levers), R (relationships), and M (measures for ranking desirability). Among those four, “a particular choice of Rs and Xs represents a future state of the world” (Lempert, Popper and Bankes, 2003, p.xvi). The millions of scenarios generated by this method are reduced by ruling out seemingly incompatible combinations, as in morphological analysis.

2.5.2 Limitations of the methods of exhaustive comparison

These approaches attempt to cover all possible situations, but because the detailed level at which they operate provides so many alternatives, it is impracticable to assess all morphological combinations, or all cross-impacts. Therefore it is necessary to make choices about the most plausible outcomes, with a consequent danger that an outcome seen as plausible at the time of preparation as implausible turns out to be irrelevant.

No matter how hard cross-impact analysis or morphological analysis tries to be comprehensive, it is often easy to imagine another possibility that was not included. For this reason –
combined with the sheer amount of work involved in making the necessary comparisons – these methods appear to have been less popular in recent times, to judge by the frequency of articles in the six leading futures journals. The same reservation may apply to the XLRM model of Lempert, Popper and Bankes (2003): though the software produced for this work can produce literally millions of scenarios, humans are still required to assess the relevance of each combination produced.\(^1\) A further limitation of the exhaustive approaches is that, though they can produce many combinations of possibilities, this is done by tokenizing the situations involved. For example, the XLRM model involved prior definition of four factors: the volume of possibilities militates against consideration of specific combinations of circumstances.

In summary, though the exhaustive approaches have the theoretical advantage of comprehensiveness, their weaknesses are (a) ensuring such comprehensiveness; (b) ensuring exhaustive execution; and (c) the assumption of entity.

### 2.6 Methods of sequential projection

"Sequential projection" refers to the way in which the futures are developed in these methods: generally, one step at a time. Thus the futures wheel and incasting step forward from the present, backcasting steps back from a future situation (usually normative), and technology roadmapping steps through a product life-cycle of design, manufacture, marketing, and recycling (Phaal, Farrukh, and Probert 2004).

#### 2.6.1 Futures wheel

This method was developed and first described by Glenn (1972). The "wheel" principle is that the starting time is shown at the centre. From that, a number of "spokes" lead to a number of possible developments; the later the development, the further from the centre. A futures wheel is often created as a participatory exercise, and Snyder (1993) and Slaughter (1995b) report that the concept can easily be communicated to participants, that the latter generally enjoy the work, and that they therefore put a lot of effort into the development of possible outcomes\(^2\). A related method is the mind map (Buzan, 1989), except that the radiating dimension of the latter is the scale of a concept rather than a change in time.

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1. Though the "millions of scenarios" producible by XLRM seem mind-boggling at first, a mere 10 variables, each with 4 possible levels, have 1,048,576 possible combinations ($4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4$).

2. This was also my own experience in participatory workshops, before beginning work on this thesis.
2.6.2 Backcasting

Robinson was the first to write a full paper about backcasting in its current sense (Robinson, 1982) but the term was used some years earlier in quantitative forecasting (according to Dreborg, 1996). Backcasting is related to the chain scenario, and can be seen as an opposite of forecasting. With forecasting, one begins at the present and creates a time-line into the future. With backcasting, one begins with an end-state, and works back in time to determine how that end-state could be arrived at. Another claimed difference between forecasting and backcasting is that forecasting implies causality, while backcasting uses a teleological model (according to Dreborg, 1996); “causality” in this context presumably refers to the classical Humean concept.

Backcasting has been most used in environmental analyses, particularly in Canada. It has also been used to plan the marketing of innovations (e.g. Wang and Guild, 1995a and 1995b; Noori and Munro, 1999a and 199b), and recently as part of scenario planning. Typically, a set of end-state scenarios is generated – or a single normative scenario – and backcasting is then applied to convert the end-states into chains (Ringland, 1998). The ensuing chains can then be used to produce a plan of action. De Jouvenel (1996) states that exploratory scenarios normally move forward, while strategic scenarios (for him, synonymous with normative) tend to use backcasting.

Looking ahead to the development of the Process, one element that my literature search failed to find was backcasting with branching: that is, two routes to one result. A more conditional view of backcasting might expect to find some backcasting chains that revealed multiple ways of reaching the same goal. However, all the chains reported (from a small number of cases) were effectively single lines of development. A key aspect of the Process developed in this thesis is the principle not simply of alternative futures, but of alternative means for attaining equivalent futures. For that, backcasting will be vital.

2.6.3 Technology roadmapping (TRM)

TRM grew from the critical path method (CPM and PERT), as often used in scheduling large construction industry and computer systems projects in which several different organizations are involved (Phaal, Farrukh and Probert, 2000). Technology roadmapping (or TRM) was first developed circa 1980 (Willyard and McClees, 1987, Bray and Garcia 1998) for coordinating many suppliers in the production of a new product. More recently, it has been extended beyond its original role into the marketing of discontinuous innovations, and thus has been obliged to take the marketing function into account, as well as the production function (Phaal, Farrukh, and Probert 2004).
Though TRM takes a variety of forms, these forms share a graphical display, generally with time progressing from left to right on a large graph, and often a number of layers denoting different aspects of a product—e.g., technology, suppliers, production, and markets. Phaal, Farrukh, and Probert (2004) distinguish eight different presentation formats, as well as eight different types of purpose. The more complex roadmaps display both a “technology push” and a “market pull,” and in many ways resemble backcasting (Barker and Smith, 1995), particularly when created for one organization rather than an entire industry.

2.6.4 Limitations of the methods of sequential projection

Sequential projection has three main limitations:

Limitation 1. A sequence of future events becomes increasingly uncertain as time progresses. If event A precedes B, this may have a very different outcome from B preceding A. For example, countries where fax availability preceded email availability (e.g., Japan) had a much slower uptake of internet usage than countries (e.g., South Korea) where the reverse sequence occurred (ITU, 2003; Petroski, 1996, chapter 6).

Limitation 2. Though trends are important in foresighting, methods of sequential projection generally cannot be applied to trends. This is because sequences, by definition, are sequences of events: in other words, for a sequence to exist, there must be a number of specific events or occasion. If two trends develop at approximately the same time (as they often do), there is no clear sequence, because the nature of a trend is that it has no specific starting date.

Limitation 3. Events may seem more identifiable than trends, but are not as clear-cut as they first seem. Thus a seemingly simple question, such as “did fax machines become available before or after email?” can have various answers depending on the precise definitions of the words in the question—as well as the words that do not appear in the question, such as “available where?” and “available to whom?” Thus any particular sequence could be deeply embedded in a specific context. This is not such a problem for past events, because the specifics can be researched, but is a conceptual problem for future events.

2.7 Methods of mental imagery

This class of methods includes scenario planning (including related methods such as Godet’s prospective) and envisioning images of the future. The latter, being a simpler method, will be discussed first.
2.7.1 Envisioning images of the future

This method consists of two main streams of research. The first was sparked off by Polak (1973), in his review of images of the future throughout history; he recorded a marked swing from optimism toward pessimism in the 20th century. This stream developed a range of descriptive studies of images of the future among the population – for example, the international surveys of Ornauer et al (1976), Lambourne, Feiz, and Rigot (1997) in a marketing context, and studies of the use of foresight in daily life (Hayward and Krishnan, 2002). The focus has been to discover and record the future images of various populations.

Where that first stream has been descriptive, the second has been normative: a process of envisioning preferred futures, as outlined by Ziegler (1991), Nanus (Visionary Leadership, 1992: a process beginning with a "vision audit" and ending with scenarios), Stewart (1993), Malaska and Holstius, 1999, and Malaska, 2001 (on visionary management) and Wacker and Taylor (2000). A major goal of these processes is to create in the minds of all involved a single coherent vision of a preferred future for the organization.

An obvious criticism of the writings in the latter stream is that their visions are not images, but abstract criteria that cannot be visualized. As a case in point, Nanus (1992, p218) gives an example of a vision for a government department: “Becoming the most efficient agency of its kind in the country, offering the greatest amount of public recreational services per budget dollar of all the states.” One might well ask: where is the vision there? What is the image? Surely that is a goal or objective, because it is not concrete enough to be correctly labelled a “vision” – and, lacking specificity, it is difficult to test against alternative courses of action. As Margaret Mead (1957) noted, utopias are unsatisfying places because they are not vivid enough to produce clear visions.

A parallel literature is that of spatial planning, which uses the concept of “community visioning,” as described by Ames (1997), the Center for Rural Pennsylvania (2001), Maine State Planning Office (2003), Nelessen (1994), Sancar (1993), and other contributors to journals on urban planning, architecture, and related disciplines. This type of visioning, because it deals with the designed environment, is intrinsically visual, and the preferred visions are of buildings, landscapes, and land use; they do not visibly embody social goals.

Though all three literatures deal with creating a vision of a preferred future, I found almost no cross-referencing between them – nor between any of them and the related literature of cognitive mapping (discussed below). Another aspect of the (en)visioning movement is its
insistence on a single corporate vision, to be embedded in the brain of each employee. This is a curious contrast with the "alternative futures" credo of scenario planning, particularly as visions are usually considered to be something highly personal: even in a widely shared scenario, people might have different visions of their preferred futures. A resolution of this paradox is offered in the Service Club study in chapter 8.

2.7.2 Multiple scenario methods
These methods, though they vary considerably in their procedures, are characterized by their output: an ensemble of scenarios for alternative futures, created for a specific entity at a future time which may or may not be specified. Though they often include elements of sequential projection, they are not solely methods of sequential projection in the sense discussed above.

The term "scenario" is used in a wide range of senses. Though all scenario planning produces an ensemble of scenarios, not all scenarios are derived from scenario planning. A large proportion of the scenarios reported in academic literature databases (OECD, Ebsco, Emerald, and Science Direct) are the outcomes of numerical forecasting. Trend projections in which assumptions are varied are frequently referred to as scenarios, even though these were derived purely from mathematical projections. Van Notten (2002, p3) distinguishes several meanings of the term "scenario" in strategic management, related to sensitivity analysis, contingency planning (e.g. military), and finally in the broader narrative sense of multiple futures. The final sense is that intended in the present context.

To judge from the literature of futures studies, including academic journal databases and the OECD Futures Group database (OECD, 2001), it seems that scenario planning is by far the most widely used mode of foresight. Perhaps because of its wide use, it has also become the most varied, with many different strands and methods described in the literature.

2.7.2.1 A typology of scenarios
Several writers on futures studies have described typologies of scenarios, including Masini and Vasquez (2000), Postma and Liebl (2005), Chermack et al (2001) and van Notten and his collaborators (2001, 2002, 2003, 2005). The most comprehensive typology published so far is that of van Notten et al (2003). They distinguish 14 scenario "types" (more precisely described as variables or factors, which could produce 24,576 different types of scenario) divided into three "overarching themes," as follows:
TABLE 2.1 SCENARIO TYPOLOGY OF VAN NOTTEN ET AL (2003)

<table>
<thead>
<tr>
<th>Overarching theme</th>
<th>Scenario type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Project goal:</td>
<td></td>
</tr>
<tr>
<td>exploration vs.</td>
<td>1. Inclusion of norms? Descriptive vs normative</td>
</tr>
<tr>
<td>decision support</td>
<td>2. Vantage point: forecasting vs backcasting</td>
</tr>
<tr>
<td></td>
<td>3. Subject: issue-based, area-based, institution-based</td>
</tr>
<tr>
<td></td>
<td>4. Time scale: long term vs short term</td>
</tr>
<tr>
<td></td>
<td>5. Spatial scale: global/supranational vs national/local</td>
</tr>
<tr>
<td>B. Process design:</td>
<td></td>
</tr>
<tr>
<td>intuitive vs formal</td>
<td>6. Data: qualitative vs quantitative</td>
</tr>
<tr>
<td></td>
<td>7. Method of data collection: participatory vs desk research</td>
</tr>
<tr>
<td></td>
<td>8. Resources: extensive vs limited</td>
</tr>
<tr>
<td></td>
<td>9. Institutional conditions: open vs restrained</td>
</tr>
<tr>
<td>C. Scenario content:</td>
<td></td>
</tr>
<tr>
<td>complex to simple</td>
<td>10. Temporal nature: chain vs snapshot</td>
</tr>
<tr>
<td></td>
<td>11. Variables: heterogeneous vs homogeneous</td>
</tr>
<tr>
<td></td>
<td>12. Dynamics: peripheral vs trend</td>
</tr>
<tr>
<td></td>
<td>13. Level of deviation: alternative vs conventional</td>
</tr>
<tr>
<td></td>
<td>14. Level of integration: high vs low</td>
</tr>
</tbody>
</table>

Despite the apparent comprehensiveness of the above table (produced after a review of 70 scenarios, according to van Notten, 2002), there are several obvious omissions in overarching themes B and C. Also, those three themes describe only the generation of the scenarios, not the ways in which the scenarios are used. I have thus created a supplementary table:

TABLE 2.2 SCENARIO TYPES FOR EACH OVERARCHING THEME

<table>
<thead>
<tr>
<th>Overarching theme</th>
<th>Scenario type</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Process design:</td>
<td></td>
</tr>
<tr>
<td>intuitive vs formal</td>
<td>10A. Time taken for scenario development: short vs long</td>
</tr>
<tr>
<td></td>
<td>10B. Formality of process: rigid vs flexible</td>
</tr>
<tr>
<td></td>
<td>10C. Method of development</td>
</tr>
<tr>
<td>C. Scenario content:</td>
<td></td>
</tr>
<tr>
<td>complex to simple</td>
<td>15. Number of scenarios: few vs many</td>
</tr>
<tr>
<td></td>
<td>16. Detail in each scenario: little vs much</td>
</tr>
<tr>
<td></td>
<td>17. Number of scenario iterations: 1 vs 2 [see below]</td>
</tr>
<tr>
<td></td>
<td>18. Shared content: standard vs unique</td>
</tr>
<tr>
<td>D. Scenario usage:</td>
<td></td>
</tr>
<tr>
<td>internalized vs externalized</td>
<td>19. Promulgation: internal secret vs wide publication</td>
</tr>
<tr>
<td></td>
<td>20. Use: direct input into planning vs better understanding</td>
</tr>
<tr>
<td></td>
<td>21. Timescale: immediate use vs kept for reference</td>
</tr>
</tbody>
</table>

Explanatory notes on the additional scenario types:
10A. Time taken. Shell's scenario development cycle lasts for around 18 months (Shell International, 2003) while at the other extreme Mercer (1997) describes achieving "robust strategies in a day."

10B. Formality. Some processes such as Prospective (Godet, 1987) and the Future Mapping of NCRI/Nervewire (Mason, 1998) have become standardized with repetition, while other processes can vary considerably depending on the client's needs (Ringland, 1998; Eden and Ackermann, 1998).

10C. Method of development. Unlike the other items in the above table, this is not a bipolar scale. The most widely used methods for developing scenarios are discussed below.
15. **Number of scenarios.** Some writers recommend few: thus Wack (1985b) suggests using three scenarios. The related literature of community visioning (such as Ames, 1997) often develops only a single scenario. Others use more – such as the seven Mont Fleur scenarios for South Africa (Kahane, 1992). Morphologically based methods (eg. Lempert, Popper, and Bankes, 2003) can generate millions, most of which are then culled.

16. **Detail.** Some scenarios are written up in detail (*Europe 2000*, with six volumes: Hall, 1997), while others (as used in businesses) can be limited to one page per scenario, on the ground that senior managers will not read anything longer.

17. **Iterations.** this refers to the practice common in the Shell tradition (Schoemaker and van der Heijden, 1992) of producing firstly a set of world-based exploratory scenarios, followed by a set of organization-specific decision scenarios.

18. **Shared content.** To some extent, each set of scenarios is unique, but to a surprisingly large extent, different sets of scenarios share many similarities.

The new overarching theme (D) is concerned with the ways in which the scenarios are used. Though it could be argued that usage is not a characteristic of scenarios per se (perhaps why van Notten did not include this in his typology), the counter-argument is that a major component of this thesis is the evaluation of scenario methods, and such methods cannot be evaluated without regard to the uses to which they will be put. Thus I have added three variables (or “types”) under the overarching theme of scenario usage:

19. **Promulgation:** restricted distribution vs wide publication. At one extreme, the organizations that commission scenarios restrict knowledge of the output to a small group of managers, because the scenarios are seen as conferring commercial advantage. At the other extreme, scenarios are made available as widely as possible – for example, the Mont Fleur scenarios, published in newspapers in South Africa for public discussion (Kahane, 1992).

20. **Use of scenarios:** direct input into planning vs better understanding. This is the “scenario planning” vs “scenario learning” dichotomy expressed by van der Heijden (1996).

21. **Timescale:** immediate use vs kept for reference. At the “immediate use” extreme, scenarios may be developed in a workshop but not written up: their value is considered to reside in the minds of the participants. At the other extreme, scenarios are regarded as documents rather than as states of mind, and are filed away, to be consulted if an unexpected situation arises.

These 24 “types” or variables of scenarios (21, plus 3 more varieties of variable 10) were used in considering possibilities for the development of the Process.

The next section focuses on several of the above factors, since they were particularly relevant to the nascent Process: how scenarios are built (type 10C), who builds them (type 7), their temporal nature (type 10), their shared content (type 18), and how they are used (type 20).
2.7.2.2 The varied methods of scenario building

The major methods of developing scenarios, discussed in most detail by Huss and Honton (1987), Ringland (1998), and Chermack et al (2001) are intuitive logics, critical uncertainties, and Prospective. Each of these methods will be discussed briefly, examining only features likely to be relevant for the Process to be developed. The above list is not exhaustive. Other methods exist, falling into two main groups, neither of which will be discussed further: proprietary methods, often software-based, that often produce partly quantified scenarios, and impact-based methods such as cross-impact analysis (Gordon, 1999) and trend-impact analysis (Glenn, 1999, chapter 9).

Intuitive logics

The initial method of scenario planning was to study a situation in detail, then develop scenarios intuitively. By definition, there is no standard procedure when this method is used: an ensemble of scenarios is developed to fit a particular situation. Such scenarios are developed by experts: professional futurists, whose deep knowledge of trends informs their intuition. Though this method is limited by the vision of the experts who develop the scenarios, it has a good track record when outcomes are compared with scenarios — in companies such as Shell. Two widely cited examples (Wack, 1985a and 1985b; van der Heijden, 1996) are Shell's successful anticipation of OPEC's oil price rise in 1973, and the demise of the Soviet Union circa 1990. Van der Heijden (1996) suggests that part of the reason for Shell's commercial success since the 1970s was its use of scenario planning in general, and the intuitive method in particular.

Critical uncertainties

This method, widely promulgated by Schwartz's book (1991) and his Global Business Network, appears to be currently the most widely used of all, perhaps because it can be reduced to a concise set of instructions (e.g. Schoemaker, 1995; South Wind Design, 2001). Some writers (such as Huss and Honton, 1987) include this method in the "intuitive" group, perhaps because the label "critical uncertainties" has not been applied to it until recent years — as by van der Heijden et al (2002). However a clear historical thread exists: a search for the earliest reference to "critical uncertainties" uncovered a paper by Hitch (1960), in an operations research journal. The link is that Hitch was then at RAND, where Schwartz also worked. Thus this scenario development method (like some other futures methods) may be much older than publication dates would suggest.

The Critical Uncertainties method typically begins by listing a number of trends or variables relating to the future. These trends are then divided into three:
1. those whose continued influence on the entity under study is almost assured
2. those that are extremely unlikely to affect the entity
3. those that are uncertain.

The uncertain trends are then divided again, into one group that will have little effect on the entity, and another group that, if they occur, will have a major effect. The latter are the Critical Uncertainties. These are ranked in order of possible impact, and the most crucial few are used to create a notional hypercube of that number of dimensions. If there are two variables, four scenarios are generated. If the variables are labelled A and B, the scenarios will be (1) low level of A, low level of B, (2) low A, high B, (3) high A, low B, and (4) high A and high B. If some scenarios are judged to be implausible, they are discarded, so there may be less than four final scenarios (when using two variables) or less than eight scenarios (when using three variables).

This is a procedure-bound method of creating scenarios, and its ease of generation may explain its popularity. However, the danger with Critical Uncertainties is of missing the point, by choosing dimensions that turn out later to be not as critical as was perceived at the time of construction. Scenarios based on a slightly different set of critical uncertainties might have produced quite different futures, suggesting quite different anticipatory actions. As a situation can change quickly, a set of dimensions that is highly uncertain one year may be certain (in one way or another) the next. This was the case with a number of scenarios created in the late 1990s for the development of the Internet (e.g. Randall, 1997), as discussed in Appendix 1. A further problem with the Critical Uncertainties method is that the worlds described by the resulting combinations of variables can be difficult to imagine. Thus it can happen that all scenarios in an ensemble— or none— turn out to apply (Liebl, 2002, p175).

Prospective

The prospective method of Godet (1987, 1999) and his colleagues at LIPS is a systematic set of procedures, more mathematical than most others described in this section. It makes extensive use of subjective probabilities, and uses specially developed software to guide and ease the calculations. For Godet, a scenario includes both a vision and the path required to attain it. (Godet 2000:10) divides prospective into three phases: anticipation, decision, and action. The “anticipation” phase, which roughly corresponds with scenario production, ends with a set of environment scenarios (including megatrends, wild cards, threats and opportunities, and evaluation of risks) feeding into the stage “from identity to visions and projects” including strategic options and possible actions. Another way of expressing the process is through answering the five basic questions that are posed:
Q1: What can and might happen?
Q2: What can I do?
Q3: What am I going to do?
Q4: How am I going to do it
Q0: (Essential prerequisite): Who am I?

From this it can be seen that the scope of prospective is broader than that of the other scenario methods described in this section: for prospective, scenario-building is only part of the process. The full process includes MICMAC (similar to cross-impact analysis), a form of morphological analysis, and (uniquely among all the methods discussed in this chapter) the Mactor method, of analysing actors’ strategies. In Mactor, all the actors are identified, and their objectives, goals, motivations, and the like are studied in detail. The Mactor process is a complex one, requiring 2 to 5 months (Godet et al, 1999, p46).

2.7.2.3 Content types of scenarios
The content of scenarios can be highly varied, particularly when developed using the intuitive method or the Critical Uncertainties method, so this section considers types of content rather than actual content: predetermined scenarios and normative scenarios.

Predetermined scenarios
At least two processes use scenarios that are predetermined. These are “deductive forecasting” (Dator, 1998) and “Future Mapping” (Mason, 1994 and 1998). Deductive forecasting arises from Dator’s experience that scenarios often fall – or can be persuaded to fall – into four general categories: (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 deductive forecasting process for any entity is to inquire into how the entity would fare in each of those four scenarios. Cornish (2004) offers a set of five common scenarios, very similar to Dator’s four: Surprise-free, Optimistic, Pessimistic, Disaster, and Transformation. Even when scenarios are not predetermined, they often fall into a number of common categories; thus Schwartz (1992) lists eight common plots for scenarios.

Several methods of planning (other than scenario planning) construct the equivalent of two standard scenarios. Though similar to predetermined scenarios, these are not quite the same, because it is only the label that is predetermined. For example the search conference method of Emery and Trist (Emery and Purser, 1996) contrasts two futures for an organization or a
community: “business as usual” (what would happen if current trends continued) vs an “ideal state.” Ackoff (1978) presents an almost identical pair of standard scenarios, describing them as “reference” and “idealized.” The similarity is not coincidental: Emery and Ackoff worked closely together (Emery and Ackoff, 1972).

Linstone’s TOP typology associates predetermined scenario types with the three perspectives: probable futures with T (technical), preferable futures with O (organizational), and possible futures with the P (personal) perspective (Linstone 1999, p231).

**Normative scenarios**

Perhaps the most commonly occurring theme is the normative scenario, similar to Emery’s “ideal state” (1995) and Ackoff’s (1978) “idealized” scenario. In some ways, this is equivalent to the Utopias of the pre-scientific era, and corresponds to the inherent optimism of humans (discussed in section 2.2 above).

The concept of normative futures – that there is a “best” future, which should be pursued – has been widely discussed (Jantsch, 1967; Coates, 1994; Ogilvy, 1996; Bell, 2004), though variously interpreted. Jantsch (1967) and Coates (1994) discuss normative forecasting – which for Coates includes normative scenarios. Coates (1994) contrasts normative with exploratory futures: the latter describe possible outcomes, while the former describe desired outcomes. In Coates’ view, normative futures are not the same as goal-based futures, though this distinction is not always clear in his writing. He states that the difference between a goal statement and a normative forecast is that for the former “no detailed analysis backed up what was necessary to achieve those objectives.” This implies that the essential property of a normative scenario is the plan for attainment, as much as the desirability of its outcome.

Ogilvy and Bell offer slightly different views of the normative approach. Ogilvy (1996) argues that what distinguishes futures studies from other social sciences is the explicit consideration of ethical values, while Bell (2004) couches his argument in terms of human values, using findings from cross-cultural values research to demonstrate that concepts of virtue are widely shared across cultures. This is similar to Galtung’s (2000) TRANSCEND approach to conflict transformation, in which the establishment of shared values is used to agree on and work toward a jointly beneficial outcome.

A parallel approach that clearly falls within this group (though not explicitly a foresighting method) is Appreciative Inquiry, developed by Cooperrider (1986). This involves an organiza-
tion creating a forward path by retaining what stakeholders agree to be the best elements from its past. In effect, an Appreciative Inquiry process (Elliott, 1999; Coghlan et al 2003; Whitney and Cooperrider, 2000) involves the participative creation of a normative scenario: an agreed ideal future, similar to the concepts of Emery and Purser (1996) and Ackoff (1978) — but more grounded in the past.

An argument against normative scenarios, from the futures studies literature, is that for psychological reasons, the fleshing-out of a normative scenario tends to diminish the perceptions of other scenarios in that ensemble. Because of the prevalence of optimism in human thought (Weinstein, 1980; Tichy, 2002), the concept of the normative scenario — a perfect world — exerts a strong attraction in scenario work. For that very reason, some futurists (such as Simpson, 1992) advise against the use of normative scenarios, as their images are too powerful: in the presence of an attractive normative scenario, participants tend to neglect other possibilities. (I made the same finding, in several of the case studies described in Chapter 8). For related reasons, it is uncommon to find pessimistic scenarios arising through participative work (as discussed by van Notten, Sleegers, and van Asselt, 2005).

### 2.7.2.4 The temporal nature of scenarios

In the past, there have been two major approaches to the sequencing of scenarios, described as the end-state (or snapshot) and the chain. As those labels imply, a set of end-state scenarios is aligned to a date — usually between 5 and 30 years ahead. A chain scenario focuses not on the end-state but the way in which it was reached. Among the first scenarios to be published were of the chain type (Kahn, 1965, describing various ways in which World War III could come about), defined a scenario as a “hypothetical sequence of events, for the purpose of focusing attention on causal processes and decision points.” This is clearly a chain scenario, but few subsequent examples of that type have been published. Godet (1986, p139) combines both sequences in stating that “a scenario is the description of a possible future and the corresponding path to it.” This viewpoint has become the most common in recent literature, and most of the current methods of scenario development (as in the cases in Part 2 of Ringland, 1998) involve the use of both elements, though the main focus is usually on the endstate, with only secondary attention to its development.

### 2.7.2.5 The uses of scenarios: planning or learning

The intended use to which scenario work is put can often be detected from the label given to the project. Descriptors in common use include: scenario planning, scenario learning, scenario management, scenario analysis, and scenario thinking — all of which have slightly different implications. Scenario planning is the original and most commonly used term. More recently, the
concept of *scenario learning* has become popular. Van der Heijden, in his book on "strategic conversations" (1996) makes the case that the main value of scenario work may lie in the learning that occurs during scenario development. Reinforcing the view that "scenario planning" may be an undesirable expression is antipathy to planning among some managers, particularly in the USA — as described by Mintzberg (1994), and in a US government context by Fallows (2004). When "planning" is seen as unacceptably cumbersome, and "flexibility" as an operational virtue (Rumsfeld, 2002), scenario learning may be regarded as more palatable than scenario planning.

A bibliometric analysis of the content of futures-related journals on the Science Direct database (*Futures*, *Technological Forecasting and Social Change*, and *Long Range Planning*: three of the major English-language journals) found that between 1968 and March 2004, the term "scenario" (singular or plural) appeared as a keyword in 387 articles. Surprisingly, neither *scenario planning* (mentioned in 58 papers) nor *scenario learning* (only 3 so far) was predominant: *scenario analysis* was by far the leader, with 221 mentions — though mostly in the context of quantitative "scenarios" that were really extended forecasts, particularly in operations research and energy studies. Other terms, used infrequently, were *scenario management* (9 papers) and *scenario thinking* (6 papers). *Scenario modelling* appeared in 25 papers, generally in a quantitative context. The point of discussing those terms is that they are indicators of the uses of scenarios within organizations. Thus *scenario planning* (along with *scenario management*) is seen as a method of increasing market share and the like, by out-planning competitors. *Scenario learning* (along with *scenario thinking*) is viewed more as a way of making the organization readily adaptable to change: a more diffuse goal.

But perhaps the dichotomy between scenario planning and scenario learning is overstated; it could be that both planning and learning are important. An alternative way to view the distinction is that scenario planning is recorded on paper, while scenario learning is recorded in people’s heads. Regardless of where the record is stored, another view is that scenarios perform the function of informing robust decisions, as suggested by Mercer (2001). To avoid prejudgement, the rest of this section uses the neutral term "scenario work" rather than "planning" or "learning".

**2.7.2.6 Who develops the scenarios?**

To judge from the review in Appendix 1, scenarios are generally developed by small teams of experts. However in recent years there has been some move to involving a range of stakeholders in the development of scenarios, leading to a growth in participatory methods of
development—though, as Arnstein (1969) demonstrates in her paper on the Ladder of Participation, "participation" can cover such a broad range that the term is almost meaningless. Thus participation can better be expressed in terms of degree than as a Boolean variable.

In Godet's prospective method the participants are labelled actors, rather than stakeholders; but this is no mere change in label. By "actors" Godet means decision-makers: those with power to act. Those who are merely experts or consumers do not seem to qualify as actors.

As world development agencies have found repeatedly (e.g. Rietbergen-McCracken and Narayan, 1998), if development projects involving the broad population are to be successful, they must engender a sense of "ownership"—so participatory development techniques have become much more common in the development industry during the last 5 to 10 years, even extending to expert-laden agencies such as the World Bank. The same findings should apply to futures exercises: if they capture input from a wide range of stakeholders, the findings are more likely to be successfully applied than if a small group of experts produces the results. In the world development field, some of the best results are reported to occur when experts are used to train the other stakeholders, hence the use of methods such as ZOPP, or Ziel-Orienterte Projekt Planung, developed by the German aid agency GTZ (Ford, 1999; Hamdi and Goethert, 1997; Helming and Göbel, 1997; COMIT, 1998). I have used such methods in work with development agencies, and have found from the viewpoint of an "imported expert" that the co-operation of a wide range of stakeholders greatly enhances the quality of evaluation findings—as well as their later application. Thus an early objective of the Process was to include a high level of participation: around level 5 on Arnstein's 7-point scale. (It could not be higher because I was developing the Process for this thesis: the methodological input had to be my own.)

One approach to scenario development is the partly-participative. This involves the trends, drivers, and/or scenarios being prepared in advance by professionals, as described in the Predetermined Scenarios section, above. Workshop participants are later asked how their organization might react in those situations. An example of this is the Nervewire Corporation's "future mapping," described at www.nervewire.com and by Mason (1998).

### 2.7.2.7 Problems of scenario work

The problems with scenarios will next be addressed, in two ways: firstly by reviewing the literature on the methods of scenario building (in this section), and in the next chapter by an empirical comparison of scenarios and their outcomes.
In the last few years, some writers, mainly from the Netherlands and Germany, have begun to question some of the well-established principles of scenario building. Postma and Liebl (2005) address some drawbacks of the commonest (critical uncertainties) scenario method, noting that it cannot deal with simultaneous trends and counter-trends. Postma and Liebl suggest incorporating the idea of the "paradoxical trend" in the scenario process.

The dependence of the conventional approach to scenario building on identifying trends means that this style of scenario work is similar to forecasting, except that the former is not (generally) quantitative, and takes a number of variables simultaneously into account. But whether a foresighting exercise takes the form of a forecast or a scenario ensemble, if the output is dependent on trends, future discontinuities are unlikely to be identified. Van Notten, Sleegers, and van Asselt (2005) found that half of the 22 scenario studies they examined in detail did not address discontinuity at all. Some of these explicitly stated that scenario work was not an appropriate vehicle for this. Brooks (1986) and Morgan (2002) suggest that scenario studies unconsciously incorporate an evolutionary model, making the implicit assumption that changes are slow and steady.

Integrating the above works, it appears that the main objection to scenario work as commonly practised is that it serves to contain uncertainty rather than to confront it. As Schoemaker (1993, p196) points out: "the scenario method caters to people's preference for certainty, by primarily specifying uncertainty across rather than within scenarios. This treatment of uncertainty is quite different from more traditional methods which usually present one model, with uncertainty nested within it." It may be that scenarios – like rosy strategic plans – can serve to seal off consideration of the future, rather than to open it up\(^3\). To the extent that users of scenarios see them in this reassuring way, the use of scenario work could have the opposite effect to that intended. This, of course, is an empirical question, which would be both feasible and interesting to test – but is beyond the scope of this thesis.

### 2.8 Methods of increased understanding

This section outlines three methods for increasing human understanding of the potential of the future: causal layered analysis, cognitive mapping, and surprise theory. Though at first they may appear to have little in common, they are all ways of dealing with complexity and unpredictability.

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3 This in mid-2003 a Pentagon spokesperson complained at the tactics of suicide bombers in Iraq that the US Army had war-gamed “hundreds of scenarios” but not suicide bombing – because it was not rational.
2.8.1 Causal layered analysis

This concept was first developed by Inayatullah (1998, but conceived in 1990, according to Ramos, 2003, p47). As much a way of viewing the present as the future, it amounts to a new means of categorizing causation. Other futurists, quickly grasping the usefulness of the method, have been applying it in a variety of ways, in slightly different forms. A special issue of Futures in 2002 (vol. 34, no. 6) was devoted to causal layered analysis, and a 30-chapter reader has recently been published (Inayatullah, 2004). The basis of CLA is to separate different types of concept into a set of successively "deeper" layers, so that each layer influences the layer above it. In Inayatullah's original conception, the layers are:

1. The "litany"
2. Social causes
3. Structure and worldview
4. Metaphor and myth

Other methods described in that 2002 issue of Futures use between three and seven layers—though of course the number of layers defined is to some extent arguable, and can vary with the purpose of the analysis. A valuable aspect of CLA is that it provides a means for categorizing and clarifying the wide variety of factors that influence change in human affairs.

2.8.2 Cognitive mapping

Cognitive mapping was originated by the psychologist Tolman in 1948, and was most widely used in educational contexts. It was first used in a management context by Axelrod (1976), and has by now spawned many variants, the best known of which is perhaps "mind mapping" (Buzan, 1989). Another aspect is argument mapping (Kirschner et al, 2002) while further variants are covered in the edited volume Mapping Strategic Thought (Huff, 1990).

Axelrod's process, often known as revealed causal mapping, is generally regarded as a management tool rather than as a futures studies method. However writers such as Eden and Ackerman (1998) have used it in strategic planning group processes, from which it is a short hop to futures studies processes. Warren (1995) was perhaps the first to explicitly link cognitive mapping with scenario planning. However this linkage has not been widely used, and seems to be largely confined to the UK. Sahin and Ulengin (2003) offer a Turkish example, but most of their examples are by English and Scottish writers.

4. One chapter in that reader is an earlier version of part of chapter 5 in this thesis.
A key value in cognitive mapping, from a point of view of futures studies, may lie in eliciting images of the future, almost in the form of chain scenarios. This contrasts with the typical envisioning methods, as discussed above, where the focus is on the end-state. By combining cognitive mapping with envisioning, it may be possible to elicit and/or create more complete successions of images.

2.8.3 Surprise theory

Surprise theory originated in the mid-1980s, when environmental scientists became concerned with the sustainable development of the biosphere. Papers by Brooks, Holling, and Timmerman (all in Clark and Munn, 1986: the most widely cited work in this area) studied the concept of surprise. Since then, this area has developed sporadically, with most literature on surprise lacking references to the futures literature—except, notably, in the “seeds of change” concept of van Notten (2002), van Asselt (2000), and their colleagues.

Brooks (1986) presents a typology of surprise, distinguishing three types of surprise: unexpected discrete events, discontinuities in long-term trends, and the sudden emergence into political consciousness of new information. However, Brooks does not critically examine the concept of environmental surprise, and fails to note that the surprise lies in human reactions to an event, rather than in the event itself. Myers (1995) distinguishes two types of surprise: discontinuities and synergies. The latter occur when two types of event, separately unsurprising, occur together and have a potentiating effect. The concept of discontinuity is also widely used in the literature on technological innovation, and is discussed at length by Maio Mackay (2002). Ayres (2000), in a paper on forecasting discontinuities, distinguishes between trends, cycles, and catastrophes. He suggests that, though the predictability of natural events is increasing, such as improvements in weather forecasting, social evolution has moved from a Darwinian to a Lamarckian process, dominated by human interests, and is thus increasingly liable to instability through social feedback mechanisms.

Timmerman (1986) discusses a set of “myths” (which might also be labelled mental models) about change in the environment, and traces these to their origins in psychology or economics. He instances the myths of

- equilibrium or homeostasis: a self-righting world, or “Gaia” (Lovelock, 1979);
- multiple stability with phase changes or Keynesian “punctuated equilibrium”;
- resilience and vulnerability, in which an ecosystem may appear to be resilient, but is becoming vulnerable because its reserves and/or learning are becoming exhausted.
He distinguishes between an event and the surprise it brings about, offering a simple three-stage model, in which a discontinuous event is followed by perceptions (surprise), and then by interpretations.

As Postma and Liebl (2005) note, scenario work is adapted to dealing with uncertainty, but only to a degree. When a continuous or dichotomous variable is known, but its future value is not, scenario work can handle such uncertainty well. Uncertainty about the variable itself, however, is another matter. Completely unexpected events are referred to as wildcards (Rockfellow, 1994, Petersen, 1999), as surprises (Brooks, 1986), or as discontinuities (van Notten, Sleegers, and van Asselt, 2005). Note the subtle implications of the difference in terminology here: a wildcard is a noun referring to an object, something that comes “out of the blue” (Petersen’s 1999 title), but surprise, being a verb as well as a noun, implies a subject: who was surprised? A wildcard is presumed to surprise everybody, while a surprise can imply that some people are surprised, but not others (Thompson, Ellis, and Wildavsky, 1990).

Writers on risk management use different terms still: radical uncertainty (Funtowicz and Ravetz, 1990) and strategic risk (Vlek, 1996). As van Asselt (2000) points out, risk and uncertainty are effectively two sides of one coin: the object-subject distinction. However, both risk and uncertainty can be contrasted with surprises / wildcards / discontinuities, in that risk and uncertainty are forward-looking concepts, involving a pre-existing awareness that all may not occur as expected. On the other hand, wildcards, surprises, and discontinuities are by definition unexpected – at least by some. A further distinction can be drawn between discontinuities and the surprise that they cause among various stakeholder groups. An event may be relatively small, but its social effect may be large and/or delayed (such as the SARS outbreak in Asia in 2003). However, because sometimes an event does not exist unless it is perceived, it is not always possible to distinguish between the discontinuity and the surprise. An example is an unintended insult from one power-broker to another – in which case the surprise may precede the discontinuity.

Van Notten, Sleegers, and van Asselt (2005) objectify surprise by speaking of discontinuities, classifying these as either gradual or sudden. Of course, the concept of a “gradual discontinuity” begs the question of how discontinuous a “discontinuity” can be. The rise of the Internet in the 1990s might thus be described as a “gradual discontinuity” from a 1990s point of view. From a 2005 viewpoint it can be seen as a trend; and very likely after 2020 it will be seen as

5. For example, when the Prime Minister of Papua New Guinea was asked to remove his shoes for security screening on arrival in Australia in March 2005, a co-operation treaty between the two countries was delayed.
one small element in the globalization of information and communications technology. Thus it may be that a discontinuity appears discontinuous only at first.

Returning to van Notten, Sleegers, and van Asselt (2005), their study of 22 published scenario projects found that most of these studies did not incorporate elements of surprise. They suggested that this might be because surprises were generally negative, and studies focusing on scenario learning saw negative surprises as organizationally disruptive. The implication is that establishing unanimity of corporate vision – implicit in many writings on visioning, such as Nanus (1992) and Collins and Porras (1994) – is seen as more important in an organizational environment than is envisaging a wide range of futures, which is the basic premise of futures thinking. Thus the question arises as to whether it is (a) desirable and (b) possible to simultaneously maintain a unified vision of a single preferred future, in combination with a recognition that exogenous forces may make it impossible to fulfil that specific vision. This is a central question for this thesis, which offers a theoretical resolution of the question in chapter 5 (section 5.3.4), with the concept of the Leaf of Goals.

Another aspect of surprise is unexpectedness. Morell (2003) outlines a tentative framework covering the implications for evaluation of unintended consequences. In this framework, based on the principles of evolutionary biology, Morell distinguishes between unforeseen and unforeseeable consequences, interpreting the root cause of the former as inadequate understanding of program behaviour, and the root cause of the latter as due to the dynamics of complex adaptive systems. Tactics for dealing with unforeseen consequences include logic modelling and the use of interdisciplinary teams. For dealing with unforeseeable consequences, Morell's tentative suggestions are to set up monitoring in advance, and to monitor programs closely, using a method similar to emerging issues analysis.

Ringland et al (1999) analysed occasions when military planning had failed. They concluded that failures were not due to individuals in charge, but to entire military systems, and that the failures occurred for three main reasons:

- failure to learn – due to making unwarranted assumptions of knowledge in a situation;
- failure to anticipate – due to lack of foresight at command levels;
- failure to adapt ("fighting the last war again").

Morell's (2003) suggestions for monitoring would probably cover only the second of these.

As is evident from the above literature review, "surprise theory" is not really a theory at all – nor is it even a futures method. Rather it is a collection of observations about the
prevalence and taxonomies of unexpectedness and unintended consequences. While some of these writers have offered some suggestions for means of anticipating the more expectable surprises (mainly, searching for "weak signals" or "seeds of change"), no systematic model seems yet to have been developed for anticipating these surprises. The nearest approach has been that of Hagerstrand and Kates (1986), with six suggestions for constructing scenarios that include elements of surprise:

1. Contrariness: How can the surprise-free assumptions be changed?
2. Perceived expert surprise: What are the tails of the distributions of relevant tasks, events, and outcomes?
3. Imaging: Given an unlikely future, what sequence of events might be used to reach it?
4. System dynamics: How could known current trends produce counterintuitive results due to interaction?
5. Surprise theory: Are there underlying principles that would let us understand unexpected events and developments?
6. Historical retrodiction: Are the seeds of future surprise always present with hindsight, and how can they be recognized?

Another potential solution lies in Dewar's (2002) Assumption-Based Planning, which is described as a "tool for reducing avoidable surprises." It involves identifying "load-bearing assumptions" (similar to "critical uncertainties") and from those identifying "signposts" and "shaping actions." When key assumptions fail, the signposts can lead to "hedging action."

Since a clear need exists for identifying discontinuity, one purpose of the Process in this thesis is to address this issue: specifically, to develop a method for anticipating and framing imaginable surprise. The morphologically-based method of midcasting (List, 2001b and 2004a) was developed for this purpose, and is tested in the fieldwork reported in chapter 8.

2.9 Trends in methods of anticipation

Having reviewed the historical progression of anticipation (in section 2.3) and the potential of specific methods for adaptation in a new Process (sections 2.4 to 2.7), emerging trends will now be considered, as pointing to possible needs for such a Process. When examining the progress of anticipation from the pre-scientific phase, through forecasting, to alternative futures, three inter-related trends were identified: (a) the transition in outlook from fatalism to voluntarism, as described by Godet (1983), (b) a movement in purpose from prediction to resilience, and (c) an increasing level of detail. Each of these trends will now be discussed.

2.9.1 From fatalism to voluntarism

In the earliest applications of anticipation, as described above, the entity whose future was being considered – whether a family, a village, or a kingdom – was regarded as powerless in
the face of natural forces, personified as "the gods" – cf. the Greek myths (Graves, 1955; Lefkowitz, 2003). The rise of quantitative forecasting implied more scope for the influence of decisions made by the entity to influence its own future. In the example cited earlier, a soft-drink factory could use seasonal forecasts to increase its profit. With the growth of the planning concept (which probably originated in military campaigns) came the implication that an entity could choose a future for itself and pursue a path towards that future.

In scenario work, such a future is often labelled as a normative scenario. However, some related approaches to organizational development are also grounded in normativity. These approaches include the search conference (Emery and Purser, 1996), future search (Weisbord, 1992), Open Space Technology (Owen, 1992), and Appreciative Inquiry (Cooperrider and Srivastva, 1987; Elliott, 1999), as well as some approaches with clinical rather than corporate origins (such as the Koinonia of de Maré et al, 1991). The underlying principle is that an outcome exists that is both desirable and attainable – so this approach assumes that the entity being studied possesses enough power over its environment to largely determine its own future. Particularly in North America, this attitude has become widespread, as demonstrated in an international survey by the Pew Research Center (2003).

However, a major argument of this thesis is that such power over the future is always partial, even for the world's largest entities. Humans may have mastered nature (natural catastrophes excepted), but they have not mastered one another. An example is the present US experiment in converting Iraq to a stable democracy – currently, late 2005, still far from successful (see appendix 4, case 3). This suggests that a different approach to normative futures is required; accordingly, such an approach is developed later in this thesis.

2.9.2 From prediction to resilience

The movement from fatalism toward voluntarism has been accompanied by a realization (as noted above) that forecasting has not been highly successful at longer-term prediction, but that the utility of a forecast is also important. In the arena of alternative futures, a parallel movement is away from "scenario planning" to "scenario learning" (e.g. van der Heijden, 1996). Scenario planners have found that, though scenarios cannot produce accurate predictions, they function well at broadening the mental horizons of those who take part in scenario building. This creates an organizational robustness or resilience: the ability to adapt rapidly when a partly-foreseen development begins to occur.
2.9.3 Increasing level of detail

The third trend that has occurred through the development of the three broad approaches to anticipation is the use of an increasing level of detail about the entity whose future is being foreseen. With the pre-scientific approach, a prediction can be made with almost no knowledge of the circumstances of the entity (usually a person), thus with astrology, their future can be predicted knowing only their time and place of birth. Using the forecasting approach, a variable needs to be measured consistently across time. In a business, one person—perhaps an accountant or clerk—could record such data. Moving to the multiplistic approach, the task of information collection can be quite onerous, as in cross-impact analysis. For example, Shell Oil takes around 18 months to collate and develop new global scenarios (Shell International, 2003:30). Thus one danger is, if the world is changing ever more rapidly, that scenarios may be outdated before they are completed. When the US Census experienced such a problem in 1900, the result was Hollerith’s invention of punch cards (Ifrah, 2000) – so perhaps it is time for a similar development with multiplistic anticipation.

2.9.4 Emerging trends in demand for anticipation

In view of the above trends, a key question is whether a new phase of anticipation is developing. Given the large changes in the world’s social environment since most of the multiplistic methods were developed, it would not be surprising if a new phase were emerging. Perhaps it is too early for the power of our hindsight to enable us to detect that new phase, and perhaps it is too soon for a new direction to emerge, but if a new phase is to emerge in the next decade or two, its drivers should already be present. These appear to include:

1. Increasingly more complex and differentiated social systems.
2. Increasing globalization — in the specific sense that a change in one part of the world is becoming more likely to have an effect elsewhere.
3. An increasing volatility of reaction to events, particularly in automated systems such as computerized share trading, with changes factored into share prices before they occur.
4. A widespread sense of increasing uncertainty, producing a corresponding widespread desire for greater certainty and security, in both domestic and social life. This can be manifested, for example, in the form of hostility towards recent immigrants.
5. Managers’ growing skepticism about being handed a fait accompli; in the form of a statement with no apparent basis (Maccoby, 1982) or unexplained data from experts (White and Taket, 1993). For example, econometric forecasts may be accepted as long as they prove accurate. Forecasts that prove clearly wrong are unlikely to be used again. But if they continue to be almost accurate enough to be usable, the forecasters will be under pressure to explain and justify their assumptions. Evidence of this is cur-
ently found in acceptance of the forecasts being made by some technology forecasting companies. Clients readily accepted their forecasts as long as the ICT industry grew steadily. But after 1999, with following-year forecasts pitched far too high, clients began to demand more transparency (Tapscott and Ticoll, 2003).

Though these trends seem self-evident (at least in the developed OECD countries) it has proved frustrating to track down solid evidence for them. This may be because, when a trend first comes to public notice, it is often already too late to begin collecting data to demonstrate that the phenomenon did not previously exist – except when the trend is indicated by a variable which is being measured routinely, such as demographic statistics. None of the above five trends is of that type. However, if it can be accepted that that the above trends probably exist, the combination of (1) and (2) suggests that anticipation is becoming more difficult. Adding item (3) suggests that the pace of change is increasing, which is partly due to reduced delays between events, which in turn is partly due to faster and more precise communication. Thus a natural reaction to the increased difficulty of anticipation is (4) – a desire for more certainty. This concern was originally at a personal level (exemplified in the growth of gated communities in countries with highly unequal distributions of wealth) but, due to the presence of (1), (2), and (3), the concern is now transferred to a societal or national level (following events such as the September 2001 terrorist attacks in the USA).

What are the implications of these trends for methods of anticipation? My conclusion – and the reason for moving in this direction in this thesis – is that in management circles, there is an increasing focus on futures several years ahead, with particular attention now being paid to discontinuities and their attendant surprises.

2.10 Looking ahead to the next phase of anticipation

The above review leads to the suggestion that anticipation methods used in the next phase of history will have the following features:

1. Scalable. To both manage complexity and at the same time retain comprehensibility, the new methods will need to incorporate a “drill down” capability, readily scalable to whatever is the most appropriate level for a current purpose.

2. Verifiable. The methods will need some element of verifiability: not precise prediction, which as the above discussion of quantitative forecasting has shown is unlikely to be attained, but more in the sense of creating a metaphorical map of the path ahead, on which
the entity can locate itself some time after the anticipation was performed, if an unlikely development occurs (Slaughter, 1996a).

3. **Transparent.** The assumptions of the new methods will need to be challengeable, and thus clearly visible. This argues against black-box approaches such as econometric modelling or neural networks, which can be so complex that the compounding effects of assumptions cannot be traced (Berry and Linoff, 1999).

4. **Nimble.** The scalability will extend to the time it takes to produce the predictions. Shell Oil’s 18-month planning cycle (van der Heijden, 1996; Davis, 2002) is too slow for many purposes, given the apparently increasing volatility of the macro-social environment. However, as identification of trends is time-consuming and uncertain, it may be more likely that systematic environmental scanning (Choo, 1998) will be used to build databases, from which anticipations will be made as required: ideally within weeks, when necessary.

5. **Eclectic:** using a diverse range of input data. Because, with the growth of specialization and globalization, futures of different entities are becoming more inter-related, the amount of information required to foresee the future of an entity is likely to be more than is needed with the multiplistic approach.

6. **Useful.** The ability to help those involved anticipate change. This characteristic includes what is referred to as “scenario learning” (van der Heijden, 1996; Bood and Postma, 1997).

Having outlined six relevant properties of a new class of anticipatory methods, a question arises: what method could usefully meet those criteria? On reviewing the recent futures studies literature, three emerging streams were noted:

1. The “critical futures” movement, as exemplified by the recent work of Inayatullah (1990, 1998, 2002a) and Slaughter (1989, 1996a, 2002b), and Causal Layered Analysis.

2. Technology roadmapping, and allied methods (Porter et al, 2004; Barker and Smith, 1995; Bray and Garcia, 1998). TRM is more an approach to planning and coordination of than a futures studies method, but it has potential for further development.

3. Increased interest in discontinuities, with which (as shown above) neither forecasting nor scenario planning was designed to deal. It may be possible to apply a morphological ap-
proach (such as that of Powell and Powell, 2004) to typologies such as those of Hagerstrand and Kates (1986) and Brooks (1986).

There has been much recent discussion in the interrelated areas of whole systems, chaos theory, emergence, complex adaptive systems and agent-based modelling (Briggs and Peat, 1990; Dent, 1999; Gleick, 1988; Schieritz and Milling, 2003; Wheatley, 1992). Since the whole Process is deeply grounded in systems thinking, I explored these areas, seeking a way of applying them to foresighting, but no clear options emerged.

How do the three classes of method discussed above meet the six likely features for a new approach to futures studies? The following table rates each class of methods on a five-point scale, where ***** represents a very high degree of matching, and * a very low degree.

<table>
<thead>
<tr>
<th>Feature of a new approach</th>
<th>Critical futures</th>
<th>Technology roadmapping</th>
<th>Anticipating discontinuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalable</td>
<td>*****</td>
<td>*****</td>
<td>**</td>
</tr>
<tr>
<td>Verifiable</td>
<td>**</td>
<td>*****</td>
<td>*****</td>
</tr>
<tr>
<td>Transparent</td>
<td>*****</td>
<td>**</td>
<td>*****</td>
</tr>
<tr>
<td>Nimble</td>
<td>*****</td>
<td>*</td>
<td>?</td>
</tr>
<tr>
<td>Eclectic</td>
<td>****</td>
<td>***</td>
<td>****?</td>
</tr>
<tr>
<td>Useful</td>
<td>*****</td>
<td>*****</td>
<td>****?</td>
</tr>
</tbody>
</table>

Critical futures methods aim at increased understanding, rather than verifiability, and to the extent that they are expert-driven, they lose some transparency. Technology roadmapping methods are slow, expensive, and time-consuming because they require much industry coordination – hence their low score on nimbleness. The presence of many different actors, with different goals, leads to political bargaining, which in turn reduces transparency. Methods for anticipating discontinuity are hardly developed yet, so much about them is uncertain. However they may not be readily scalable, because discontinuities can vary greatly in scale (e.g. from a disk drive failure to global catastrophe) and in consequences (“for want of a nail, the kingdom was lost”).

From the above table, an ideal new method would resemble...
- critical futures methods – but would be more verifiable;
- technology roadmapping – but more nimble and transparent, with broader input;
- surprise anticipation – but more scalable and with broader input.

Since to some extent each of the three methods compensates to some extent for the others, it may be possible to develop a superior Process, incorporating elements of all three of those. The arrival of new methods does not mean that earlier methods will be supplanted. Just as the introduction of scenario thinking did not mean the end of forecasting, there is no evident
reason why a fourth phase will indicate the end of scenario work. But in some situations where existing approaches are regarded as inadequate, a new approach could be useful.

2.11 Review of this chapter

This chapter has examined the historical progression of modes of anticipating the future, dividing these into three main phases: the pre-scientific (intuitive and fatalistic), the objective (quantitative forecasting) and the multiplistic (alternative-futures methods), and foreshadowed the appearance of a fourth approach: the critical. Looking ahead to create a new method of anticipation, that integrates the most useful multiplistic methods, a wide range of multiplistic methods was studied. Those with most potential for incorporation into a new approach to scenario work were the futures wheel, backcasting, surprise theory, and causal layered analysis.

A major limitation of this chapter is that details about the usage, application, and effectiveness of the methods are generally not available. This chapter has evaluated only the published literature, which focuses on methodology rather than application. At the outset of this thesis, I had no previous experience of working in the futures studies field, apart from several minor futures-wheel exercises that I facilitated, and organizing several search conferences (not strictly a futures method. Much of the work done in this field over the last several decades appears not to have been reported in detail. There are many foresighting studies carried out for individual organizations (judging by the number of professional futurists in the World Future Society directory), and most of these futurists are rarely published. Even rarer are reviews of how completed scenarios (and other futures studies outputs) were used. I am thus aware that the above account of the development of the area, and of possible weaknesses in methods used, being based only on the literature, may not provide complete information.

To supplement the methodological review in this chapter, Appendix 1 reviews 15 anticipations (mostly scenarios) of the year 2000, and compares them with the relevant outcomes for 2000. That review revealed eight classes of problem that arose when comparing the scenarios with the outcomes. One objective of the new Process will be to avoid those problems. Appendix 1 was originally intended to be a chapter in its own right, but because it is fairly long, and self-contained, and its implications for the new Process can be summarized very concisely, it has been removed from the main stream of argument. However, Appendix 1 could usefully be read (or skimmed) at this point, before continuing to chapter 3, in which criteria are set up to evaluate the effectiveness of foresighting methods.
Chapter 3: Evaluation criteria for foresighting methods

3.1 Introduction

This chapter reviews the literature on evaluation of futures studies and related areas, using the literature to explore the effectiveness of methods of scenario planning and qualitative futures research. The initial focus is on the extensive literature of scenario planning, later extending into related areas: other qualitative futures studies methods, and the literatures of corporate and social planning, evaluation, and organizational development. Further findings are drawn from relevant areas of the literatures of social psychology, sociology, and systems theory. From the combined findings, the chapter then develops a set of criteria for evaluating the effectiveness of the type of process being developed in this study. The chapter finds that the most effective scenario planning method will meet a range of criteria of several types: (1) process criteria and (2) outcome criteria. It concludes that the most effective foresighting method will be participative, will include a thoroughly canvassed range of possibilities, will be presented in a visual format, and will embody a theory of the future. The chapter concludes with a discussion of the shortcomings of the evidence on this issue, contradictory findings in the literature, and any outstanding empirical research questions.

3.2 The particular difficulties of evaluating futures studies methods

For social research methods in general it is not conceptually difficult to develop criteria for evaluating the method, but in practice this does not seem to have been done – partly because almost no social research methods appear to have been developed deliberately from the outset. Discussion of the evaluation of research methods has generally been couched in terms of their (a) accuracy, (b) usefulness to their consumers, and (c) ability of their performers to carry them out well. With a normal research method it would be possible to evaluate the method as a whole, even if this has not been done in practice. However in the case of a futures studies method, two new conceptual problems occur: (a) if accuracy of prediction is a criterion, this can be assessed only after the target period for the prediction; (b) self-altering prophecies are likely to apply, in which the foresighting exercise itself causes the eventual outcome to change.
Initially I was hoping to be able to apply a standard technique for evaluating social science methods, particularly qualitative methods, but an extensive literature search failed to reveal the existence of any such standard technique. For social research methods in general, it is not conceptually difficult to develop criteria for evaluating a method, but in practice this does not seem to have been done – partly because (as discussed in chapter 6, section 6.2.1) almost no social research methods appear to have been developed deliberately from the outset.

Discussion of the evaluation of research methods is generally (e.g. Patton, 1990; Bernard, 1994) couched in terms of their (a) accuracy, (b) usefulness to their consumers, and (c) ability of their performers to carry them out well. With a normal research method, it would be possible to evaluate the method as a whole – even though this seems not to have been done in practice. However in the case of a futures studies method, two additional conceptual problems occur:

(1) If realization of the foresighting is one of the criteria, this can be assessed only after the target period for the foresighting. Though a 10-year or 20-year delay is not a problem in principle, it was a problem in this case because of the need to finish this thesis on time.

(2) Self-altering prophecies such as the “Oedipus effect” and the “bandwagon effect” may apply, in which the foresighting exercise itself causes the eventual outcome to change (Popper, 1956; Henshel, 1978).

In this case, to solve problem 1, I considered using *hindcasting* – that is, predicting the present using only data available in the past (Salant, 1971; Harrald and Mazzuchi, 1993) – but realized that this would preclude the use of stakeholder participation, and would have to rely solely on documented input. Though one of the cases is based on secondary data, there would still exist conceptual problems related to the unidirectionality of hindsight (Einhorn and Hogarth, 1980; Hawkins and Hastie, 1990). My partial solution was to include some short-term effects, of around one to two years, so that these effects could be assessed in the follow-up phase of the fieldwork.

Problem 2, on closer examination, turned out to be soluble, because there is no reason why a thorough foresighting study should not include assessment of its own potential self-altering effects: in other words, scenarios of responses made to another scenario. Also, studies of expectancy effects have found them to be fairly rare, with earlier conclusions of studies such
as the Hawthorne Experiments (Roethlisberger and Dixon, 1939) now being questioned (Draper, 2004).

3.2.1 Separating evaluation of the method from evaluation of the execution

The primary purpose of this thesis is to develop a “good” method of foresighting. To demonstrate the goodness of the method, its execution was compared against the criteria developed later in this chapter. However, the criteria alone may not be sufficient, because of the problem of additionality (whether the same result would have occurred without the intervention; see Georghiou 2003, p5). Thus the effectiveness of a particular case study is determined by several factors, including:

1. The quality of the method itself;
2. The quality of the way in which the method was applied by its organizer/s; and
3. The quality of the way in which the processes and outcomes were used by the entity in the case study.

Thus it might be possible that the Process I developed met the criteria inherently, but my execution of it was flawed, perhaps due to my lack of experience in applying this new process. Another possibility would be that an entity whose future the Process helped to anticipate did not regard its execution as effective – perhaps because the entity did not want to face unpleasant possibilities.

As the goal of the present study was to assess the quality of the method itself, it was important to disentangle the above three factors. In view of the findings of Skumanich and Silbernagel (1997) in their interviews with foresighting organizations, and the gloomy prognosis of Hackman and Wageman (1995) concerning the possibilities of evaluating the effectiveness of Total Quality Management, this is far from simple, and possibly cannot be established at an incontrovertible level. The best possible indication may turn out to be preceded by a statement such as “On the balance of evidence, it seems that....”

A further complication is that perhaps the quality of any process may not be relevant to its success. It might be, for example, that any process in which a group of staff of an organization met for several days to discuss the organization's future would be about equally successful, regardless of how much thought had been devoted to designing the process. The futures literature described below does not address this additionality issue.
3.2.2  **Process and outcome criteria**

Patton (1990, pp94ff) distinguishes between the evaluation of outcomes and the evaluation of processes. He notes that with some methods of community and organizational development, "what we do is less important than how we do it." Where, as in these cases, the process is more important than the outcome, it is important to evaluate the process, as it is to some extent an end in itself. But even for interventions that emphasize results and outcomes, a process is undertaken to produce results. To that extent, some process evaluation is always useful. As this criterion certainly applies in the case of futures studies methods, it will be useful to divide the criteria for the Process being developed into process criteria and outcome criteria.

Useful as is the separation of process and outcome criteria, some further division is helpful in the present case. Any management intervention has a number of chronological stages – often divided into five, in the literature of evaluation, specifically program theory and logic modelling (Chen, 1994; Funnell, 1997; Weiss, 1998):

1. inputs
2. process
3. outputs
4. direct outcomes (short term and directly identifiable as effects)
5. broad outcomes (often labelled "impacts").

The innovation introduced by program theory was that when an intervention is divided into the above stages, each stage can be evaluated separately, using the most appropriate method for that stage, such as financial data (for inputs), or participant evaluations (for processes). The flexibility of this approach is so advantageous that the criteria listed below are classified into these five stages, as follows:

1. Input and planning – e.g. preparation for using the Process with a particular entity;
2. Activity – producing the outputs – e.g. scenario-building;
3. Output – e.g. written scenarios;
4. Direct outcomes – e.g. effects on thinking of participants;
5. Broad outcomes – e.g. non-immediate effects on the entity being studied.

3.3  **Evaluation criteria for futures methods**

This section reviews the relevant literature seeking criteria for the evaluation of futures studies methods (focusing mainly on scenario planning), but also with an eye to other relevant futures studies methods, as well as evaluation of the varieties of large-group interventions used in
organizational development (Bunker and Alban, 1997; Holman and Devane, 1999), and the evaluation of qualitative research methods in general. Thus this literature review is divided into three increasingly generalized groups:

- evaluation criteria for futures methods in general;
- evaluation criteria for organizational interventions;
- evaluation criteria for qualitative research methods.

Each of these areas is now addressed in turn, with each group listed in chronological order of publication. Three sources were used to find suitable criteria:

1. A review of the methodological literature, covering futures methods thoroughly, and organizational development and qualitative research to a lesser extent (covered in sections 3.3.1 to 3.3.3 below).
2. From Appendix 1: review of a number scenarios for 2000, comparing the scenarios with outcomes. A summary is in section 3.3.4 below.
3. Criteria emerging from chapter 2, not found in the above two categories: in section 3.3.5.

Following that review, a summary is made of the criteria that were most relevant to the current study, and were mentioned most frequently.

### 3.3.1 Evaluation criteria in the methodological futures literature

A search of the literature of futures studies found no detailed studies focusing in detail on the evaluation of futures studies methods: i.e. nothing as detailed as this chapter. However, that search did find around 40 journal articles and reports that, either explicitly or in passing, described the characteristics of desirable futures studies methods.

Criteria preceded by a > symbol and followed by a reference number in square brackets were included in the database that forms the basis of the following section (3.4). As will become evident, few papers address this issue squarely, but a number of papers mention criteria *en passant*: often only a few words per criterion. Some criteria were expressed so briefly that they were ambiguous and could not be included here.

Hoos (1974), using > veracity and accuracy as possible criteria [1], is skeptical about the possibility of “good” futures research (as she labels it, using quotation marks). She seems to have been referring mainly to Delphi, rather than to scenario planing, little on which had been published by that time.
Zentner (1975, reviewed by Wilson, 1978, p233) names three criteria for testing scenarios (in the eyes of “planners”): credibility [2], utility [3], and intelligibility [4] (“scenarios must be set forth in a manner easy to understand and use”). As Wilson points out “there can scarcely be any quarrel with these criteria.” Wilson (1978) adds a further criterion: relevance to the interests of the organization in question and the issues being addressed [5], organized around “key branching points.” Wilson also discusses the purpose and uses of scenarios, which is considered in section 3.4 below.

Amara (1981), in one of the few papers directly addressing the quality of futures studies work, discusses the objection that validation criteria are nonexistent in futures studies. He initially argues against successful prediction [6] as a criterion, because “the futurist’s purpose is not to predict but to generate images or perceptions and to analyze them so that we can increase the probability of producing futures more to our liking” (Amara, 1981, p66). Instead, he focuses on plausibility, and states that the most useful indicator is whether the forecast meets criteria of proximate validity and internal validity. Proximate validity [7] amounts to approximate prediction early in the period of a forecast (“forecast” being a term which Amara uses in an unusually broad sense), while internal validity [8] is a measure of how well it “hangs together” and its integration of elements. This is puzzling: Amara first dismisses prediction as a criterion, but two paragraphs later he is setting forth “proximate validity” as a validation criterion — but what is proximate validity if not a form of prediction?

Amara (1981) distinguishes three different purposes of futures studies: the possible (“what can be”), the probable (“what may be”), and the preferable (“what should be”). Depending on the purposes of a particular study (though these are often combined in individual studies) he offers three sets of criteria, under three broad headings: conceptual explicitness, analytical clarity, and utilitarian objectives:

**Conceptual explicitness**

- Are the futurist’s premises explicit? [9]
- Are the purposes of the activity explicit? [10]
- Are the futurist’s values explicit? [11]

**Analytical clarity of the product**

- Are the futurist’s methods explicit? [12]
- Does the product include a description of change processes? (i.e. is there a trail that can be followed?) [13]
- Is there time to act? (i.e. is the product really describing the present, not the future?) [14]
Utilitarian objectives

- Is the product clear and specific? [15]
- Is the product credible? [16]
- Does the product change perceptions and guide actions? [17]

Amara (1981) also discusses the criterion of plausibility, which he defines as having three components: “general conformance with basic physical and behavioral principles” [18], internal consistency [19], and reasonableness [20]. He admits, however, that many innovations when first developed did not meet these criteria. He concludes by matching the criteria with his three previously stated purposes of futures studies, stating that

- When the goal is the possible, the criterion is plausibility [21].
- When the goal is the probable, the criterion is reproducibility (analogous to reliability) [22].
- When the goal is the preferable, the criterion is explicitness of values and likely impacts [23].

Amara’s focus is largely on the “product” or output, not on the process; the emphasis on “scenario learning” did not develop until some ten years later. Thus Amara includes no criteria relating to participation or enlightenment resulting from involvement with the process itself.

Wack (1985a) writes of the uses of scenarios as “meeting the deepest concerns of managers” through “the reperception of reality and the discovering of strategic openings [24] that follow the breaking of the managers’ assumptions (many of which are so taken for granted that the manager is no longer is aware of them) [25].”

Adelson (1989, p30) focuses on the outputs of futures research, stating that “any result... is likely to matter in one or another of the following ways:”

- influencing dialogue [26]
- dispelling misconceptions about the past [27]
- interpreting the meaning of the present [28]
- articulating aspirations [29]
- reframing issues [30]
- enhancing risk appreciation [31]
- formulating alternatives [32]
- multiplying perspectives [33]
- highlighting residual doubt [34].
Dror (1989), in a paper on policy reasoning for forecasting, presents 22 abstract ideas for policy reasoning for evaluating forecasting and planning. Dror takes very much a macro-historical and large-scale viewpoint, and several of his 22 ideas are relevant to futures inquiry:

- Thinking-in-history serves as a main mode (i.e. the need to pay attention to long-term trends) [35]
- Passing windows of opportunity and various surprise domains and possibilities need intense attention [36]
- Interactions with dynamic and in part responsive environments are carefully considered, with attention to required net advantages [37]
- Critical choices are identified and concentrated on [38]
- Innovation, including iconoclasm, is central [39].

Amara (1991) repeats his 1981 criteria almost verbatim, indicating that after a further 10 years' work in the futures field, he found no reason to change his position on the criteria for quality in futures work - though he did change his position on some other issues, such as moving away from the “hard” methods such as cross-impact analysis toward a preference for more qualitative approaches.

Nanus (1992), focusing on corporate visioning, writes “the best vision is the one that works across all the scenarios” (Nanus 1992, p108). This is the criterion of robustness [40]. Later (p.121) he lists the properties of a “good vision”:

- Future oriented [41]
- Utopian: likely to lead to a clearly better future [42]
- Appropriate: fitting in with the organization [43]
- Set standards of excellence and reflect high ideals [44]
- Clarify purpose and direction [45]
- Likely to inspire enthusiasm [46]
- Reflect the uniqueness of the organization [47].

The focus of the above criteria is a little different from those reported earlier because Nanus is discussing a single vision (Amara’s “preferable future”) rather than alternative futures.

Bezold (1993, p.I-3) quotes James Robertson (1989) as saying “thinking about the future is only useful and interesting if it affects what we do and how we live today” [48]. Though Bezold notes that this contains the “essence of futurism,” in some senses Robertson’s position is an extreme one. For example, Shell Oil created a scenario of the break-up of the Soviet
Union in the mid-1980s, but did not begin to act on this idea until the break-up began several years later (van der Heijden, 1996). Because the scenario was not used immediately, Robertson’s position would be that this was not “useful and interesting” – but that was certainly not the experience of Shell, which van der Heijden (1996) reported to have made significant gains due to its prescience. Because of this narrowness, Robertson’s criterion is one that I did not use in evaluation of the Process.

Bezold’s own position follows the mainstream of alternative-futures thinking: that the methods work by

- “stimulating the imagination, encouraging creativity,” [49]
- identifying threats and opportunities, and [50]
- allowing us to relate possible future choices and consequences to our values” [51]  
  (Bezold, 1993, p.I-4; my lineation).

Schoemaker (1993) does not explicitly address quality criteria, but notes several times that “scenarios do not aim to predict the future, but rather bound it” [52]. He reports the results of four experiments, which found that the psychological benefit of scenario planning appeared to lie in the use of one set of psychological biases (such as conjunction fallacies) to counteract another (such as overconfidence) [53].

Schoemaker (1995) reported another experiment that used a similar approach; this seems to be the only positivist assessment of the effect of scenario planning. After noting one of the major problems with human judgement identified in the research of Kahneman, Slovic, and Tversky (1982) – specifically the optimism bias – Schoemaker (1995) had some MBA students engage in scenario planning. A post-test found that the students, after engaging in scenario planning, had broadened their numerical estimates of some sales figures, and were less optimistic than they initially had been. Implication: scenario planning is effective in reducing (unrealistic) optimism [54]. One might comment, though, if reducing unrealistic optimism is to be the only purpose of scenario planning, perhaps a course in basic probability might have been more effective still. Schoemaker did not address this issue.

Rhyne (1995, pp539-40), after his work at Patterns and Systems International, “came to feel that a description of a future context should possess all (or anyhow, most) of [these] attributes, if it is to induce similar images of that context in the minds of its users.”

- Scenarios, not snapshots (an unfolding tale, rather than an image) [55]
Wide-ranging sets of scenarios (including both barely the credible and the almost obvious) [56]

Scenarios should reflect patterns of circumstances rather than events [57]

A scenario should be self-consistent at each time point [58]

Sequential consistency, along each scenario line [59]

Scenarios should specific enough to be comparable with reality, as it unfolds (to help determine subsequent trends) [60]

Alternatives should be described even handedly, with no overt preference for one scenario [61].

Rhyne's emphasis is on the importance of narrative. Note his implicit assumption that the scenarios being discussed are imposed (in Amara's terminology: the possible, rather than the preferable). Thus the above criteria apply to scenarios of "what the world may be like" rather than scenarios of "how we might change our environment."

Van der Heijden (1996) lists five objectives for scenario planning

- the development of robust strategies [62]
- better understanding of the future [63]
- better perception of patterns and change [64]
- transmission of management ideas via scenarios [65]
- improved leadership [66].

Elsewhere, van der Heijden (1996, p41) describes another function of scenario planning as to "create a more adaptive organization, which recognizes change and uncertainty and uses it to its advantage" [67]. His emphasis is on the value of scenarios for "strategic conversation" — discussions between managers in which they make use of alternative-futures thinking. For this to occur, the scenarios must possess simplicity [68], evocativeness [69], plausibility [70], relevance [71], and a memorable label [72].

Elkington and Trisoglio (1996; reinforced by Bazerman and Watkins, 2004) discuss the Brent Spar episode, in which Shell Oil, despite its foresighting focus, seriously miscalculated the effect of public opinion on its plans to scuttle an unwanted oil rig in the Atlantic Ocean. Trisoglio analysed the scenarios produced by Shell up to 1995 and found on mapping them to three psychological archetypes derived from cultural theory that all the scenarios fell into the "individualist" or "hierarchist" groups, while the emerging "egalitarian" perspective (in line with the thinking of many environmentalists) was ignored. Elkington and Trisoglio also note that Shell's scenarios focused strongly on Shell as an organization, and not much on its...
broader environment. Though these writers do not explicitly state evaluation criteria, a criterion clearly emerging from the paper is that the conceptual space of scenarios should be broadly cast, in terms of potential stakeholders [73].

Slaughter warns against extrapolative futures: “An issues-based ‘future of...’ approach tends to enlarge or exaggerate aspects of the present world. In many cases an underlying assumption remains that of a basically static frame of reference” (Slaughter, 1996c:148). Thus Slaughter is urging futurists to probe behind the surface issues [74].

Ogilvy (1996) argues that the purpose of futures studies is not successful prediction [75] nor minimizing risk [76], but the articulation of risk “so that we know what is at stake in our daily decisions” [77] (Ogilvy, 1996, p32).

Skumanich and Silbernagel (1997) of the Battelle Institute reviewed foresighting activity around the world for the US government Department of Environment (DOE), which was considering the use of foresighting. Of all the works I found, this is the most detailed treatment of the evaluation of foresighting, though its focus was simply on seeking one best method. Skumanich and Silbernagel, in this review, drew four main conclusions:

- Since the future is essentially unpredictable, the emphasis in foresighting should not be on making accurate predictions but on the “ability to imagine a range of possible futures” [78].
- The process is as important as the outcome, in its ability to aid people to think more flexibly together [79].
- A variety of foresighting methods can be used to achieve a given purpose [80].
- Foresighting activities create impacts in a variety of ways, which are mostly near-impossible to measure; consequently the commonest yardstick of effectiveness is “high level buy-in” and public legitimization [81].

Other relevant points made by Skumanich and Silbernagel are that:

- Foresighting is often not a passive activity, in that it facilitates bringing desired and likely futures into closer alignment [82].
- Royal Dutch/Shell believed that because the future is uncertain, evaluation of the accuracy [83] and even the usefulness [84] of scenarios is not feasible or even helpful. Shell regarded scenarios as successful when they are used at a point when a decision is made [85]. (The apparent paradox between the last two items
might be resolved by regarding usefulness as perceived usefulness at the time the scenarios are developed.)

- Rather than focusing on "foresighting" Shell preferred to emphasize long-term perception, to develop a greater understanding of the present [86].
- In view of the difficulty of measuring the effectiveness of foresighting, organizations studied by Skumanich and Silbernagel tended to use visible metrics as their indicators of success – for example, the number of copies of reports requested [87].

Schoemaker (1998) takes a negative approach, listing 20 common pitfalls in scenario planning, dividing them into pitfalls of process and pitfalls of content:

**Process pitfalls:**
- failing to gain top management support early on [88]
- lack of diverse inputs [89]
- poor balance of line and staff people [90]
- unrealistic goals and expectations [91]
- confusion about roles [92]
- failure to develop a clear road map (for the process itself, not its output) [93]
- developing too many scenarios [94]
- insufficient time for developing scenarios [95]
- failing to link into the planning process [96]
- not tracking the scenarios via signposts [97].

**Content pitfalls:**
- inappropriate time frame and scope [98]
- too limited a range of outcomes [99]
- too much focus on current trends [100]
- lack of diversity of viewpoints [101]
- internal inconsistencies in the scenarios [102]
- insufficient focus on drivers [103]
- not breaking out of the paradigm [104]
- failing to tell a dynamic story [105]
- failure to connect with managerial concerns [106]
- failure to stimulate new strategic options [107].
By reversing these negatives, the 20 pitfalls can be converted into 20 criteria for evaluation. Note Schoemaker’s implicit assumption that the scenarios being developed will focus on the future of a specific business.

Ringland et al (1999), reviewing 20 scenario projects, found three main classes of defects noted by Cohen and Gooch (1991): failure to learn, failure to anticipate, and failure to adapt. This view is confirmed by the findings of Tuchman (1984) and Durschmied (1999). The first and last of the three classes are not directly relevant to the current inquiry, but criteria can be drawn from their recommended solutions to the failures of anticipation:

- Do not focus too much on the present and immediate past [108]
- “Ask the right questions” (to do this, the authors suggest looking for “an empty space we cannot explain”) [109]
- Avoid the dangers of over-dramatization of one viewpoint [110]
- Note the unreliability of experts with vested interests and limited focus [111]
- Allow enough time to do a high-quality analysis [112]
- Beware of untested assumptions about the present [113]
- Note that it can take many years for ideas to become accepted [114]
- Pressures for organizational conformity can overwhelm some scenarios [115].

Greeuw et al (2000, p13) in an assessment of recent European and global scenario studies, distinguished three classes of quality criteria for scenario studies:

- Methodological quality: the quality of the development process and the methods and approaches adopted [116]
- Analytical quality: the quality of the scenarios themselves (e.g. thoroughness) [117]
- Usability: whether the recommendations are concrete, challenging, realistic, and practical [118].

They concluded that the following elements are crucial in scenario planning:

- “Participatory development [119]
- Two-way integration of scales, [i.e. include cross-impacts] [120]
- Integration of surprises, resulting in more peripheral scenarios, [implying that many scenarios in an ensemble were too similar to one another] [121]
- Balanced integration of environmental, social, economic and institutional processes [122]
- Integration of various scenario methods [123]
- Explicit inclusion of a wide variety of perspectives [124]
translation of long-term policy recommendations to short-term policy agenda” [125] (Greeuw et al, 2000, p91).

Oughton and Reed (2000) carried out a study in a completely different area which was nevertheless highly relevant to scenario building. In a study of the effect of hypermedia knowledge and learning style on student-centred concept maps about hypermedia, they had students prepare concept maps about hypermedia, then scored those maps for complexity, and found that the students with the most knowledge of the topic also had the most complex maps. How might this relate to scenario planning? The parallel would be to evaluate completed scenarios using similar methods to the concept map scoring. For this, the scenarios might be expressed as concept maps. The criterion would be that successful scenario planning causes those involved to create more detailed mental maps of the future [126].

Chermack et al (2001, pp23-28) list two types of characteristics of effective scenarios, drawn from the literature: as tools for “organizational learning” [127] and as “creating future memory” [128]. They also point out that the evaluation component is “nearly absent from the literature of scenario planning.” The only citation they found that empirically evaluated the effects of scenario planning in any form was Schoemaker (1995), as described above.

Davies et al (2001) reviewed a set of 13 scenario studies with a British focus, in the course of which they created a set of criteria for the best practice in uncertainty management, divided into two groups: sources and analysis:

Sources:

- Explicit criteria for selection and use [129]
- List sources of data used [130]
- Combination of research types [131]
- Review of previous work conducted [132]
- Statement of uncertainty in inputs [133].

Analysis:

- Method should be documented [134]
- Statements of purpose of outputs [135]
- Statement of uncertainty in outputs [136]
- Dimensions and spread of uncertainty illustrated [137]
- Scenarios should be of sufficient breadth [138]
- Tests for self-consistency and coherence [139]
Inclusion of discontinuities and wild-cards [140]

Equivalent effort across scenarios [141]

Inclusion of scenario narratives [142].

The above amounts to a checklist of desirable properties for scenario reports. Given the secondary analysis approach they used, the above criteria are (not surprisingly) all related to outputs, not to processes. These writers regarded robustness as highly important:

“We can...explore how different situations might affect postulated plans. Undertaking this robustness analysis is perhaps the most valuable outcome and use of futures studies” [143] (Davies et al, 2001, p3).

They also commented (2001, p5) that the possibility space from which scenarios are drawn is more interesting than the scenarios themselves [144].

Phelps et al (2001) used an impact-related set of criteria for evaluating scenario work, attempting to correlate the use of scenario planning to business performance. They investigated the apparent effect of scenario planning on the financial performance [145] and customer orientation [146] of a sample of British companies: 22 water companies (of which 5 had used scenario planning) and 25 IT consultancies (of which 11 had used scenario planning). For both groups, the finding was a weak positive relationship between financial returns and scenario planning, though in the case of the water industry this may have been at the expense of quality levels – not a sign of long-term thinking.

Rubin (2001, p4) noted that “the scenario method is often seen...as a helping tool in decision-making and strategy work, and the need of its use lies in the present. So the scenario method is used mainly to create instrumental images of the future [147] – knowing about the future per se is not a goal” [148]. She adds: “Some people are interested in what the future will bring and they use scenario methods to explore the future alternatives and possibilities to know more about them [149]. Some other people want to make some specific future, which they value as good and essential... and search for knowledge as how to contribute to make that future happen [150]. And still some others want to know what kind of strategies would be the best and most reliable under different boundary conditions in the future” [151].

Anastasi (2003, p31) noted that “the real value in scenarios lies not in the insight they provide to the core team [152] but in the quality of strategy derived by decision makers” [153].

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Harries (2003, p806) suggests that “It is not that one of the handful of scenarios will turn out to have been the correct forecast but rather between them they should reveal the underlying working of and interactions between uncertainties.” Harries also notes that “although the proponents of scenario planning emphasize the importance of not predicting but being prepared for a range of possibilities, the fact is that case studies often uphold foresight as an example of successful application of scenario planning” — and cites examples given by Ringland (1998). In other words, despite their disavowal of prediction as a purpose of futures work, leading writers in this field (such as Wack, Ringland, and van der Heijden) justify the work by listing successful predictions — such as Shell's frequently-cited prediction of the downfall of the Soviet Union.

Cuhls (2003a), discussing the large-scale German foresighting project FUTUR, has no solid conclusions to offer on its evaluation, except that the project will have to be evaluated by outsiders (in this case, non-Germans). She raises a list of key questions:

- “What are the targets that can be evaluated when every participant has his or her own reason to participate?” (This in turn raises the question of the motives of participants, versus the purposes of the organizers of the project.)
- “What is the ’success’ of foresight? Can it only be measured by the resulting lead visions” (i.e. the recorded output)?
- “Does it also matter if the stakeholders in the system become motivated to act in an intended way? Or if foresight supports the communication processes? Or if cooperation partners find each other?”

Cuhls (2003b) notes that the major outcomes of the FUTUR project were to be “lead visions” (similar to scenarios) which should reflect the demand for research, and result in publicly funded projects. Bearing in mind the above questions, Cuhls then reviewed the desired characteristics of the lead visions, which were to:

- Include precise objectives
- Include a new quality of problem-solving
- Be interdisciplinary and integrate multiple perspectives
- Start from a societal need and build steps to meet that need
- Be understandable by the public
- Have a high economic relevance.

These characteristics (as often proved to be the case with the evaluation of specific projects) are a mixture of different levels, and do not necessarily translate into criteria usable in other
studies. In order to achieve the above goals, Cuhls (2003b) then specified seven process-oriented criteria:

- The process should be open and independent of other initiatives [164]
- The process should be result-oriented [165]
- To achieve interdisciplinary lead visions, interdisciplinary teams are needed [166]
- Participation of non-experts [167]
- Combination of different methods [168]
- Thus it is important to ensure sustainability of the process [169]
- Importance of reflexive learning, flexibility, and adaptation to experience [170].

The FUTUR project was summatively evaluated by an international team led by Georghiou (2003) who presented a generalized evaluation framework with three basic foci:

- Accountability: efficiency in use of public funds [171]
- Justification: whether the efforts of foresight justify its continuation [172]
- Learning: how foresight can be done better [173].

Georghiou (2003) introduced the concept of generational evaluation, in which different criteria are applied to a project at different stages of its development. Georghiou was also the only writer in this review who mentioned the problem of additionality, posing these questions for evaluation (2003, p5):

- Would foresight have happened without the policy intervention? [174]
- Is foresight done differently or better because of the intervention? [175]
- Are the resulting actions better because of foresight? [176]
- Have persistent changes been achieved (e.g. foresight culture)? [177]

For the FUTUR project, Georghiou (2003, p7) organized what was largely a process evaluation, focusing on the objectives of FUTUR: the different instruments and methods, with regard to their effectiveness, efficiency, and interplay, and the process in general. This is a macro-scale evaluation model, and the kind of criteria being sought for the present study would all fall into Georghiou's "effectiveness" group.

In a separate evaluation, of a British foresight program, Georghiou (2003, p9) used an indicator-driven framework, separating process from impact and focusing on the evaluation of impacts on five main stakeholder groups. Indicators were collected to show evidence of participation levels [178], participant satisfaction [179], changes in industry behaviour
[180], and some other less transferable criteria. In contrast to the FUTUR study, this was an outcome-driven evaluation.

Cairns et al (2004, p234) commented that "scenario planning... promotes dissenting opinion, encourages divergent thinking, and does not apply selection and exclusion in search of a causa finalis" [181], later mentioning "maintenance of divergence of opinion, belief, perception within an overall unifying frame of limits of possibility."

Niewöhner et al (2004) performed a participative scenario development process in Germany, using von Reibnitz's method with members of the general public and experts on biomedicine. This paper was the only evaluation by participants that I found in the futures literature. Niewöhner et al (2004) had their participants complete a questionnaire on satisfaction with the process [182], using 5-point Likert scales. With this type of scale, according to Anderson and Fornell, 2000) the "normal" result in customer satisfaction research is around 70% of the maximum (i.e. around 3.5 out of 5, where 5 indicates the highest satisfaction level; for the 1999 Bain survey of management tools (Rigby, 2001a) the average was 3.76). In the 2004 Niewöhner study, the only two items of the nine that differed significantly from that "normal" level were "if you stray from the original structure of the scenario method, it will tell in the quality of the output" (which attained below-average agreement) and "Proceeding according to the scenario method can only be seen as a guideline. To get decent results, deviations from the standard procedure have to be tolerated" (above-average agreement). As these two statements are almost mirror images, the combined implication is a plea for flexibility within a process [183]. This may be a reflection on the application of von Reibnitz's method, which is highly process-oriented (Schwab, Cerutti, and von Reibnitz, 1993; von Reibnitz, 1992).

O'Brien (2004, p720) describes "good scenarios" as having three characteristics:

- They are multidimensional, capturing a broad range of uncertain factors [184]
- They challenge participants' implicit assumptions about what will not change in their current world and help move their audience beyond it [185]
- Engaging scenario titles and narratives are more likely to capture the readers' imaginations, and thus influence their understanding of how the future may develop [186].
Postma and Liebl (2005, p5) list four early and three more recent functions of scenario work:

- “evaluation and selection of strategies” [187]
- integration of various kinds of future-oriented data [188]
- exploration of the future [189], and
- identification of future possibilities” [190].

“More recently, scenarios aim at
- making managers aware of environmental uncertainties [191]
- stretching managers’ mental models [192], and
- triggering and accelerating processes of organizational learning” [193].

3.3.2 Evaluation criteria for organizational interventions

Though interventions used for organizational development (OD) do not always have a lot in common with the methods of futures studies, because I was looking toward a participative method, it seemed that the process-related criteria for OD interventions may be relevant for any kind of participative process. Thus the literature search for criteria was extended to include the OD literature.

Considering the large volume of work on methods for organizational intervention – here defining it very broadly, including everything from action research to scenario planning, as well as the more standard OD methods – surprisingly little has been written on the evaluation of this type of work. Typically, the question is ignored, or shrugged off as being too difficult to assess. Nevertheless, organizations spend a substantial amount of money on OD (Rigby, 2001a). In May 2004 I made a query on the online mailing list of the International Association of Facilitators1, asking about methods used to evaluate the effectiveness of facilitated projects. From the 820 subscribers, I received only two responses, neither of which revealed any accepted evaluation method or any relevant literature on this issue. Both replies stated that if the intervention agents were invited by the same clients to do subsequent work [194], that was an indicator of success.

Greenwood and Levin (1998, pp77-80) mention the criteria of workability [195] and internal [196] and external credibility [197]. Internal credibility is with clients; external, with readers of reports.

1. GRP-FACL, available online at www.albany.edu/cpr/gf
Reason and Bradbury, in the summary chapter of their handbook of action research (2001b:447ff) discuss the evaluation of action research, employing five criteria:

- quality as relational praxis (i.e. inclusion of wide range of participants) [198]
- quality as reflexive-practical outcome (useful consequences for those involved) [199]
- quality as plurality of knowing (e.g. appropriateness for participants’ needs) [200]
- quality as engaging in significant work (the task was seen as important by all concerned) [201]
- quality as enduring consequences [202].

Because the development of the Process used action research, these criteria are clearly relevant. However, because they are so general, they are (except the last) too broad to be directly applicable as specific criteria. Indicators would need to be derived from them.

Harries (2003, p806) takes a more indirect approach, evaluating scenario-based decision making. She discusses three approaches to such evaluation: case studies, empirical evaluations, and theoretical evaluations – and finds problems with all of these. Case studies are not comprehensive: empirical studies find it near-impossible to take all factors into account; and theoretical evaluations, with their lack of empirical data, are likely to make unwarranted assumptions. Though Harries offers no solution, she does note that “given all the potential mechanisms by which it might be advantageous, scenario planning seems plausibly so.” However, this is a one-sided argument, as she failed to canvass any disadvantages of scenario planning.

I searched the literature of Total Quality Management, because of its emphasis on process, seeking criteria that might be useful in the present situation. Again, I found almost nothing relevant, because this literature focused on its substantive level, rather than the meta-level of assessing the quality of the quality management. One of the few in the latter category was by Hackman and Wageman (1995), who in a broad overview assessed TQM according to three classes of criteria: implementation, process, and outcomes. Pointing out the problems of measuring outcomes (obvious methodological problems which would also apply to foresighting, but which were not mentioned in the foresighting literature discussed above, except by Georgiou, 2003) they concluded somewhat pessimistically that the success of TQM may be “a prediction that can never be definitively confirmed in empirical research” (Hackman and Wageman, 1995, p325). However, that paper was framed in a positivist paradigm, and there may be an alternative way out of this impasse, as discussed below.
3.3.3 Evaluation criteria for qualitative research methods

Because the Process being developed was necessarily qualitative (as explained in Chapter 6), it was useful to study the literature on the evaluation criteria for qualitative research methods, to determine to what extent those criteria were relevant for the current Process.

Though there exists an extensive literature on qualitative evaluation methods (e.g. Denzin and Lincoln, 2000; Guba and Lincoln, 1989; Patton 2002), its coverage of meta-evaluation methods themselves is far from comprehensive. In defence of that situation, Seale (2002) points out that evaluation of evaluation of evaluation (and so on) can become a never-ending spiral. In the literature of qualitative research, chapter 8 in Guba and Lincoln’s 1989 book has perhaps the fullest coverage of meta-evaluation. Though most of the criteria listed there are not directly applicable to the evaluation of futures studies methods, they can generally be adapted to that purpose with a minimal change of wording.

Lincoln and Guba (1985) offered four criteria for assessing the value of research using their method of naturalistic inquiry, which is situated in the constructivist paradigm:

- **Credibility** (parallel to internal validity) focuses on establishing a match between the realities of the researcher and the “members.”
- **Transferability** (parallel to generalizability) depends on the degree of matching of salient conditions, and is established mainly through “thick description.” It is not the senders (original researchers) who determine transferability, but the receivers — those who want to establish the possibility of a transfer.
- **Dependability** (parallel to reliability) relates to the stability of the data over time.
- **Confirmability** (parallel to objectivity) involves establishing that the data is not a subjective creation of the researcher; this can be accomplished by tracking the data back to its origin.

Following the publication of Lincoln and Guba’s 1985 book, a reader pointed out to them that (to quote Seale, 2002, p105):

“their criteria depended on a contradictory philosophical position, since their belief in ‘multiple constructed realities’ (Lincoln and Guba, 1985, p294) rather than a ‘single tangible reality’ (Lincoln and Guba, 1985, p295) which lies at the heart of the constructivist paradigm, is not consistent with the idea that criteria for judging the trustworthiness of an account are possible. Relativism does not sit well with attempts to establish truth, even if the term is placed in inverted commas.”

70 Chapter 3
Further, Lincoln and Guba's above 1985 criteria, useful as they are, apply only to the "research"—that is, the outputs of the research process. However, as Patton (1990, p95) notes, the findings of a process cannot be evaluated comprehensively without also evaluating the process itself.

Bearing that reader’s criticism in mind, Guba and Lincoln’s next book (1989) reclassified all the above four criteria under a broad heading of trustworthiness (with parallels to quantitative research) but added another broad heading: authenticity. This is achieved when researchers can demonstrate that they have represented a wide range of viewpoints among “members” (those among whom the research was done). Authenticity has five components:

- **Fairness** (representing a wide range of realities),
- **Ontological authenticity** (well-informed understanding among members),
- **Educative authenticity** (mutual understanding between members),
- **Catalytic authenticity** (stimulating action), and
- **Tactical authenticity** (empowering members to act).

Adapting these two sets of criteria to a scenario evaluation context, they become:

1. **Trustworthiness**
   - **Credibility**: are the scenarios plausible? [203]
   - **Transferability**: will the scenarios apply in other entities or places, in the face of changes in the entity’s environment? [204]
   - **Dependability**: because, like the reliability concept that it parallels, this is time-based, this may refer to the ability of scenarios to transcend their time [205], such as freedom from the “fittingness” noted by Michael (1985).
   - **Confirmability**: is enough data available to audit the way in which the scenarios were produced? [206]

2. **Authenticity**
   - **Fairness**: was a wide range of stakeholders involved? [207]
   - **Ontological authenticity**: was their understanding enlarged by the scenario development? [208]
   - **Educative authenticity**: did they better understand the positions of other stakeholders? [209]
   - **Catalytic authenticity**: were they stimulated to act? [210]
   - **Tactical authenticity**: did they feel empowered to act? [211]
Note that the authenticity criteria relate to the process stage (of the five-stage model described above), while the trustworthiness criteria relate mainly to the output stage — though transferability also relates to the broad outcomes stage.

A general approach to evaluation is to evaluate something by comparing it with a set of standards. Thus Hastie (2001, pp657-8) points out that “the standards used to evaluate the quality of decisions usually involve comparisons between behavior and the prescriptions of rational, normative models, which often take the form of tests for the coherence of expectations, values, and preferences of the achievement of ideal optimal outcomes.” Most of the papers described in this section take this approach: describing a set of standards that a method must meet. With the ensuing emphasis on methodology, they fall into the trap described by Guba and Lincoln (1989): that they are purely methodological criteria, while “outcome, product, and negotiation criteria are equally important in judging a given inquiry.” Specifically, adherence to a method “cannot guarantee that stakeholders benefit” (Guba and Lincoln, 1989, p237) — which statement suggests that, for Guba and Lincoln, > stakeholder benefit [212] is the ultimate criterion.

Little (1970) specified six conditions for mathematical models, which, as Daellenbach (2003, p86) points out, can be applied to any symbolic model. Namely, a model should be...

- **Simple** — so that it can be understood by those who may need to use it or act on it
- **Complete** — including all factors that may impinge on the system’s performance
- **Flexible** — easy to manipulate and communicate with; this applies particularly to computerized mathematical models
- **Adaptive** — so that changes to the problem situation do not invalidate the model
- **Appropriate** — for the situation studied, specially in terms of its scale and complexity
- **Productive** — of information that is relevant for decision making.

Little (1970) acknowledged that some of the above characteristics will often be contradictory: thus a model that is complete may not be simple. Most of Little’s criteria may be applied, in a general way, to the output produced by the nascent Process.

This concludes the literature review of criteria that might be used in the evaluation of scenario planning and related methods. Because these criteria were harvested out of context from a
wide range of papers, not all of them are directly comparable, or usable in a different context—so before they can be directly applied to the present Process, they need to be sifted for relevance. Some factors to take into account are that...

- Many of the above criteria focus on evaluating the uses of foresighting methods rather than evaluating the methods themselves: an area beyond the scope of the present study.
- Though it is reasonable to suppose that different purposes might require different evaluation criteria, only Amara (1981) and Guba and Lincoln (1989) explicitly noted this.
- Some of the criteria sets (e.g. those of Cuhls, 2003a and Georghiou, 2003) derived criteria for specific studies, while others (such as Greeuw et al, 2000, and Davies et al, 2001) derived criteria for small groups of studies, without seeking broader application.
- With the exception of Amara’s 1981 paper, none of the above papers had the evaluation of futures studies methods as its primary focus. However the documents by Guba and Lincoln (1989), Skumanich and Silbernagel (1997), Greeuw et al (2000), Davies et al (2001), and Georghiou (2003) all include at least several pages’ discussion of evaluation criteria—perhaps an indicator of depth of thought. For that reason, comments made in those articles and books were given greater weight in the selection of criteria for the current Process.

Despite those reservations, the 218 criteria drawn from the above 42 studies practically exhaust the literature in this area, so they will be used as the primary basis for further development. However, two further groups of criteria were drawn from other sources, as follows.

3.3.4 Evaluation criteria from the study of scenarios for 2000
Appendix 1 reports the result of a study of scenarios anticipating the year 2000. On comparing the outcomes with the anticipations, a number of problems with the scenario methods were found, and some lessons for later practice were drawn from these, as follows.
### Additional criteria derived from chapter 2

Several other criteria not specifically mentioned by any writer above were added, because a broad interpretation of the futures literature summarized in chapter 2 suggested that these are desirable characteristics of a futures process. These additional criteria are shown in the sequence of the five-stage model.

**Stage 1: Input and planning**

> If the reason for carrying out a futures study is related to a specific problem, the time horizon of the study should extend at least several years beyond the expected occurrence date the problem. This is for two reasons: (1) planned events tend to be delayed, rather than brought forward, and (2) because anticipations of the future can affect the present, any future anticipated at the time the expected problem occurs may affect the handling of that problem [226].

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**TABLE 3.1 PROBLEMS WITH SCENARIOS FOR 2000, AND POSSIBLE SOLUTIONS**

<table>
<thead>
<tr>
<th>Problem</th>
<th>A solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intuitive and normative methods were more effective than the Critical Uncertainties method and econometric modelling.</td>
<td>➢ Use intuitive and/or normative methods [219]</td>
</tr>
<tr>
<td>Large-scale scenario exercises (involving more than 5 person-years' work) were no more effective than smaller-scale exercises.</td>
<td>➢ When large-scale resources are available, commission several smaller projects rather than one huge project [220]</td>
</tr>
<tr>
<td>Scenarios produced solely by famous people or experts were less effective than those involving the general public.</td>
<td>➢ Include members of the public as participants [221]</td>
</tr>
<tr>
<td>Technological change is over-predicted, but social change tends to be overlooked.</td>
<td>➢ Consider both technological and social aspects together, and how they might affect each other [222]</td>
</tr>
<tr>
<td>Scenarios were often not distinct from each other.</td>
<td>➢ Use a morphological approach to scenario construction, rather than a dimensional one, because morphological classification is inherently mutually exclusive [223]</td>
</tr>
<tr>
<td>End-state scenarios were difficult to envisage: Lack of detail at human scale</td>
<td>➢ Increase vividness by providing more context and more detailed paths [224]</td>
</tr>
<tr>
<td>Restricted focus and overly narrow boundaries</td>
<td>➢ Begin a project by questioning boundaries, reviewing likely stakeholders [225]</td>
</tr>
</tbody>
</table>
Stage 2: Activity

➢ A case should be developed over a number of sessions, interspersed by pauses for reflection, data-finding, and reconsideration, as is the practice in action research (Greenwood and Lewin, 1998) — thus not (unlike Mercer, 1997) in a single day [227].

➢ The Process should be relatively quick and simple to apply [228]. A case should be developed over a period short enough that it is unlikely to be overtaken by events: in the order of weeks, but not (unlike Shell International, 2003) 18 months.

➢ Since the futures for a case will be deeply grounded in the continuing influence of the past, there is a need to look about as far back in time as the scenarios look ahead [229]. For example, in order to foresee 2000 from 1966, Kahn and Wiener (1967) looked back to 1900.

➢ With new data constantly coming to hand, it would be wasteful to repeat the entire Process prematurely. Thus an added criterion is that scenarios produced by the Process should be readily updatable as situations changed [230].

Stage 3: Output

➢ In order to accomplish item [230] above, output should be presented in a format conducive to “drilling down” to different levels of detail, presenting findings in a set of systems, super-systems, and sub-systems (after Koestler, 1967; further discussed in chapter 4) [231].

Stage 5: Broad outcomes

➢ The Process should result in some action for change [232], similar to Reason and Bradbury’s (2001b) “quality as enduring consequences.” In the absence of any change (though perhaps delayed) in the plans, decisions, or behaviour of participants or their entity, the Process must have failed.

➢ Some participants should use learning gained during the Process in their relationship with the entity (parallel to the third level of Kirkpatrick, 1994 – described further below) [233].

➢ Their use of that learning should contribute to the achievement of the entity’s goals (parallel to the fourth level of Kirkpatrick, 1994) [234].

3.4 Grouping and critique of criteria

The criteria found in the literature search were categorized according to (1) the frequency of mentioning, after very similar statements had been combined, (2) the extent of agreement among writers, and (3) the circumstances in which they are applied.
### 3.4.1 Grouping

The following (multi-page) table summarizes all criteria listed above, noting some that are too vague to be usefully applicable. Criteria that were almost identical were combined into separate groups, as shown in the following table, which lists them in descending order of frequency within the five-stage model. Groups are numbered (1.1 to 5.4) for later reference.

#### Table 3.2 Frequency of Evaluation Criteria in the Literature

<table>
<thead>
<tr>
<th>Stage 1. Input and planning (31 references)</th>
<th>Criteria group</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Purpose of activity and output should be explicit [9, 10, 11, 12, 23, 93, 133, 134, 135, 158]</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>1.2 Include a wide range of participants, including non-experts [90, 111, 119, 166, 167, 178, 198, 207, 221]</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>1.3 Allow enough time, with several sessions [95, 98, 112, 227]</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1.4 Process should be quick, simple, efficient, nimble [171, 220, 228]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Other input criteria (each mentioned once only)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Gain top management support early on [88]</td>
<td>(1 too vague to be usable)</td>
<td></td>
</tr>
<tr>
<td>Realistic goals and expectations [91] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review previous foresight work first [132]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process should be open and independent of other initiatives [164]</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2. Activity (77 references)</th>
<th>Criteria group</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Challenge participants’ assumptions and focus; reframe perceptions and re-perceive reality [24, 25, 36, 28, 30, 33, 39, 53, 104, 109, 113, 115, 185, 208, 209, 225, 226]</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>2.2 Include diverse perspectives, broad range of scenarios [56, 73, 101, 124, 138, 144, 149, 160, 184, 189, 190]</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>2.3 Look toward improvement, be normative [29, 42, 44, 82, 147, 150, 161, 219]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2.4 Integrate various methods and approaches [80, 89, 122, 123, 131, 168, 188, 214]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2.5 Probe behind issues, considering values and drivers [51, 74, 103, 155]</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2.6 Participants are satisfied with process [179, 182, 200, 201]</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2.7 Do not focus narrowly on the present and short-term [14, 41, 100, 108]</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2.8 Include discontinuities, with some peripheral scenarios [77, 121, 140]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.9 Even-handed treatment of scenarios [61, 110, 141]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.10 Consider the continuing effect of the past [27, 229]</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Other activity criteria (each mentioned once only)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Pay attention to long-term trends [35]</td>
<td>(4 too vague to be usable)</td>
<td></td>
</tr>
<tr>
<td>Interactions with dynamic environments considered [37] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify and concentrate on critical choices [38]</td>
<td></td>
<td></td>
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<tr>
<td>Participants should have no confusion about roles [92]</td>
<td></td>
<td></td>
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<tr>
<td>Do not develop too many scenarios [94]</td>
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<td></td>
</tr>
<tr>
<td>High methodological quality [116] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Include cross-impacts – consider interactions of variables [120]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explore what strategies would be best under different conditions [151]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process should be result-oriented [165] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process should be flexible [183]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate scale and complexity [217] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11 Consider how technical and social aspects affect each other [222]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12 Use morphological approach to scenario construction [223]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria group</td>
<td>Items</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Stage 3. Output (48 references)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Plausibility, credibility, reasonableness – among both participants and external audiences [2, 7, 16, 18, 20, 21, 54, 70, 81, 196, 197, 203]</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3.2 Include narratives and describe change processes [13, 55, 69, 99, 105, 142, 186, 224]</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3.3 Anticipations should be trackable and confirmable [22, 52, 60, 97, 205, 206]</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3.4 Consistency within and between scenarios [8, 19, 59, 102, 139]</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3.5 Output should be readily understandable by all involved [4, 15, 68, 162, 213]</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3.6 Futures identified should be relevant to the entity [5, 43, 47]</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Other output criteria (each mentioned once only)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Identify threats and opportunities [50]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflect patterns of circumstances rather than events [57]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-consistency at each time point [58]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memorable name for each scenario [72]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analytical quality of scenarios [117] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reports should list sources of data used [130]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not to create insight among the core team [152]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Include new quality of problem-solving” [159] – vague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.7 Present the output in a format conducive to drilling down [231]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Stage 4. Direct outcomes (37 references)** | |
| 4.1 Output should be directly usable \[3, 32, 48, 71, 84(\_), 96, 106, 118, 125, 163, 199, 212, 218, 233\] | 14 |
| (1 disagreed) | |
| 4.2 Create future memory and more detailed mental maps, deeper understanding, and perception of patterns \[17, 31, 49, 63, 64, 86, 107, 126, 128, 156, 192\] | 11 |
| 4.3 Participants feel empowered to act \[46, 210, 211\] | 3 |
| 4.4 Extent of uncertainty is clarified \[34, 136, 137\] | 3 |
| Other direct outcomes criteria (each mentioned once only) | 6 |
| Quality of strategy derived \[153\] – vague | |
| Organize evaluation by outsiders \[157\] | |
| Would foresight have happened without this intervention? \[174\] | |
| Evaluation and selection of strategies \[187\] – vague | |
| Workability \[195\] – vague | |
| Can apply output in other situations \[204\] | |

| **Stage 5. Broad outcomes (41 references)** | |
| 5.1 Become more future-oriented, open to divergent thinking, adaptable to change \[26, 45, 65(\_), 67, 79, 127, 169, 170, 172, 173, 177, 181, 191, 193, 215, 230\] | 16 |
| (1 disagreed) | |
| 5.2 Not prediction, or knowing about the future \[1(-), 6, 75, 78, 83, 148, 154\] | 7 |
| (1 disagreed) | |
| 5.3 Action for change \[175, 176, 180, 202, 232, 234\] | 6 |
| 5.4 Enable robust decisions \[40, 63, 76(\_), 143, 216\] | 5 |
| (1 disagreed) | |
| Other indicators of outcomes (each mentioned once only) | 7 |
| Improved leadership \[66\] – vague | |
| Scenarios successful when used in making decisions \[85\] | |
| Usage indicators, eg. copies of reports requested \[87\] | |
| It can take many years for ideas to be accepted \[114\] – vague | |
| Positive effect on financial performance \[145\] | |
| Increased customer satisfaction \[146\] | |
| Organizers asked to do subsequent work \[194\] | |
| (2 too vague to be usable) | |

| Total references to criteria | 234 |

It is clear from the above table that negligible overt disagreement existed among the writers studied: only 4 of the 28 grouped sets of criteria contained explicit dissent, and each of those...
had only a single dissenter. A more serious issue (discussed below) is that two criteria groups in Stage 2 (Look toward improvement and Even-handed treatment) are likely to be contradictory in practice. On re-examining the 28 criteria that were mentioned more than once (in the above grouping), these between them accounted for 195 of the 234 references in the above table: 83 percent of them. This level of agreement provides further confidence in the consistency of the writers in this area.

As well as the 28 grouped sets of criteria, 39 criteria were mentioned only once, and were unable to be sensibly grouped. After discarding 12 that were too vague for their accomplishment to be unambiguously ascertained, a total of 55 distinct criteria remained. As it was not feasible to evaluate a Process using so many criteria, it was necessary to reduce them to a usable set. This was done by including all 28 criteria mentioned more than once in this chapter’s literature review, and adding the broad supplementary criteria [222, 223, and 231] that were found only once in the literature: a total of 31 criteria. The selected criteria were then divided into those that could be evaluated on the design of a method, and those that could be evaluated only on application of the method. However, before that took place, several criteria needed closer scrutiny.

3.4.2 Critiques of selected criteria

Some of the above criteria that were frequently mentioned (but not explored in detail by other writers mentioned above) warrant further consideration. These are robustness, prediction, consistency, and plausibility. The possible contradiction between normative scenarios and even-handedness is also addressed here.

Critique 1: robustness

This criterion (number 5.4 in Table 3.2), mentioned by five separate writers, was highly regarded. A robust decision is generally defined as one that is likely to be successful in any scenario. For example Davies et al (2001, p3) state that “Undertaking this robustness analysis and examining our sensitivities to future uncertainties is perhaps the most valuable outcome and use of Futures Studies.” However, I contend that robustness is not a characteristic of scenarios themselves, but of the way in which they are applied. Though this thesis develops a Process, it cannot develop a generalized way of applying it, because that will depend on specific circumstances.

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2. Interestingly, all disagreement concerned the outcome stages: the results of futures work, not the work itself.
Further, robustness is not a universally accepted criterion in business. Robust decisions may be appropriate in some situations, such as those with high capital requirements and long amortization periods – for example, Shell constructing an oil refinery in an unstable country, as mentioned by van der Heijden (1996). The robust decision in this case is not to build the oil refinery unless profitability can be foreseen in all scenarios. But in a highly competitive service industry, robustness (which is essentially risk-avoidance) can be an over-conservative criterion that may lead to decisions not being taken and to eventual business failure. Robustness was therefore not used as a criterion in evaluating this Process.

Critique 2: prediction

Many writings on scenario methods disavow prediction as a purpose, generally on the ground that prediction is impossible. For example, Skumanich and Silbernagel (1997, p3) state: “A basic philosophical orientation of the programs interviewed is that the future is essentially unpredictable. As a result, the emphasis in these programs is not on making ‘accurate’ predictions of the future but on the ability to imagine a range of possible futures.”

But what, precisely, do these writers mean by prediction? Different writers seem to use this term in different senses, and many writers do not make those senses clear. For example, as noted above, Amara (1981) appears self-contradictory on this issue: he denies that successful prediction is a criterion in futures work, but two paragraphs later recommends “proximate validity,” which amounts to an interim prediction, part-way through the future being studied. Further, of all the writers on criteria listed in section 3.3 above, only Harries (2003) notes the different potentials of prediction of a single scenario and an ensemble of scenarios.

The most comprehensive work in English on prediction appears to be Rescher’s 1998 book, Predicting the Future, of which the author states, “As best I can tell, this is the first book on the theory of prediction-in-general since Cicero’s De Divinatione.” (Rescher, 1998, p.xiii). Rescher (1998, pp38-43) declares that a prediction must meet these conditions:

1. it is resolvable in principle,
2. it rests on some evidential basis, and
3. there must be a predictor who takes responsibility for the prediction.
4. it states what the future will be, not what it might be – thus multiple scenarios cannot be predictions.

He defines a forecast as a class of prediction: one that is concrete, verifiable, and not probabilistic. Others, however, might disagree. For example, on Rescher's criteria, a statement that "The probability of rain tomorrow is 80%," being probabilistic, is not a forecast— a statement that would surprise meteorologists.

Since prediction is a problematic concept, it is useful to further analyse it, beginning with Rescher's criteria for a forecast: an unconditional statement that

(a) an event will occur
(b) at a certain time
(c) in a certain situation.

Note that the three statements are linked by an implicit Boolean AND: if any one of the three conditions is not met, the entire prediction fails. An example of such a prediction is "it will rain tomorrow in Adelaide." Thus the event is rain falling, the time is "tomorrow," and the situation is Adelaide. (Not all situations are place-specific: some involve actors rather than places. 4)

Since one difference between a forecast and a prediction, according to Rescher, is that the former is concrete, it follows that, depending on the precise definition of concreteness, there must be a point at which a statement is not concrete enough to be considered a forecast, and therefore falls into the more general class of a prediction. Consider these three statements:

(a) Between 9:00am on the 13th of May and 9:00am on the 14th of May 2004, at least 0.5 mm of rainfall will be recorded at the meteorological office at Adelaide, South Australia
(b) The rainfall in Adelaide in 2005 will be between 400 mm and 700 mm (bearing in mind that this condition has been met in 68 of the last 100 years).
(c) At least one shower of heavy rain will be recorded in Adelaide in 2005.
(d) Some precipitation will occur in South Australia between 2005 and 2010.

At what point is enough concreteness lost that the statement is downgraded from forecast to prediction? I submit that concreteness is a characteristic of the viewpoint as much as of the view, and that statement (d), though not at all concrete today, would have seemed highly concrete if made in, say, Egypt, a thousand years ago. If it is thus agreed that concreteness is relative, it follows that there is no clear distinction between a forecast and a prediction. Note that in the above sequence of statements, concreteness is progressively lost through implied

4. As "situation" was later found ambiguous, it was subdivided into location and context. See chapter 7, section 7.1.
Boolean OR statements. The sequence makes it clear that the less specific a prediction, the more likely it will turn out to be true, because of the implied ORs separating quantities, times, and places. It thus follows that any prediction can be accurate – as long as it is loose enough, and that it is therefore meaningless to discuss prediction without at the same time considering the degree of specificity.

For example, Popper (1982, chapter 2) attempts to demonstrate that the future cannot be predicted because, even if we had the knowledge, it would take all our time to predict the future in detail. It seems that by “prediction” in this case, Popper is referring to a moment-by-moment prediction, including the details of all surroundings, such as precisely where Popper’s cat decides to sit on his writing pad. However, by the same argument, one cannot describe even the present: because humans can think faster than they can speak, I could never catch up when describing my own thoughts – as Sterne (1759) makes clear in Tristram Shandy. However, Popper’s problem with prediction could be sidestepped by selecting a scale of prediction that is most appropriate in a particular situation.

Though Popper (1982) appears to regard prediction as complete precision, to define prediction not as binary but as scalable will help to resolve the problems that writers such as Amara have grappled with. “Scenarios are not prediction,” they say in one breath, but in the next cite “plausibility” as a criterion. And what is plausibility, if not an implicit prediction based on the future being similar to expectations derived from the past? The use of a continuum for prediction resolves Amara’s paradox and allows prediction-disavowing futurists such as Ogilvy (1996) to be consistent with the minority such as Harries (2003) and Bell and Olick (1989), who claim that some degree of prediction is inherent in all scenarios.

Accordingly, a central tenet of this thesis is that prediction is not something that either exists or does not exist: rather, it is inherent in any statement expressed in the future tense, and even in some statements expressed in the present tense. For example the statement “I am going to the city tomorrow” is (in English) synonymous with “I shall go to the city tomorrow.” Even to say “I travel to the city via Main North Road” implies a habit that will continue into the future. I thus propose that a valid criterion for assessing scenarios is that a loose level of prediction applies. It is not necessary that any one scenario in an ensemble should turn out to be a “correct” prediction, but rather that at least one scenario in the ensemble should be a prediction that turns out to be closer to the final outcome than to the time when the scenarios were developed. However, such a comparison will make sense only in a specific situation. That is because, even though it is possible to conceptually place predictions on a scale (much
as McBurney and Parsons (2002) did for the concept of plausibility) in practice the elements of prediction (event, time, and situation) can interact in so many ways that predictions such as “2010 will be more similar to 2000 than to 2020” are meaningless without tighter specification of the context. To demonstrate with a thought experiment (as in Horowitz and Massey, 1991), subtract 100 years from each date in that last prediction, and consider World War I. To a European in 1920, that prediction would seem true, because 1920 was very different from 1900 and 1910. However, to people in countries where the 1910-1920 decade saw less change than 1900-1910, the opposite would have applied.

The outcome of the above discussion is that, despite six writers decrying prediction as a criterion for evaluating futures methods, I contend that a broad degree of prediction is a useful criterion, but to avoid confusion, the term “prediction” in this sense is replaced by “anticipation.” Broadly correct prediction is referred to as “foresightfulness.”

**Critique 3: consistency**

Four writers reviewed above (Amara, Davies et al, Rhyne, and Schoemaker) mentioned consistency as a criterion of desirable futures methods (criterion 3.4 in Table 3.2). They refer to internal consistency: that a scenario should not include incompatible elements. (However, consistency between scenarios is regarded as undesirable.) For Amara, consistency is a component of plausibility, in that a scenario cannot be plausible if elements of it appear inconsistent. Though clearly there are degrees of inconsistency, Liebl (2002, p175) notes that “it is striking how often situations occur that were dismissed as ‘logically impossible’ or ‘inconsistent’ during the process of scenario building.”

Concurring with Amara that consistency is related to plausibility, I contend that any scenario that is too consistent is ipso facto implausible. The world, as we experience it, is not fully consistent. Humans resolve apparent inconsistency using two powerful defence mechanisms: attribution in hindsight, and the construction of intervening variables such as “God’s will.” If the world is not consistent, why should a scenario be so? In fact, the deliberate inclusion of inconsistencies in scenarios may well provoke a deeper level of analysis, in which inconsistencies are taken as paradoxes to be resolved. Thus consistency of output was not used as a criterion for evaluating this Process.

**Critique 4: plausibility**

In the above literature review, plausibility was one of the most commonly named characteristics of good scenarios, particularly by writers in the “scenario learning” group – the Shell
school, whose scenario work is done for specific firms. By plausibility, they mean that managers should accept scenarios as being possible outcomes. Among all the works consulted, only Schultz (2002) argues against plausibility, citing what has become known as Dator's Second Law of the Future that “any useful statement about the future should seem ridiculous” — in other words, implausible.

However, none of the papers and books reviewed above examined plausibility in detail. Because of the frequency with which plausibility is mentioned, and its importance to the argument, it will be worthwhile to analyse it further. I argue here that plausibility is (1) a continuum, not a binary characteristic, and (2) is essentially subjective.

McBurney and Parsons (2002) addressed the concept of plausibility, placing it on a 5-point ordinal scale of certainty as to the truth of a claim, thus:

0. open: no arguments in favour of the claim have been presented;
1. supported: an argument in favour has been presented;
2. plausible: a consistent argument has been presented;
3. probable: a consistent argument has been presented, and no undercuts or rebuttals have occurred;
4. accepted: a consistent argument has been presented, and every counter-argument to it has been attacked.

The above scale can be regarded as the positive half of a symmetrical scale: the other half of which would be (moving back beyond Open)... -1. unsupported: an counter-argument has been presented;
-2. implausible: a consistent counter-argument has been presented;
-3. improbable: a consistent counter-argument has been presented, and no undercuts or rebuttals to it have occurred;
-4. rejected: a consistent counter-argument has been presented, and every counter-argument to that has been attacked.

Though there is no intrinsic reason why an Open...Accepted scale is better or worse than a Rejected...Open...Accepted scale, the latter has the advantage of being alignable with a probability estimate, where Rejected corresponds to 0% probability of truth, and Accepted corresponds to 100%. In these terms, the concept of plausibility can be defined as a minimum probability threshold: for example, we might choose to define “plausible” as “subjective probability greater than 10%.” The actual figure may be arguable, and it may vary in different
settings, but what I am trying to establish is that it is reasonable to regard plausibility as a range on a scale: somewhere between a minimum threshold and almost total certainty. None of the documents covered in Table 3.2 mentioned the possibility that plausibility might be a continuum rather than a logical variable — that there might exist degrees of plausibility. However, I found support for this position in the writings of Peirce, who observes that plausibility ranges "from a mere expression of it in the interrogative mood, as a question meriting attention and reply, up through all appraisals of Plausibility, to uncontrollable inclination to believe." (Peirce, 1908, volume 6, p469, cited in Rescher, 1995, p311).

The second point (which Peirce does not address in that discussion of hypothesizing) is that plausibility is not a property of a scenario, but a property of an individual's view of that scenario. What is plausible to one person may be implausible to another. Different people may have different thresholds of belief, depending on their knowledge of the mechanisms involved, and the strength of their attitude toward the scenario. What seems like implausible magic to the uninformed may be simple technology to the better-educated: an example is the introduction of mirrors to a tribe in Papua New Guinea (Carpenter, 1972, p112).

If plausibility is subjective, it can change. Thus a scenario which is not plausible at the time it is created can become extremely plausible in hindsight. Therefore perhaps a suitable criterion for plausibility is that it should not be evaluated too early after the fact: at least a substantial part of the way into the period to which the scenarios apply.

A danger with scenario-building is that if plausibility is a major criterion, the ensuing scenarios will not extend participants' thinking about the future — which is another important criterion for scenarios. For example, van Notten, Sleegers, and van Asselt (2005) found that participants in scenario-building did not view scenarios as plausible when they included negative outcomes for the organization being studied (though it seems possible in this case that plausibility and possibility were not clearly distinguished). Also, setting too high a value on plausibility can cause scenario-builders to not explore trends that in retrospect become obvious. This is demonstrated both in Appendix 1, which finds that scenarios for 2000 predicted their own times better than they predicted 2000, and in the legal services case, described in Chapter 8, in which, only a few months after completion of the study, a radical and unexpected change occurred — one that I would have regarded as highly implausible, had it occurred to me beforehand.
As noted in Chapter 2, a common problem with scenario planning is that it tends to contain uncertainty rather than confront it, and that there is a need for futures studies methods that can anticipate surprise. However, plausibility is almost the opposite of surprise. The only writer I found who mentioned this tension was Hirschhorn (1980), who notes that “a good scenario is one that optimally combines the two [viz. plausibility and surprise]. Such a scenario... produces surprises by developing sequential arguments that are inherently plausible.”

Bearing in mind the “scenario learning” function, one might argue that a key purpose of scenario building is to change participants’ views about what is plausible: in other words, to align plausibility more with hindsight. In view of the “failures to anticipate” described by Cohen and Gooch (1991), and the predominance of Type I over Type II errors in anticipation (as demonstrated in Appendix 1), participants’ views of plausibility will generally need to be enlarged rather than restricted – particularly in the case of social change.

Another aspect of plausibility is timing. A projection that is implausible for tomorrow (holidays on the moon, perhaps) may become quite plausible when the horizon is extended. In the case of technology, where Type II errors predominate, innovations are seen as too plausible – not so much that they cannot occur, but unrealistically likely to happen in the time-frame envisaged. It may be possible to overcome this problem by using a method such as technology roadmapping (Phaal, Farrukh, and Probert, 2004): listing a chain of events necessary for a particular outcome to occur, and estimating time delays for each element of that chain.

Thus the criterion adopted for plausibility in this thesis is not the simplistic notion that “scenarios should be plausible” but Hirschhorn’s (1980) suggestion that scenarios should attain an optimal level of plausibility: neither too high nor too low. This is supported by the findings of Kahneman, Slovic, and Tversky (1982), whose studies of subjective probability found that people overestimate the probability of both highly likely and highly unlikely events. Criterion 3.1 is thus revised: that plausibility should converge during the process. Events and states that initially seemed totally implausible should become more plausible (in a specified time horizon), while events and states that initially seemed certain or imminent should become less plausible. This would foster appreciation of a wide range of possible futures.

**Critique 5: normative scenarios versus even-handedness**

Though two criteria groups in Table 3.2 (2.3 Look toward improvement and 2.9 Even-handed treatment of scenarios) may not at first appear contradictory, in practice this is likely to occur. Some writers on futures (such as Ogilvy, 1996, and Slaughter, 2004) believe that an important
function of futures work is not simply to outline possible futures, but to work towards a "better" future – however defined. Other writers (such as Simpson, 1992; Rhyne, 1995; Ringland et al, 1999; Davies et al, 2001) point out that to include a preferred scenario in an ensemble is likely to cause others to be neglected – hence their advocacy of even-handedness in the treatment of scenarios. Since this Process was designed to be one of inquiry rather than of planning, the normative criterion was refocused as "Participants have a clearer perception of their desired futures."

3.4.3 Outcomes of critiques
The following table summarizes the outcomes of the above five critiques.

<table>
<thead>
<tr>
<th>Tentative criteria</th>
<th>Outcome of critique</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4 Robustness</td>
<td>Not used as a criterion</td>
</tr>
<tr>
<td>5.2 Prediction</td>
<td>Rather than &quot;no prediction&quot;, the criterion used is &quot;anticipation of broad situation&quot; or &quot;foresightfulness&quot;</td>
</tr>
<tr>
<td>3.4 Consistency</td>
<td>Not used as a criterion</td>
</tr>
<tr>
<td>3.1 Plausibility</td>
<td>Convergent, rather than maximal. Thus criterion 3.1 in Table 3.2 was combined with criterion 4.4 (&quot;Explore possibilities; clarify extent of uncertainty&quot;) as &quot;Boundaries of uncertainty and plausibility are clarified.&quot;</td>
</tr>
<tr>
<td>2.3, 2.9 Normativity vs even-handedness</td>
<td>Refocused, toward clarification of desires rather than scenarios that would fulfil them</td>
</tr>
</tbody>
</table>

Thus two of the criteria from Table 3.2 were dropped, and four others were modified.

3.5 The criteria selected
The next step in the process was to divide the selected criteria into design-related criteria (verifiable in the design of a process) and executional criteria (the achievement of which depends on the execution of that process in a particular environment).

Having settled on 29 criteria to be used (the 31 selected from Table 3.2, with changes detailed in Table 3.3), the next stage was to separate criteria that could be designed into the Process from those that needed to be assessed on execution. The following table lists the final criteria, noting the relevant category for each. Four criteria fell into both categories. Where possible, these criteria were incorporated in the design of the Process, but some also needed to be assessed following execution. Though the numbering (at left) matches that in Table 3.2, the
wording of some criteria has been sharpened, to enable accomplishment to be more readily assessed. The table shows the point at which each criterion should be applied:

- Design – a design characteristic of the Process itself, to be assessed at the design stage of the process. The criteria are numbered, beginning with D, for comparison with the Process design at the end of chapter 5.

- The other possibilities are characteristics of the execution of the Process, best assessed either during the execution of a case (generally toward the end of the casework) or on follow-up, some time after the casework is completed, the latter denoted by an asterisk. These criteria are numbered beginning with E, for comparison with the operation of the Process following the case studies, in chapter 9.

- Three criteria need to be assessed both at design stage and execution stage. These are numbered beginning with DE, and their accomplishment is assessed both at the end of chapter 5 and in chapter 8.
Stage 3. Output

3.1 Boundaries of uncertainty and plausibility are clarified
3.2 Include narratives to describe change processes
3.4 Output should be readily understandable by all concerned
3.5 Anticipations are expressed specifically enough that they can be tracked and confirmed
3.6 Focus on the situation of the entity in its changing environment
3.7 Output in format conducive to re-analysis and expansion of detail as needed

Stage 4. Direct outcomes

4.1 Output is directly usable by the entity
4.2 Participants gain more detailed perceptions of future possibilities, creating “future memory,” to help prepare for later action
4.3 Participants feel empowered and stimulated to act

Stage 5. Broad outcomes

5.1 The entity becomes more future-oriented as a result of the Process, open to divergent thinking, and adaptable to change
5.2 The broad future situation is successfully anticipated
5.3 The Process results in action for change: in the entity or in participants’ behaviour

* Outcome criterion 4.2 proved so similar to activity criterion 2.2 that these were combined.

In other words, the design of a new futures Process should fulfil the design criteria in the above table, while the execution of the Process should fulfil the execution criteria, measured during and/or after the casework.
3.6 Ongoing development of criteria during the inquiry process

In research that uses the positivist paradigm, when a set of outcomes was being evaluated against a set of criteria, the following standard sequence would be used:

1. All the criteria would be set out.
2. All the data would be collected (often through a survey).
3. Finally, the outcomes would be evaluated against the original criteria.

Though the above sequence seems logical enough, for a linked series of studies (such as a set of experiments seeking to perfect a method), it may be more appropriate to modify the criteria between studies. Such an approach amounts to action research, as originally envisaged by Lewin (1946). However, regardless of whether the research approach is qualitative or quantitative, failing to update the criteria between waves would entail losing much of the value of the iterative process, as Greenhalgh and Taylor (1997) point out.

In this study, following the standard action research paradigm of multiple cycles interspersed by reflection, I began with a somewhat different set of criteria from that shown above, but after working through several case studies and reading additional literature, modified the criteria in the light of the findings and the literature. This meant that the final criteria were different from the initial criteria for which data were collected. Fortunately, I had anticipated such changes by designing the evaluation questionnaires to be largely open-ended, allowing for later recoding. New criteria were added, some were changed in emphasis, some were made more specific, and some were removed. This explains the minor changes in wording between tables 3.2 and 3.4. With the benefit of hindsight, after the reflection on the last case, I returned to the data, and compared each case against the final criteria (as listed above in Table 3.4). The results are reported in chapter 9.

3.7 Review of this chapter

This chapter has scoured the futures literature, and also searched the related literatures of organizational development and qualitative research methods for criteria by which a futures studies method might be evaluated. More than 230 criteria were examined, and placed into a five-stage model commonly used in program logic modelling. Some criteria were combined, some were redefined, and several were rejected as irrelevant to the current purpose. The criteria that survived this process were grouped (with a little overlapping) into 18 design
criteria (characteristics of a method as such) and 15 execution criteria (characteristics of the way in which the method is carried out).

The design criteria are used in chapter 5 to help develop the basis of the Process. The execution criteria were assessed in the two data-collection exercises (survey and group discussion) carried out for each case: one during and towards the end of the Process activity, and the other during follow-up around a year later. Findings from the surveys and group discussions in each case (covered in chapter 8) were used to improve the process in next case studied; these are discussed in chapter 9.

3.7.1 Limitations of the evidence presented on this issue

Though the approach taken in gathering criteria was as rigorous as was feasible, there are some likely shortcomings:

Shortcoming 1. It is probable that I failed to find some of the literature on the evaluation of futures methods. However, it is unlikely that a highly important document was omitted, because

(a) if it were an older one, a reference would have been listed in comprehensive works such as Skumanich and Silbernagel (1997), Greeuw et al (2000), and Davies et al (2001).

(b) If it were more recent than the late 1990s, and published in a major futures journal, an evaluation journal, or a widely-reviewed book, I should have seen it while keeping abreast of new publications in those fields.

Another limitation is that my search was largely limited to the literature in English – or with English abstracts, as on the OECD Future Trends database (OECD, 2001). There may be important documents in other languages (most likely French, German, Italian, Russian, and Japanese) that I did not find. It is less likely that there are other documents in Dutch, Finnish, and other Scandinavian languages, despite the high volume of futures work in these countries, because major work from there is often published in English.

Shortcoming 2. This eclectic approach could be criticized for not sufficiently taking into account the subtle interactions between criteria. However, none of the 50 documents examined covering the evaluation of futures methods made reference to such interaction. The closest to this was the approach of Amara (1981), who delineated different criteria depending on the purpose of a study, whether it was considering probable, possible, or preferable
futures. By “probable futures” Amara was referring mainly to forecasting and quantitative methods, which (as explained in Chapter 2) are outside the scope of the present study.

Shortcoming 3. A further criticism is that only 31 criteria were used, and the others (each found once in the literature) were not incorporated. However, most of the others were either “motherhood” statements (such as “high methodological quality), or would normally be incorporated as a matter of course (such as “gain top management support”), or embodied specific assumptions which might not apply to a new Process (such as memorable names for scenarios), or referred to a subsequent planning stage rather than the inquiry stage on which the Process was to focus.

Shortcoming 4. Six of the seven writers who mentioned prediction disagreed with its use as a criterion, stating that prediction is not a purpose of futures studies. However, by reconceptualizing prediction, from a binary attribute to a continuum of anticipation, I have tried to demonstrate that futures are not totally unpredictable, and that if an ensemble of scenarios cannot produce even one scenario that turns out closer to its anticipated future than to the circumstances of its creation, that ensemble will not have been very useful.

Shortcoming 5. Another controversial aspect may be the rejection of plausibility and credibility as criteria. However, this is because the literature review in chapter 2 found evidence that one useful role of a futures exercise would be to optimize (rather than to maximize) plausibility: not to make any future seem either too plausible or too implausible.

Shortcoming 6. A conceptual problem in establishing the achievement of these criteria in practice is the difficulty of disentangling effects due to the Process from (a) effects due to its execution, (b) effects due to the use that the entity makes of the findings, and (c) whether those effects would have happened in any case – or as a result of the use of any method which encouraged people to think about their future in detail. The solutions applied are covered in chapter 6; briefly, an abductive and formative approach was used.
Chapter 4: Towards a conceptual framework of futures

4.1 Introduction

This chapter argues that a new Process for anticipating futures should be based on an explicit conceptual framework, incorporating explicitly defined concepts. Accordingly, such a framework is developed in this chapter, to focus the development of a Process for perceiving the future, from a constructionist point of view – in other words, the method applies to the human future, rather than any physical future. The input to this chapter is the literature, particularly on futures studies, systems thinking, organizational development, philosophy, and sociology. The output of this chapter is a conceptual framework, which is used to inform the development of the Process in the following chapter.

4.1.1 Why incorporate a conceptual framework?

To avoid taking an uninformed and purely pragmatic approach – which might result in the development of a Process that worked, but without knowing why – it was important to use a theoretical model of the future that could be used to guide the development of the Process, so that the outcomes would be theoretically driven as well as practically useful.

As Checkland (1995, p2) states, “If descriptions of action research were to be more than merely anecdotal accounts of what had happened, it seemed an essential requirement that the researcher declare in advance the intellectual framework within which knowledge in the research situation will be defined.” Supporting that argument, Checkland extended his Soft Systems Methodology to include the FMA model, showing how a framework of ideas (F), led to a methodology (M), which in turn led to an area of application (A) (Checkland, 1999; Hindle et al, 1995; West and Stansfield, 2001). This model is further discussed in chapter 7. Transferring that to the present case, the framework of ideas in this chapter leads to the SNM methodology in the following chapter, which in turn led to the application of the Process as described in the case studies in chapter 8.

Also, by developing a Process in line with a theoretical framework, there was some expectation that both could be improved. Not only would the framework guide development of the Process, but its development would also be used to strengthen the theoretical framework.
Thus I sought an appropriate framework, beginning by searching the futures literature covered in chapter 2. However, no single source could be found that covered the full scope of this study. For example, Rescher, in his 1998 book *Predicting the Future*, claims to have written the first book on the theory of prediction since Cicero's *De Divinatione*, which appeared in 44 BC (Loeb edition, 1970). However, a theory of prediction is not as comprehensive as a theory of the study of the future. As demonstrated in chapter 3, prediction (however qualified, or reframed as anticipation) is only one component of futures studies. Most other comprehensive publications in the area, such as Fowles' *Handbook of Futures Research* (1978) and the multi-volume *Knowledge Base of Futures Studies* (Slaughter, 1996a) have been edited collections, which by their nature do not have the space in which to developed a detailed theory. The closest approaches to comprehensive theory have perhaps been de Jouvenel's 1967 book *The Art of Conjecture* and the several volumes of Wendell Bell's *Foundations of Futures Studies* (Bell, 2003 and 2004). Other significant contributions have been made by Slaughter and Inayatullah, in developing the related areas of critical futures and integral futures, including Inayatullah (1990 and 2002a) and Slaughter (1989, 1996b, 2004).

Not finding a suitable model in the futures literature, I searched more broadly. Since the concept of the future can also be viewed as a re-expression of the concepts of time and of change, I explored the literatures of time and organizational change, and found several theoretical works in those areas. Jaques (1982) focuses on time, from a management perspective. Van de Ven and Poole (1995) and Tsoukas and Chia (2002), also taking a management perspective, focus on change. Abbott (2001) considers time from a sociological perspective, but not comprehensively so. All of the above works provided valuable insights, but none of them was fully relevant to the process being developed.

It became evident that I should have to assemble a framework specifically to guide this work. Seeking guidance on the construction of theoretical models, I explored the works of Dubin (1978), Bacharach (1989), Whetten (1989), and Weick (1989), but most of these were designed for producing theories about content, while the need here was for a model for setting up a structural framework at a more abstract level. Not finding the above writings usable in this context, I determined that such a framework could be assembled in four stages:

1. Determining the scope of a framework;
2. Critically examining the core concept within that scope – in this case, the future;
3. Establishing a set of key principles;
4. Using those principles to construct the detailed framework.
To illustrate those stages using an architectural metaphor, those four stages correspond to (1) deciding the scale of construction, (2) the selection of a site, (3) drawing a plan, and (4) using that plan to build the framework. To continue the metaphor, the application of SNM in a specific case would then correspond to completing the building. However, departing from the architectural metaphor, the creation of a conceptual framework may involve changing an earlier stage in the light of findings from a later stage.

A comprehensive theory of the future would be very useful indeed; the aphorism often attributed to Kurt Lewin applies: “there is nothing as practical as a good theory”\(^1\). An entire thesis could be devoted to developing a theory of the future, but this thesis is not it. As the sole purpose of this model to create a solid foundation for the Process, the principle of Occam’s Razor has been applied, and the model is deliberately minimal. It does not attempt, for example, to reach into the areas covered by Slaughter (2004) in his concept of integral futures. The focus here is more outward looking than Slaughter’s, focusing on the sociological aspects, whereas Slaughter focuses more on psychological futures.

Though some writers (such as Weick, 1999) might consider this chapter to be developing a theory, the consensus among others is that the essential component of a theory is explanatory power. For example, Sutton and Staw (1995), in a paper on “what theory is not,” state that theory is not references, not data, not lists of constructs, not diagrams, nor hypotheses. For them, theory is explanation: “theory is the answer to queries of why.” Whetten (1989), in his widely cited paper “What constitutes a theoretical contribution?” echoes Dubin (1978) in stating that a complete theory has four essential components:

- Which factors to include (taking account of both comprehensiveness and parsimony);
- How the factors operate together; their causal relationships;
- Why: describing a plausible mechanism for relationships between the factors
- Who / where / when: the situation in which the theory applies.

Like Dubin, Whetten does not distinguish between a model and a theory. Comparing the present chapter with Whetten’s and Dubin’s view, it is on the borderline. It does not seek to explain the future; rather, it is a way in which the future can be viewed, and thus the label “conceptual framework” is more in accordance with general usage than is the label “theory.”

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1. Lewin (1945, p129) expresses this in quotes, as if it were not original; others attribute it to the 19th-century physicist Boltzmann.
4.1.2 Scope of this framework

The scope of this conceptual framework is delineated by three main restrictions: its focus on human futures, the medium term, and a probably-restricted cultural background.

Human futures. A social-constructionist approach, emphasizing human futures, as opposed to terrestrial. In the words of Waddington (1978, p9) “Whatever the future will be, it will have been made by Man.” Terrestrial factors (e.g. geological) are relevant only in so far as they affect humans. Thus the entities to which this theory applies are social entities: individuals, families, geographical communities (of any size), organizations, products and services, and concepts. Because the future, from another viewpoint, can be described as change, it follows that this framework of the future can also be described as a framework of social change.

Medium term. The scale at which this model is designed to apply is the medium term: applying for a period of between (very approximately) 1 year and 20 years. This is for pragmatic reasons. Below one year, the variables are known, and quantitative forecasting or the assumption of continuity will be generally safe. Above 20 years, uncertainty becomes too great, and there is little need to plan for longer periods.

Cultural background. Given my cultural background, as an inhabitant of a wealthy English-speaking country – no matter how much I have tried to transcend it – the model is likely to be limited by its origin and time, to the developed world in the early 21st century. I hope, though, that my experience in participative research in Asia, Africa, and Eastern Europe has enabled me to escape some of the limitations of my home culture.

4.2 Clarifying the concept of future/s

Having defined the scope, the argument now turns to address the various concepts of “the future.” For at least two thousand years, philosophers have distinguished slightly different meanings of the future and its relation to time. There are several versions of the various concepts, including variations from the ancient Greeks, Saint Augustine, and the contemporary scholars McTaggart, Jaques, and Koselleck.

Ancient Greeks. The ancient Greeks used two words to denote time: *chronos* and *kairos*. These can be roughly translated as “time” and “timing,” according to Jaques (1982). Though these concepts had long been present in Biblical scholarship, the foundation of the concepts
was re-examined by Kermode (1967) in his influential book on literary endings, inspiring other writers to develop variants of the concepts.

**St Augustine.** Writing in 397, St Augustine, in his *Confessions*, mused on the nature of the future, and eventually decided it was more akin to *kairos* rather than *chronos*.

"It is now plain and clear that neither future things nor past things exist. Nor is it correct to say, 'There are three times: past, present and future.' However it might be correct to say, 'There are three times: a present of past things, a present of present things, and a present of future things.' For these three somehow co-exist in the soul... It may also be said, in our loose usage, 'There are three times: past, present, and future.' But I do not object... as long as the intention is understood." (*Confessions*, Book XI, chapter XX; my translation of the edition of O'Donnell, 1992)

Augustine was aware of the writings of the philosopher Plotinus (fl.205-270) from whose *Enneads* he may have derived the germ of the above idea, so perhaps Augustine was not the first constructivist after all. However, the times in which he lived must have had an effect on his thinking: were Augustine alive today, the ubiquitous presence of time-measuring devices – from calendars to clocks – may have swayed his judgement toward the *chronos* interpretation.

**McTaggart.** The philosopher McTaggart (1927: Vol II, Book V) developed a paradox in which he attempted to prove that time could not exist. Though it is now accepted that McTaggart's paradox cannot be substantiated (Popper, 1956, p538; Quine, 1960; Gale, 1968), the two concepts that he described in his argument are still of relevance for the current purpose: the A-series and the B-series of time. The A-series is that in which events are seen as moving backward from the future, through the present, into the past – much as a person standing at a straight and dusty roadside might see a bus appear from the haze on the left, pass the bystander, and disappear to the right in a cloud of dust. The B-series is a relative view of time, in which events are labelled as happening before or after one another – as if the roadside bystander looked neither left nor right, but simply recorded the time at which the vehicle passed.

**Jaques.** Elliot Jaques (1982), though writing from a management perspective, deals with the theory of the future in more detail (relevant to the present study) than any other writer, though his explicit focus is "time" rather than "future." He redefines *kairos* in more detail as "the time of episodes with a beginning, a middle, and an end, the human and living time of intentions and goals." Hedaa and Törnroos (1997 and 2001) redraw this distinction in the context of business networks, using the terms in much the same sense as does Jaques.
Koselleck. The German historiographer Koselleck (1990 and 2002, with a review by Zammito, 2004) distinguishes between “historical time” and “natural time.” He describes the former as “a future that transcended the hitherto predictable,” a concept that arose around the time of the French revolution, supplementing the older conception of time as simply “the medium in which all histories take place” (Koselleck, 1990, p246).

Extending into the realm of foresighting the chronos/kairos distinction and the concepts of McTaggart and Koselleck, two related views of futures can be defined – as St Augustine (397) realized: firstly, the future as chronos (similar to the B-series), labelled by its date. This is the conception that St Augustine rejected. His second, and preferred view, was of the future as a percept in the human mind: a conflation of hopes, fears, and expectations, differing from person to person and from one time to another for the same person. The latter view of the future is not precisely the same as the Greek concept of kairos, nor quite McTaggart’s A-series, nor quite Koselleck’s “historical time,” but falls within that class of views.

Though all the above writers distinguish two concepts of the future, there are subtle differences between them. Some confusion in the area of prediction seems to have arisen due to these slightly varying dual interpretation of “future.” Thus for the purpose of this Process, it seemed productive to use two different meanings of “future” but to clearly label them when ambiguity might arise. The issue was which two meanings would be most useful. Given the nature of the Process, it seemed most relevant to adopt Jaques’ concepts: his interpretations of kronos and kairos, meaning respectively “time as succession” and “time as intention.”

Forecasters, confined as they are to predicting specific time periods, perceive the future in terms of the B-series, Koselleck’s “natural time,” or as chronos. Scenario builders, however, focus mainly on the future as the A-series, Koselleck’s “historical time,” or as kairos, but sometimes slip into the other mode. My proposition is that confusion can best be avoided by clearly distinguishing between the two views, and selecting the appropriate one for each question. Thus the concept of future can be seen as having two dimensions that can vary independently: calendar time, and intentions. The hemispherical model developed later in this chapter therefore distinguishes between (a) physical futures / future-as-time / chronos and (b) mental futures / future-as-progress / kairos.
4.3 **Axioms on the future**

For maximum clarity, it was useful to begin with a set of theoretical postulates, from which the conceptual framework outlined in this chapter was derived. After studying the ways in which various philosophers had done this, the approach of Spinoza (1665/2000) seemed to be the most relevant in this case. In his *Ethics*, Spinoza began by laying out a set of definitions. Having clarified his terms, he wrote a number of axioms, supposedly of indubitable truth. From most of the axioms followed one or more propositions, which in the sense of the Greek philosophers were *doxa* or hypotheses rather than *episteme*, or confirmed knowledge (Hirschheim, 1984). Spinoza’s final stage was to “prove” the truth of his propositions, which he attempted to do by reasoning, rather than through empirical evidence. Wittgenstein, in the *Tractatus Logico-Philosophicus* (1922), set out his seven main propositions using similar principles.

Spinoza’s axioms, though he derived the term from Euclid, are not the latter’s mathematical truisms; they are statements with which it is possible to disagree on an empirical basis. Bertrand Russell, though he did not agree with Spinoza’s proofs, praised his method for its clarity and self-containment: “His attempt was magnificent, and rouses admiration even in those who do not think it successful” (Russell, 1961, p547). However, Kantor (1981) pointed out that some of Spinoza’s “truths” could better be described as assumptions. Kantor suggested that psychology could benefit from using Spinoza’s approach, and that to clearly state the axioms involved in a study would reduce confusion and conflict among psychologists who assume different axioms. A more recent model than Spinoza’s was the approach of Kelly (1955) in developing his theory of personal constructs, for which he developed one main postulate, with 11 corollaries.

4.3.1 **Bell’s set of assumptions**

Though no writer seems to have compiled a set of axioms concerning the future, Wendell Bell (1996) approached this, deriving from the futures literature nine assumptions that are “distinctively part of the futurist perspective”:

1. Time moves unidirectionally and irreversibly.
2. Not everything that will exist has existed or does exist.
3. Futures thinking is essential for human action.
4. The future is not totally predetermined.
5. Future outcomes can be influenced by human action and choices.
6. The interdependence of the world invites a holistic perspective and a multidisciplinary approach.
7. Some futures are better than others – so part of the futurist task is to study the criteria people use to make evaluative judgements of alternative futures.

8. The only really useful knowledge is knowledge of the future.

9. There is no knowledge of the future. (Bell, 1996, pp11-15)

These assumptions, later restated by the same writer with minor variations (Bell, 1998) at first seemed a useful starting point for a theory to accompany the present Process. However, on closer scrutiny, many reservations emerged:

1. “Time is unidirectional” – not necessary for the present process, and in the *kairos* sense of the word “time,” clearly untrue. Bell seems to be saying that the future cannot affect the past or present, but as explained above, if the future is regarded as dwelling in the mind rather than in the calendar, people’s perceptions of futures frequently affect their current behaviour.

2. “Not everything that will exist has existed or does exist” – obvious, but not particularly relevant for the Process.

3. “Futures thinking is essential for human action” – perhaps overstated, given the frequency of unconsidered action. Thus “essential” could be rephrased as “desirable,” or the term “human action” (with its implied “all”) could be replaced by a term such as “human progress.”

4. “The future is not totally predetermined” – the truth of this statement is ultimately unknowable: as philosophers from Epicurus (c.300 BC) to Bostrom (2003) have noted, the illusion of free will could coexist with a universe orchestrated by some superior being.

5. “Future outcomes can be influenced by human action and choice” – accepted, even if the previous assumption does not hold. Again, though, the implied “all” is questionable, depending on the precise interpretation of the word “outcomes” – what if the Sun explodes next week?

6. “The interdependence of the world invites a holistic perspective” – agreed; but this need not imply that all human systems are equally interdependent.

7. “Some futures are better than others” – almost a truism, but the precise nature of “better” may be arguable. Bell’s agenda here and subsequently (Bell, 2004) is to assert the universality of some human values (for which solid evidence exists), but if the future is viewed as a path rather than a destination, it need not always follow that some paths are better than others, even if some destinations are indubitably better.

8. “The only really useful knowledge is knowledge of the future” – but might not knowledge of the past be “really useful,” at least in so far as it helps set up the future?
9. "There is no knowledge of the future" – I demur, given the concept of graduated prediction put forward in the previous chapter, which also applies to knowledge of the future. For example, my knowledge that it will become light tomorrow morning is certain. (But the variant statement "there is no complete knowledge of the future" is undeniable.)

Blass (2003) also criticizes Bell's assumptions, basing his comments on the 1998 version. He notes the cultural dependence of the implications of the first and sixth assumptions in the above list (the 1998 version is renumbered), and points out the joint implication of assumptions 8 and 9: if both are true, it follows that "really useful knowledge" does not exist – and ergo that Bell's nine assumptions are not really useful knowledge. It seems, however, from the context of Bell's other recent writings, that he did not intend the above assumptions to be subjected to such intense cross-examination; and they are not presented as his personal assumptions, merely his compilation of the assumptions of other writers.

4.3.2 An alternative set of axioms

Finding most of the above assumptions to make unsatisfactory axioms, I developed another set, with an emphasis on ensuring internal consistency, and on minimizing challengeability. Following the observation by Kantor (1981) that axioms are assumptions that have survived scrutiny, I venture to refer to these as axioms – on the supposition that no reasonable person might have evidence to disagree with the substance of any of them. They can alternately be regarded as postulates or working hypotheses: statements whose truth (though in several cases unverifiable) is nevertheless self-evident. Though some axioms may at first seem radical, and far from self-evident, the rest of this chapter may convince the reader of their obvious truth. These axioms, which underlie the Process developed below, and apply only to human entities, fall into five broad groups, labelled Predictability, Interconnection, Impingement, Permanence, and Causation. Each axiom is given a brief mnemonic label, for later reference.

Axioms of predictability

1. Axiom of continuity

   Future events have roots in the past, to the extent that the past is held in actors' minds (cf. axiom 16) and generalizations are formed. Thus perception of the future requires knowledge of the perceived past. This axiom disputes Bell's 8th assumption ("The only really useful knowledge is knowledge of the future") by implying that knowledge of the past can also be "really useful."
2. Axiom of limited knowledge

Though future events cannot be accurately known in all their detail, this is equally true of past events and current events – given the limitations of human memory, and the fact that it is not feasible to record the varying intentions of all actors associated with an event.

3. Axiom of partial predictability

Future events are not totally unpredictable. (Cf. Bell’s assumptions 2, 4, and 9.) Most of “the future” (in the context defined for this study) is created by humans. Even natural disasters, though not predictable in terms of precise timing, can be anticipated to some extent, and their effects are modified by human agency (UNISDR, 2002). The more specific an event, the less predictable it is, as discussed in chapter 3. For example, the total number of meteorites landing on the earth on a stated day of the year can be estimated with reasonable accuracy, though the exact location of their landing places cannot be predicted. A re-expression of this axiom is that every future event is predictable – as long it is expressed loosely enough.

Axioms of interconnection

4. The endogenous/exogenous axiom

The causes of future situations can be separated into two broad groups: the exogenous and the endogenous. In other words, the future of any social entity is partly planned by itself, and partly unplanned. Section 4.4.1 below treats this topic in more detail.

5. Axiom of holonic perception

Any system can be simultaneously perceived at several scales: as a group of sub-systems and part of a larger system. This is true of both events and human systems – with even individuals subdivisible into their various roles. Applying this principle to time, this makes it possible to comprehend the vastness of “the future” by viewing it at whichever scale is most relevant for the current purpose. This is covered in more detail in section 4.5 below.

Axioms of impingement

6. Axiom of social impingement

The future of any social entity (from individual to supra-national organization) does not mysteriously appear out of nowhere, but is influenced by the actions and intentions communicated by other actors.
7. Axiom of proximity

The more direct is such communication (i.e. the fewer intervening actors), the more the entity will be influenced.

8. Axiom of power influence:

The mutual influence of any two communicating actors is determined by their relative power: the more powerful actor will influence the less powerful actor’s future. (Reversing this axiom creates a definition of power.)

9. Axiom of embeddedness

It follows from the previous three axioms that the exogenous future of any entity is largely the result of exchanges between the entity and other entities with which it communicates. Section 4.4.1 below deals with those axioms in more detail.

**Axioms of permanence**

10. Endless-rainbow axiom

An “end state,” though often envisaged, never occurs. Like the end of the rainbow, the future cannot be reached, because mental futures \((haires)\) always outpace physical futures \((chronoi)\).

11. Axiom of desired stability

Though there is no end state, humans are comforted by acting as if one exists, hence their constructs such as “heaven.” Such mental comfort need not lie in fixity: it may also be a constant rate of change, such as “unending progress” or “sustainability.”

12. Flat-horizon axiom

The rate of perceived change varies, with plateaus of relative stability interspersed by rapid change (the “punctuated equilibrium” of Eldredge and Gould, 1976). Actors on such a plateau may regard it as a permanent state.

**Axioms of causation**

13. Multi-cause axiom

Almost no human event ever happens for a single proximate reason. As discussed in section 4.6 below, multiple causation is the norm. Even when there initially appears to be a single cause, there exist underlying causes behind the direct cause.
14. Multi-effect axiom

Complementing the previous axiom: almost no human event has a single result; there are practically always side-effects (except perhaps actions involving only one person).

15. Axiom of enchainment

An effect of one event may be a cause of a subsequent event. (The word "cause" here has the sense used by epidemiologists rather than the sense used by physicists, as explained in section 4.6.1 below.)

16. The decision-linking axiom

In the social world, no event directly causes another event. Events are connected through human decisions, whether explicit or implicit.

The general thrust of the above axioms is that "the future" is not nearly as unpredictable as is often claimed — as for example by Bell's 9th assumption. On allowing that futures are partly predictable, a suitable objective for a futures process is to clarify the boundaries of the predictable and the unpredictable, and to assess the stability at those boundaries.

The epistemology underlying the above axioms derives from the confluence of two streams of thought:

(a) social constructionism (or constructivism), as described variously by Berger and Luckmann (1967), Watzlawick (1984), Gergen (1994, 1999), and Schwandt (1994). Slaughter (2002a) summarizes the uses of this mode of thinking in futures studies.

(b) of pragmatism and its descendant, critical realism. The former encompasses the varying emphases of Dewey, Mead, Peirce, and Rorty (as noted by Tapio, 1992 and 1996). The critical realism stream is detailed by Sayer (1984), and applied to futures studies by Bell and Olick (1989) and Bell (2003).

Though constructionism and critical realism might be regarded as incompatible, in that the existence of a "real world" is essential to realists but irrelevant to constructionists, for the purpose of the present theory they are both useful, and need not be contradictory, as noted by Mir and Watson (2000). Futures are very clearly constructions, and (from a pragmatist point of view), the critical realist approach, as applied by Pawson and Tilley (1997), can usefully explain constraints on possible futures.
In the remainder of this chapter, some combinations of the above axioms are used to develop a more coherent theory of the future.

4.4 A taxonomy of forces influencing the future

This section provides more detail on axioms 5 to 9: the division of forces on the future into the endogenous and the exogenous, and subdivisions of those forces. This bipartite division of influences on the future is long established. For example, Machiavelli, in *The Prince* (1525, chapter 25) writes of *necessita* and *virtü*:

"Nevertheless, not to extinguish our free will, I hold it to be true that Fortune is the arbiter of one-half of our actions, but that she still leaves us to direct the other half, or perhaps a little less." [translation by W K Marriott, 1908]

In other words, the future (as kairos) of any human entity is partly determined by external forces (whether "the market," fate, globalization, or karma) and partly by its own actions.

4.4.1 A formula for the future

Lewin (1948) set out a generic formula for predicting social behaviour, as:

\[ B = f(P, E) \]

where \( P \) = personality and \( E \) = social environment. In other words, behaviour is a function of personality and environment. Following Lewin’s example, recasting the exogenous/endogenous axiom in mathematical notation, a formula for the future can be set out as:

\[ F = f(ex, end, int, err) \]

In other words, the future of any human entity (\( F \)) is a function of four types of variable:

1. \( ex \) = exogenous: resulting from sources external to the entity;
2. \( end \) = endogenous: from sources within the entity itself;
3. \( int \) = interactional: neither purely exogenous nor purely endogenous, but resulting from the interaction between the two, and
4. \( err \) = random variation or "error": the effectively random properties of the future: what makes the future unpredictable. When \( err \) is small in relation to \( ex \), \( end \), and \( int \), the future is less unpredictable. Though "error" is the term used in regression, it is not the most appropriate word in this situation: "variability" conveys the sense better.

Though the above formula is similar to that for regression analysis, the statistical analogy should not be taken too far. Unlike the independent variable whose value a regression equa-
tion predicts, the future cannot be expressed by a single variable – nor in fact by *any* number of prior variables, because new variables and constructs are continually evolving. In mathematical terms, the future might be seen as an array rather than a variable – but an array with an indeterminate number of vectors, some of which are undefined.

The above four components of the future may be further subdivided:

**Exogenous components**
1. Actions of influential others: e.g. governments (enacting laws) or market leaders.
2. Explicit plans of impinging actors.
3. Perceived motivational drivers of impinging actors: their motives, attitudes, worldviews, capabilities, beliefs, values, images, visions, expectations, and hopes about the future – as perceived by the focal entity.

**Endogenous components**
4. Plans: concrete plans, intentions, and their ensuing actions. Some of these contribute to the eventual goals, while others may have unintended consequences, and militate against accomplishment of the goals.
5. Motivational drivers of the entity: even if the entity has no specific objectives, its members' motives, attitudes, worldviews, capabilities, beliefs, values, images, visions, expectations, and hopes about the future can shape its direction. As the future (in St Augustine's preferred sense) resides inside human brains, its perception can be influenced by these drivers.
6. Behaviour (or lack of behaviour) by the entity that is not purposive or goal-directed, but turns out to have some eventual bearing on its future. This includes inaction due to an impression of inevitability.

**Interactional components**
7. Conjunction (to borrow a term from astrology): an effect due solely to a particular confluence and/or sequence of several uncommon events – such as the "normal accidents" of Perrow (1984).
8. Power imbalance: Unless there is a clear difference in power between the focal entity and any impinging entities, any conflict in plans will be unlikely to have a direct effect. But when one entity is able to influence another, this may have a large impact on the future of the weaker entity. As few entities are powerful enough to affect their entire envi-
ronment, the power imbalance in most cases will consist of inward influences: suffering power rather than exerting it.

9. Zeitgeist: generally (but unhelpfully) labelled the "spirit of the times" (Maffesoli, 1993). It may be more useful to define Zeitgeist in terms of what is and is not currently thinkable: assumptions that are so widely accepted within a social system that they are not noticed, and are therefore unquestioned, both by the focal entity and its surrounding entities. A Zeitgeist component may be noticed only after some years, when the situation changes, or by comparing past behaviours with current behaviours.

Unpredictable components

10. Occurrence of the unexpected: a totally unanticipated event with major effects on the human world — a large earthquake under the Zuider Zee, for example.

11. Non-occurrence of the expected: the failure of a cyclic event — such as non-arrival of the belg or "small rains" in Ethiopia, resulting in drought and consequent famine.

Though it is not possible to demonstrate that the above list is comprehensive, no additional distinct components have been identified after several years' development and discussion. A literature search revealed no equivalent list, except to some extent that of Leach (cited in Bell, 1964). On attempting to further subdivide these 11 categories, more detailed breakdowns began to reveal overlapping constructs. For example, any attempt to subdivide items 3 or 5 raises difficult questions about the boundaries between these various mental components. Thus it seemed appropriate to stop at that point.

The practical use of the above list of forces is that, when considering the nature of the impingement of a system on the main system, it is helpful to consider to what extent each of the above forces might apply, and what form that impingement might take.

4.4.2 Rethinking the concept of trends

One notable omission in the above equation of components of the future is trends. Many of the earlier writings in futures studies focused on trends as a determinant of the future. This emphasis is at its strongest in cross-impact analysis (e.g. Helmer, 1977), in which trends are compared pairwise with a view to estimating their potential compounding effects. However, over-reliance on trends has also been criticized by writers such as Brooks (1986) and van Notten, Sleegers, and van Asselt (2005) who point out that trend analysis is insufficient for anticipating discontinuities. Others have decomposed trends into several streams. For example Dator (1993, p2) states that "the future' may be considered as emerging from the interac-
tion of four components: events, trends, images, and actions.” He groups the trends into three categories:

a. Trends that are a continuation of the present and the past;

b. Cyclical trends;

c. Emerging issues, not based on past trends.

Though the endogenous/exogenous categorization of influences on the future laid out above does not include trends, given axiom 1 above – that the future has roots in the past – the present theory needs to take explicit account of the forces from the past.

In sociology, the concept of trend has a precise meaning: a continuing unidirectional change in a variable over time. However, emerging trends are difficult to measure, because a construct must be closely defined before it can be measured. In the realm of social affairs, definitions of constructs are often arguable; vide the nine changes in the definition of unemployment by the Thatcher government in the UK, as noted in chapter 2. By the time agreement has been reached on the definition and therefore the measurement of a construct, a trend can be well under way, and such identification may be too late for some purposes – such as to gain “first mover” advantage with a technological innovation (Mohr, 2001, pp53-54).

Perhaps for this reason, a looser use of the term “trend” seems to have developed in futures work, as suggested in Dator’s tripartite grouping definition above: his context was broader than the types of trends and social indicators measured by statistical bureaus. The problem with emerging trends is that they are not known trends (in the stricter sense) but possible trends. However, from the point of view of the exogenous future of a specific individual, given axiom 6 above (that an actor’s future is largely mediated by the future of surrounding actors), the existence of a trend may be irrelevant: it is not vague trends that affect the individual’s future, but specific influences, mediated through specific actors.

As the narrativist movement in historiography has demonstrated (e.g. Danto, 1985; Ricoeur, 1988; Roth, 1988), the concept of a trend carries some degree of historical inevitability. For example, Lindenfeld (1999) uses concepts from chaos theory to examine the rise of Hitler in the 1930s, considering whether there existed key points at which the Nazis might not have come to power, thus forestalling all that ensued from that. Lindenfeld identifies one such key point as the January 1933 election in the tiny province of Lippe, which the Nazis won. Had they not been elected in Lippe, Lindenfeld argues, it is plausible that Hitler would not have become Chancellor. Extending this counterfactual, there are two alternatives:
(i) the Nazis would have eventually come to power because of the underlying trend, and World War II would have gone ahead in much the same way; or

(ii) with support for the Nazis already declining in 1933 (as reported by Lindenfeld, 1999), they would not have been elected, and the course of the 20th century would have been very different.

A "trend theory" in the mainstream sociological tradition (e.g. Collins, 1995) would argue for (i), and a "chaos theory" for (ii). Alternative labels for the two alternatives are "robust-process" explanations, which implicitly consider counterfactual worlds (equivalent to (i) above), and "actual sequence" explanations, equivalent to (ii) above (Petit and Jackson, 1992; Sterelny, 1996).

Though there is no way of knowing what might have ensued had the National Socialist party lost in Lippe, there were two clear alternative possibilities, and an over-emphasis on trends carries an overtone of an inevitability that may not exist. Specific events (in the *chronos* sense) do not simply arise through "trends" but are mediated through actors. In this case, the communication path was from the Nazis to the voters in Lippe, and the actors were all those involved in that path.

Thus the concept of trends is subsumed in this Process (and perhaps more usefully) by a concept of inertia: that some forces from the past will persist, for one reason or another, even after the reason for their creation no longer applies. These forces can be from the very recent past, such as a perception of a new fashion in clothing (Gladwell, 1997). This concept of inertia, an extension of the sociological concept of cultural lag (Ogburn, 1957; Brinkman and Brinkman, 1997) is more flexible than the concept of trend, fits better with the actor-oriented approach inherent in this theory, and requires fewer assumptions to be made. This is not to claim that trends are a subset of inertia, or that they do not exist: simply that the practical effect of a trend on an entity will be manifested through some form of inertia, at some level of effect.

Inertia can take several forms:

- Inertia of the focal entity – such as an organization resistant to change because its staff are comfortable with their established practices (Wenger, 1998; Pettigrew, Woodman, and Cameron, 2001).

- Inertia of impinging actors – such as customer non-acceptance of a new product, typified by the "New Coke" (Casnig, 2003).
Social momentum is another form of inertia. In this condition, when inertia is overcome by a sweeping force for change, the social system may tend to overshoot, in a mechanism that is perhaps a social equivalent of cognitive dissonance (Festinger, 1956). An example is the adoption of radical free-market economics by Russia in the 1990s.

A trend can arise simply through differing degrees of inertia among actors. It is well established (Rogers, 1995) that innovations are adopted at a varying rate: at first slowly, then accelerating, then slowing again as the innovation approaches saturation. When graphed, this is an s-shaped curve. This can be explained (Bass, Krishnan, and Jain, 1994) by the simple two-factor Bass model, in which both factors can be regarded as different forms of inertia.

If inertia is important, why is it not included in the above equation? This is not because it does not fit into the exogenous/endogenous division, but rather that inertia, in its various forms, can be a factor in all of the components listed above, and operates differently in each of them. For example, take the first exogenous component “actions of others,” which includes the enactment of laws. One major source of inertia is the body of existing law, the principles of which change very slowly, even though new laws are often made. Some new laws have effects that do not become apparent for several years. A relevant example of inertia (in the case of this thesis) was a 1997 reduction of funding for the Australian Broadcasting Corporation (where I was then working). This resulted in the eventual abolition of my position in 1999, which in turn led to my working in a university, the requirement to gain a PhD, and eventually the completion of this thesis. There were two sources of inertia here: the two-year lag between funding reduction and my departure from the ABC, and the six-year completion of a part-time PhD. Section 4.7 below, in setting out the theory of hemispherical layers, further develops the concept of inertia.

4.5 The holonic principle

Combining axioms 6 to 9 (i.e. the future of any entity is largely determined by those with which it communicates) and axioms 10 to 12 (actors can be divided and recombined at various system scales), the combination of influences and system scales can be expressed well by using the concept of holons.

Holons (as originated by Koestler, 1967) were defined by him as “self-regulating open systems which display both the autonomous properties of wholes and the dependent properties of their parts” (Koestler 1978, p304). That reference was to biological holons, but Koestler also
acknowledged evolutionary, morphogenetic, behavioural, linguistic, and social holons. To that list I am proposing to add holons of three perceptions: of time, of events, and of intentions. A holon can be regarded simultaneously as a system, its collection of subsystems, and the larger systemic environment in which it exists. Holons can be nested inside other holons, and they can overlap. For example, any business with a single office is a member of both its industry and a member of its local area. To ask “Is that one holon or two?” misses the point, because a holon is simultaneously singular and plural. However two businesses, in different industries, in different countries, would share a holon only at global level. Though the word “systems” could be used in the same sense, to refer to “holons” clarifies the hierarchical embeddedness inherent in the concept.

In a paper taking a critical view of General Systems Theory, Phillips (1969) criticizes its presumed inability to specify precisely where a system starts and ends, and quotes Stafford Beer (1960): “the crucial scientific problem for systems research is this: how to separate a particular viable system for study from the rest of the universe without committing an annihilating divisio.”

But must it follow that if something has no unambiguous boundaries, it cannot be described? The concept of holons is a partial solution of this problem². Since a holon is an embedded system, it can be viewed either as part of a larger system, or as the entire holarchy of a smaller system. Koestler (1967) limited his concept of holons to the biological and social, and described holons purely in hierarchical terms. Thus to Koestler, an industry would not be a holon, if it contained competing firms that did not form part of a common hierarchy. Nor would the population of a small island be an entity, if that island did not have a separate administration. A related concept from complexity theory is that of fractals, which are recursive rather than hierarchical (Mandelbrot, 1982; Gleick, 1988).

As a purely hierarchical model is limiting, for the purpose of this theory, a broader definition of holon than Koestler’s is used, bearing in mind the statistical concept of clustering (as in cluster analysis, not as in sampling): a holon is defined by a high ratio of within-group to between-group associations. The associations can be measured – potentially, at least – by the frequency and/or perceived importance of communications between the sub-holons (individuals, perhaps) whose holonic boundaries are to be defined. For example, a group of people working in a large office may or may not be regarded as a holon, depending on their ratio of

² But, even using the concept of holons, and the “boundary work” concepts of Churchman (1971), Ulrich (1994), and Midgley (2000), boundary-setting turned out to be one of the key empirical problems in this study, as noted in chapter 9.
within-group to between-group communication (Wenger, 1998). The group may be a holon for some purposes (such as evacuation in an emergency) but for other purposes it may be a number of small holons (such as separate departments). In other words, a holon is not an intrinsic property of an object, but a property of its relationship with other objects. (“Objects” here are not only social structures, but also events and intent structures, as discussed below.)

The use of the (enlarged) holonic concept in the Process solves several practical problems, partially overcoming boundary-related objections expressed by Philips (1969), and also enabling data reduction. Thus it is not only social entities that can be seen as holons, but also events. A problem mentioned in writings on cognitive mapping (Vennix, 1996; Eden and Ackermann, 1998; Huff and Jenkins, 2002) is that cognitive maps often become so large that perceptions of detail overwhelm perceptions of structure. The use of the holonic principle enables participants to focus at a productive scale on any part of a cognitive map.

4.5.1 Events as holons

Any event (however large or small) has the properties of a system, as defined in General Systems Theory (e.g. von Bertalanffy, 1956): it has one or more inputs (preceding events, which might be labelled “causes”), and one or more outputs (“effects”). Inside the black box of the event is some process for converting inputs into outputs. Since any system can be viewed as a holon, events are holons too. Many events, particularly those reified by labels, are multiple events: in other words, collections of events, which could be referred to as event systems (“World War II,” for example). What may singly appear to be discrete events often turn out to be event systems. Historians refer to this as the “problem of colligation”: determining the most appropriate scale for historical analysis (McCullagh, 1978 - though some use a different definition, as noted by Roberts, 1996, chapter 2).

Events can be colligated at any scale, either successively increasing or decreasing. As an example of increasing colligation, somebody passing the open door of this office might see me pressing a key on the keyboard. As far as the passer-by was concerned, that was the event. But from a more microscopic point of view, this was a holon of several smaller events:

1. I decide to press a key.
2. I decide which key to press (it will be A).

3. It makes no sense to aver that a particular social entity is a holon, because a holon is a perception, or construct; the holonic property rests with the perceiver, not the perceived.
3. My brain sends a message to the little finger on my left hand to press the A key. (This could be subdivided further still: locate the A key, decide which finger to use, find the appropriate muscle, and consciously move that finger to lie above that key.)

4. I press the key.

Pressing that key was just one part of the larger event of writing the preceding paragraph, which in turn is a subset of writing this chapter, which in turn is a subset of this thesis...and so on. At the extreme, the period of human life on planet Earth can be viewed as a single event – as it may be, millions of years in the future, by students in another galaxy. Our “extended present” (Elise Boulding, 1988) may be summed up by a single sentence in their textbook on the history of the universe.

An example of a smaller (but currently still enormous) event is World War II, which involved millions of people for six years. From the perspective of 60 years later, World War II is regarded as one event – as revealed by its label. It had specific beginning and ending dates, and its social consequences made the label “World War II” a shorthand way of referring to all of its components in a single phrase. However, a war is made up (inter alia) of battles, and those who participated in World War II may have seen at the time it not as one event, but as a kaleidoscope of many. Each of those battles (and other events) in turn were made up of many smaller events... and so on. At the most microscopic level, a soldier crooking a finger to pull a trigger and fire a gun was an event.

Another illustration of the constructivist character of events occurs when what may be regarded from a distant viewpoint as one event is seen by those involved as several different events. For example, people from the USA refer to the “Vietnam war,” while the Vietnamese speak of the “American war” (Chiến Tranh Chống Mỹ Của Cách Mạng). While that war was happening, there was no agreement on its purpose. In the battles of that war, the US government was fighting against communism, while the Vietnamese were fighting for national unification. At an individual level, the US troops were fighting because they were military career staff or had been drafted, while the Vietnamese tended to have a more local focus, of defending their communities (Neale, 2001).

As the above examples demonstrate, given the fluidity of boundaries and interpretations of a single event, it is obvious that an event is purely a social construct. Without an observer, no event is demarcated; and the scale to which an event is constructed depends on its propinquity to the observer. The mass media help to create and maintain social constructs, by labelling
them and reconfirming them (McCombs and Shaw, 1972; Dearing and Rogers, 1996; Scheufele, 2000).

Events can be colligated into larger events using five main criteria. Though holonic boundaries of human groups can be established by comparing between-group and within-group messages, this cannot be applied to events in time. Instead, events can be colligated using the following criteria. (Events are denoted as A and B, with no relation to McTaggart’s A-series and B-series.)

<table>
<thead>
<tr>
<th>Principle</th>
<th>Guiding question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacency in time</td>
<td>Did B happen immediately after A, without an intervening event of the same type?</td>
</tr>
<tr>
<td>Adjacency in space</td>
<td>Did A and B occur at the same location?</td>
</tr>
<tr>
<td>Adjacency of actors</td>
<td>Were the same actors involved with both A and B?</td>
</tr>
<tr>
<td>Adjacency of context</td>
<td>Did A and B occur in the same social context?</td>
</tr>
<tr>
<td>Attribution</td>
<td>Is A widely regarded as “causing” B?</td>
</tr>
</tbody>
</table>

I submit (influenced by Braudel, 1980, Danto, 1985, and Pierson, 2003) that the more of those questions are answered affirmatively, the more likely that A and B will be seen as a single event. And the more distant in place and time from an observer, the more likely that observer will regard them as a single event. The practical relevance of the holonic properties of events for scenario maps is that when an event is plotted on a map, it can be at any scale. Though one event might appear as a single point on the scenario map, it can be expanded indefinitely if required. And when an event is viewed as a construct rather than a sequence (such as the Great Plague; cf. Ziegler, 1969), narrativity does not apply: a static description, as with an “end-state” or “snapshot” scenario can be used. At that level, the event is a holon, as if in a closed box; it is only on opening the box that the event is visibly a narrative.

Events, situations, and processes. The perception of events as holons can include events that could also be described as situations. If World War II was a large event, it was also experienced as a situation by some of those involved in it. From a teleological view it could also be regarded as a process, in which two opposed forces were striving for victory. In that sense, “situations” and “processes” are constructs which fall within “events.” A more complex model of history might separate them, but as this is a minimal model, all three constructs are combined in the same group.
4.5.2 The holonic nature of intent structures

Having demonstrated that both social systems and events can usefully be regarded as holons, I shall now apply the same argument to intent structures. An intent structure, as used in theory-based evaluation (Weiss, 1998; Bickman, 1990; Chen, 1994), is a sequence of intentions to achieve a goal through performing a series of actions. I posit that there is no clear distinction between actions and goals, because at any scale, each goal may be subdivided into a near-infinite number of actions, and, conversely, every action will contribute to some goal.

This concept is inherent in some widely used management methods, though not explicitly stated. In Total Quality Management, for example, the Japanese use a process described as “the five whys and the five hows” (Mizuno, 1988). For each possible action, one can ask “why should we do this?” For each answer, ask the same question again. Repeat the process, perhaps five times, and eventually you reach the final goal – no matter which action was initially chosen. Working back in the other direction, keep asking “how can we do this?” then “how can we do that?” The process is repeated till eventually the initial answer to every “how” question may be some immediate physical action – even if only to make a phone call. The laddering method developed by Reynolds and Gutman (1988) and used in marketing research to detect consumers’ needs, takes a similar approach.

From a constructivist viewpoint, moving in the “why” direction is broadly equivalent to hermeneutic inquiry, while the “how” is almost equivalent to scientism (Riedl, 1984). The ladder of inference, as described by Senge (1990), climbing up and down between the concrete and the abstract, is a similar concept.

Logical Framework Analysis (Baccarini, 1999; McCaul, 2000; Sartorius, 1991), and its derivatives such as ZOPP (Ziel-Orientierte Projekt Planung; see Helming and Göbel, 1997, and COMIT, 1998) and program logic models (Cummings, 1997; Funnell, 1997; Julian et al 1995) are widely used widely by aid agencies in planning and evaluating projects. These methods use a similar approach, which can be regarded as traversing a series of discrete steps from objectives to practical implementation. The Leaf of Goals developed for this Process (see section 5.3.4 below) is a structure in which all these concepts can be situated.

4.6 The role of causation in this model

The classical concept of causation, as defined by Hume (1739/1978) employs the concepts of necessity and sufficiency. Like Wendell Bell’s first assumption about the future (Bell, 1996)
causation is asymmetrical in time: an effect cannot precede its cause (note the implication that the object of a cause is an event). In the Humean sense, event A can be shown to cause event B when the link is both necessary and sufficient. For example, if there is a pencil on my desk and I push it with my finger, that push will be a necessary and sufficient cause to make the pencil move along the desktop — provided that all conditions are suitable. That is, I must push it hard enough to overcome static friction, the pencil must not already be touching the wall at the back of the desk (I cannot push hard enough to move the wall), and the desktop is level (thus the pencil was not already moving). Even in this very simple example, what first appeared to be simple cause and effect, it now transpires, applies only in certain conditions. Pearl (2002) notes that:

"The modern study of causation begins with the Scottish philosopher David Hume... Hume has introduced to philosophy three revolutionary ideas that, today, are taken for granted by almost everybody... First, he made a sharp distinction between analytic and empirical claim — analytic claims are the product of thoughts, empirical claims are matters of fact. Second, he classified causal claims as empirical rather than analytic. Third, he identified the source of all empirical claims with human experience, namely, sensory input.” (Pearl, 2002, p95).

This is the classical concept of causation (or causality; the two words seem to be used interchangeably, as by Mohr, 1999, and Davidson, 2000). Perhaps because this view of causation is rooted in the physical world, and physical phenomena can readily be examined, several aspects of cause and effect seem to have been taken for granted by writers on this subject. There are implicit assumptions that (a) causes and effects exist; (b) they can be distinguished, and (c) causes and effects occur in pairs: one cause to one effect (and vice versa, as in the TQM concept of “root cause” — cf. Finlow-Bates, 1998). Outside the physical realm, however, causation cannot be guaranteed to work in such a simple way — if, indeed, “causation” is the appropriate term to use.

4.6.1 Causation in epidemiology and in law

One discipline for which the concept of causation is central is epidemiology. To be able to prevent diseases, epidemiologists must know their origins. As empirical data do not accord with the “one cause, one effect” principle, epidemiologists have developed the concept of the “web of causation” (Timmreck, 1998; Krieger, 1994). In other words, cause and effect tend to operate in networks. In terms of the axioms listed above, the multi-cause axiom, the multi-effect axiom, and the enchainment axiom apply. One “cause” can have many “effects,” and vice versa. Nor need a cause always have an effect: for example, when a person is immunized against a disease, the precipitating cause (bacteria, perhaps) may have no effect on that person.
Medicine in the 19th century (according to Abbott, 2001, p100) "separated the causes of diseases into three layers: predisposing causes, precipitating (or 'exciting') causes, and anatomical causes." Predisposing causes imply a differential likelihood of effect (such as contracting a disease), precipitating causes are the final reasons for contracting a disease (such as the presence of certain bacteria), and anatomical causes are physical lesions that created the symptoms. Green and Krueter (1991) offer a slightly different list: predisposing, enabling, and reinforcing factors, in which "enabling" refers to factors such as lack of health services.

The legal profession has sidestepped the problem of enchainment (as when assigning blame after a traffic accident) by focusing on "proximate cause": the last cause in a chain (McLaughlin, 1925-6). If one car hits another on a wet road, the fact that the driver was on a particular errand is not a proximate cause. Epidemiologically, though, there would be a whole network of events and situations: an enchainment of causes and effects such that the effect of one event may be the cause of the next. The preferred term in epidemiology is association. Unlike causation, which is deterministic (A either causes B or it does not), association is probabilistic: the presence of A significantly changes the probability that B will occur. Thus Rothman and Greenland (1998) use the concepts of inhibitors and promoters: factors that increase or decrease the risk of disease

Aristotle's four causes are not strictly "causes" in the Humean sense. As McDonald (1999) states: "The Aristotelian four-fold approach to causality is the antithesis of reductionism. It means that in answering why something is so, there are at least four valid and different explanations, or different approaches in explanation." Aristotle is thus arguing for the multiple cause axiom, in a broader sense than the term is normally used today.

4.6.2 Causation in the social sciences

In social research, the establishment of causation is even more complex than in epidemiology, because of reflexivity (Steier, 1991; Alvesson and Sköldberg, 2000; Soros, 2000, pp91-115). As Checkland points out:

"How much more complex chemical research would be if the molecules could decide to behave idiosyncratically in order to thwart researchers in chemistry laboratories! Social science research is complex not least because human beings can act in relation to researchers in a way that changes the phenomena investigated and determines the result obtained." (Checkland, 1991, p397, cited in Larsson, 2001)

Even when no researchers are involved, human behaviour is subject to many social influences. Though direct cause-and-effect chains do occur (as when an employee follows the direction of
an employer, and, negatively, when a citizen decides not to break a law) the execution of such chains cannot be guaranteed; it does not occur on all occasions, even when the external conditions are unchanged. Bateson (1972, p452) notes that in the social world, an absence of action can be a cause, due to the expectations of others: "the letter which you do not write can get an angry reply."

Because of these problems of applying the principles of physical causation to social behaviour, a number of writers have suggested looser alternative concepts: probabilistic rather than logical. For example, Axelrod (1976) refers to "influences." Weick (1979) refers to "interlocked behaviour cycles" and Abbott (2001, p190) uses the term "enchainment" – similar to the epidemiological concept. The concept of probabilistic influence is inherent in statistical methods such as path analysis (Lazarsfeld, 1955) and structural equation modelling (Jöreskog and Wold, 1982; Hoyle, 1995).

In cognitive psychology, the study of causality has been recast as the study of attribution: the issue is not whether causes and effects exist in some "real world" but whether humans act as if they do (Heider, 1958; Weiner, 1986; Munton et al, 1999). To that extent, causes do not precede effects, but follow them: after an effect is noticed, a cause is sought – as noted by Nietzsche (de Man, 1979, pp107-110). Thus hindsight arises.

Davidson (2000), from the viewpoint of evaluability, distinguishes nine forms of evidence for inferring causality:

<table>
<thead>
<tr>
<th>Label</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Temporal precedence</td>
<td>A occurs before B, and B does not occur not before A.</td>
</tr>
<tr>
<td>2. Constant conjunction</td>
<td>Whenever A occurs, so does B.</td>
</tr>
<tr>
<td>3. Contiguity of influence</td>
<td>Evidence suggests A and B are related in some way, possibly via C.</td>
</tr>
<tr>
<td>4. Strength of association</td>
<td>B occurs much more with A than with others.</td>
</tr>
<tr>
<td>5. Biological gradient</td>
<td>The level of A is highly correlated with the level of B.</td>
</tr>
<tr>
<td>6. Coherence</td>
<td>This A-B relationship accords with previous knowledge of A and B.</td>
</tr>
<tr>
<td>7. Analogy</td>
<td>A and B resemble the accepted association between C and D.</td>
</tr>
<tr>
<td>8. Causal list inference</td>
<td>Almost all B's are caused by C, D, or A. As C and D didn't occur in this case, A is likely to be the cause.</td>
</tr>
<tr>
<td>9. Modus operandi</td>
<td>Evidence of the characteristic footprint of causal process A, and not of other likely causal processes.</td>
</tr>
</tbody>
</table>

Davidson's classification is literature-based, not a taxonomy: the first three forms are from Hume (1739/1996), the next four from Miles and Huberman (1994), and the last two from...
The epidemiologist Bradford Hill (1965) provided nine slightly different factors of causation, and Timmreck (1998, p337), combining Bradford Hill's nine with several others, lists 12 factors of causation. However, because none of these classifications is logically exhaustive, there can be no certainty that all possible factors of causation are included.

A more systematic approach would be to base a causal taxonomy on the logic gates used in designing computer circuits, which perform combinations of AND, OR, and NOT operations (Roth, 1999). These need not be electronic; they are simply the logical results of combining several inputs into a single output, or vice versa. Using these principles, the ancient Chinese could have invented computers by assembling thousands of people and having them memorize instructions such as “if somebody behind you puts a hand on your left shoulder, take your hands off the shoulders of the person in front of you.” Such a “computer” would be slow, but as long as the instructions were followed, it would work. A key difference between the logic gate method and Davidson’s typology is that most of Davidson’s types require some memory, while logic gates work without using any stored data from the past. They can thus be prospective. In contrast, Davidson’s focus (given her background in evaluation) is on evaluating a completed project. Put another way, if Davidson’s typology is about causes, logic gates are about effects. Because this Process involves tracing the evolution of futures from their roots in the past (cf. the continuity axiom), the two approaches are complementary, and both are used in this Process; see section 5.4 in the next chapter.

A second key difference between social and physical causation is that one social event cannot directly cause another (the decision-linking axiom). Though an earthquake can cause a tsunami without human intervention, this does not apply to human actions, on which this Process focuses. Because social events are, by definition, mediated by humans, social causation will always include an element of decision, as noted by Weiner (1986) and other attribution theorists. Thus event B becomes “caused” by event A because an actor decides or acts as if this will be so, creating a repeating sequence of Event — Attribution — Reaction. For example, future history books may report that the terrorist attacks on the US in September 2001 caused the US attack on Afghanistan a few months later. The enchainment of events could be reported as...
The associative connection between the first and last of the above events was decisions of the US government: specifically, the President, the Cabinet, and their top military advisors. Some decisions led to further decisions, and other decisions led to military action. Though the terrorists had been living in Germany, and most were Saudi Arabian, the USA did not attack Germany or Saudi Arabia, so other factors must have been involved in the decision to attack Afghanistan. One such promoter (to borrow that epidemiological term) would have been the public dislike in developed countries of the Taliban government, with its oppression of women and its then-recent destruction of the ancient Buddhist statues at Bamiyan.

In summary, the model of causation to be used in this process should not be the "necessary and sufficient" model of physical causation, but the probabilistic (as opposed to deterministic) model of social causation, as espoused by Gerring (2003): "The core, or minimal, definition of causation held implicitly within the social sciences is that a cause raises the probability of an event occurring." This definition can include evidence from the past, and employs a range of criteria from evaluation and epidemiological sources, as embodied in the epidemiological "web of causation." It also follows from the argument in the previous section that since intent structures can be regarded as holonic, and since a web of causation is an intent structure, causation can also be represented holonically. In other words, any cause can be seen as part of a larger web of causation, and on further examination can itself be seen as forming a smaller web. This sense of causation is used to explain the links between the layers described in the following section.
4.7 **Layers of change**

The framework for this Process uses a layered view of social change, with each layer influencing the layer above it, but with inertial delay. Inayatullah (1998), summarizing his development of Causal Layered Analysis, describes four levels at which CLA operates: the litany (at the most superficial level), trends, worldview and social structures, and (at the deepest level) myth and metaphor. The present theory, inspired by Causal Layered Analysis, currently involves three layers. It borrows the concept of “time depth” from anthropology (Riner, 1987), and thus has a somewhat different emphasis from CLA.

<table>
<thead>
<tr>
<th>Top</th>
<th>Layer 1: events</th>
<th>...which can be grouped as holons, into states or situations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 2:</td>
<td>motives</td>
<td>...including intentions, less enduring attitudes, and the like. These motives influence the events and states in Layer 1.</td>
</tr>
<tr>
<td>Bottom</td>
<td>Layer 3: values</td>
<td>...long-term values, beliefs, worldviews, and assumptions (about both situations and other actors' motives), influencing the values in Layer 2.</td>
</tr>
</tbody>
</table>

In this categorization, each successive layer changes more slowly than the one above it. The layers can be seen as combined into a hemispherical model, with events and states on the equator and worldview near the South Pole. The sequence of layers is one of accessibility and ease of change. Events – at the surface level – are obvious, particularly at a small scale. Large events may only appear as wholes when viewed from a considerable temporal distance – such as the Thirty Years' War, as discussed by Danto (1985). Comparing the second with the third level, motives (including intentions and medium-term attitudes) change more quickly than do values (as noted by Kluckhohn and Strodbeck, 1961; Meddin, 1975; Taylor 1977; Hitlin and Paliavin, 2004). Moving down the layers towards the collective unconscious, influences on behaviour are progressively less concrete, and change more and more slowly.

In terms of the two definitions of the future in section 4.2 above, physical futures (*chronos*) are displayed in the first layer, while mental futures (*kairos*) occupy the second and third layers. The following diagram shows how the layers fit together as a hemisphere.
This may be regarded as the southern hemisphere of the Earth. (The northern hemisphere was less suitable: the metaphor of depth would not fit, because the “deepest” forces would be in the sky.) On this hemisphere, time progresses from left to right on the diagram. Around the equator, change is rapid, but at each successively lower level, change becomes slower; inertia, time-lag, and hysteresis increase. The vertical line in the centre marks the present time, but the extent of the present becomes broader at the deeper layers, where chronology is less relevant. Though the future is often considered only in terms of events (the *chronos* model), the theory underlying the hemispherical diagram is that change (and thus the future) happens at various levels, but that different levels change at different rates.

### 4.7.1 Why three layers?

Inayatullah (1998), in his version of Causal Layered Analysis (CLA), distinguishes four layers. Slaughter (2002b) uses three layers, Hollinshead (2002) lists seven, and Japanese writers on quality management (Imai, 1986; Mizuno, 1988) use five in their Root Cause Analysis—but all the purposes and contexts are slightly different, and this hemispherical model is not quite the same as CLA. The precise number of layers, if they are viewed as holons, is arbitrary. In earlier versions (List, 2002a and List, 2003a) this model had four layers, the last two of which were labelled values and worldviews, but after finding it not possible to separate these in the case studies (chapter 8), Occam's Razor was wielded.

One reason for envisioning the layers as a hemisphere is to use an Earth-like metaphor. A person standing at the equator is spinning at some 2000 kilometres an hour, but near the South Pole, the movement is extremely slow. The lower the level, the slower the change—and the more delayed its effect. So in terms of this hemispherical model, a “trend” corresponds to a change in the strength of a force at a particular layer. Using multiple layers allows us to
disaggregate changes into three types: changes in events, in motives, and in values. When changes happen gradually, they possess inertia: slow to gather momentum, and difficult to stop or divert. The deeper the layer, the greater the inertia, and thus the greater the time-lag. Knowing this inertia, it becomes possible to predict the future by working upward from the south pole of the hemisphere — but only to a broad extent, because upper layers incorporate more possibilities than lower layers.

A hemisphere defines the future as seen by one actor, or one homogeneous stakeholder group. As different actors may have different motives, values, and worldviews, multiple actors are best indicated by overlaying hemisphere diagrams over one another. In practice it was found that depicting all actors on a single diagram (except at event level) produces diagrams so complex that they are difficult to interpret.

Each layer is now considered in more detail.

**4.7.2 Layer I: events**

The top layer of the hemisphere, at the equator, is the time-bound world of events. Though not the same as the “litany” of Inayatullah’s CLA (Inayatullah, 1998), it shares the superficiality of that concept. This is the quantitative view of history: as with school children reciting “1945, atomic bomb dropped on Hiroshima.” It tells us when, but not why.

Though one physical event can directly cause another (for example, a major earthquake might cause a tsunami, severely damaging coastal settlements) most events in the hemispherical model affect other events only by mediation through the human brain. In other words, most “events” are social constructions. They can thus be of different scales, nested inside one another. For example, “atomic bomb dropped on Hiroshima” is part of the larger event “US attacks on Japan in early 1940s,” which in turn is part of the still larger event “World War II.” The larger (in time) an event, the broader its position within the first layer; a continuing situation can be regarded as an event with a long duration, and a trend (in activities) as a situation that is gradually changing.

If events seem to occur at random, without a discernible pattern, perhaps it is because they are being driven by forces that emanate from lower levels of the hemisphere. The present framework distinguishes two levels of these lower forces, labelled motives and values.
4.7.3 **Layer 2: Short term forces: motives**

The second layer of the hemisphere contains the proximate causes of the events in layer 1. These causes can variously be described as *intentions, motives, trends, forces, drivers, expectations, attitudes, norms,* or in the language of conflict management as *triggers and inhibitors* (Beyra et al, 2001). In this context, those terms refer to the short term: no more than a few years. As there is no single word in the English language that covers this range of meaning, I have chosen to label this layer as *motives* – either individual or organizational. The reader is asked to bear in mind this intended broad connotation of the label.

There is a bi-directional influence here: not only can events be due to motives, but motives can also change in response to events. Motives (in this sense) tend to last for only a few years, until memories of those events are overlaid by memories of more recent events. The larger the event – in terms of its duration, the number of people involved, and the strength of its effect on them – the longer its memory could persist, and the longer its effect could last.

Layer 2 also involves the problematization of the attribution of cause: in other words, the interest is not merely in why “A causes B” but more in why participants believe that to be true. As mentioned in section 4.6.2 above, the word “cause” here is used in the broader sense of “influence,” not the strict Humean sense of necessity and sufficiency.

Another factor in the second layer, though less obviously a motive, is the way in which events influence subsequent events, through inertia, the momentum of a “world system” (Pepper, 1957), or “path dependence” (Håkansson and Waluszewski, 2002; Liebowitz and Margolis, 1995; Mahoney, 2000) – for example the use of the QWERTY keyboard. The “motive” here (further stretching that label) is reluctance to change a habit. A related factor is social hysteresis (Simon, 1997), which occurs when reversing a cause does not reverse the corresponding effect – such as when unemployment remains high after a recession ends. A further factor is habit, defined here as a type of mental inertia: repeating an activity in order to avoid the effort of considering alternatives. All of these factors are slightly different, and their time span extends typically between a few months and a few centuries.

4.7.4 **Layer 3: Long-term forces: values**

If motives influence events, what influences those motives? Here we must look at longer-lasting social factors, such as *values,* long-held *beliefs* and *attitudes, culture,* and *worldviews* (all combined here under the umbrella label of *values*). At this third layer, change is slower still, taking more than a year to occur, and perhaps as much as a generation. Descending from one
level to the next (as if deeper into the earth) cognitive processes are gradually left behind, slipping from the heights of the cerebral cortex to the instinctive reactions of the mid-brain.

For the practical application of this layer, rather than invent a new taxonomy, previous work was used as a foundation. The work of Rokeach (1973), followed up by S. Schwartz and colleagues (1987, 1992, 1994) involved the study of some 70 cultures around the world, distinguishing between instrumental and terminal values. Schwartz’s work has empirically established the existence of 10 main groups of terminal values. A recent review of values in sociology (Hitlin and Piliavin, 2004) found no taxonomy with better empirical support.

**Table 4.5 The Ten Value Factors Found by Schwartz**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedonism</td>
<td>Self-centred personal gratification</td>
</tr>
<tr>
<td>Power</td>
<td>Status and prestige, controlling people and resources</td>
</tr>
<tr>
<td>Achievement</td>
<td>Competitive success, for both individuals and groups</td>
</tr>
<tr>
<td>Stimulation</td>
<td>Encourage risk-taking and adventure</td>
</tr>
<tr>
<td>Self-direction</td>
<td>Autonomous thought and action</td>
</tr>
<tr>
<td>Prosocial</td>
<td>Tolerance and concern for welfare of others</td>
</tr>
<tr>
<td>Benevolence</td>
<td>Preserve and enhance welfare of those close to the actor</td>
</tr>
<tr>
<td>Conformity</td>
<td>Self-restraint and subordination of one’s own inclinations to the expectations of others</td>
</tr>
<tr>
<td>Tradition</td>
<td>Traditional and religious activities</td>
</tr>
<tr>
<td>Security</td>
<td>Stability, safely and harmony of society, relationships, and self</td>
</tr>
</tbody>
</table>

All of the above are individually held values, because they were derived from questionnaires administered to individuals. Because the Process studies the futures of social groups, several variations were made to Schwartz's list of values in Table 4.5, to define values more relevant to the present conceptual framework and case study:

1. The individual value of Hedonism was broadened to an equivalent social value of Comfort, implying a desire for wealth and an easy life.
2. Harmony (lack of conflict in relationships) was added, because this is a value important in social relationships but less meaningful for individuals. This is a combination of Schwartz’s values of security, conformity, prosocial, and tradition.

Inertia (as described in section 4.4.2 above) is not part of tradition in Schwartz’s sense: the latter is more active. Rather, inertia applies to all of those values, as a reluctance to change. (In this framework, the deeper the layer in the hemisphere, the stronger the force of inertia.)
Though values (as interpreted by Schwartz, Rokeach, and others) is the most apposite term for human forces that last for some years, their research did not extend to beliefs, attitudes, and long-term desires. Thus Schwartz’s categorization is here taken as a starting point, and not assumed to include all forces in the third layer, which is primarily defined in terms of duration.

At the base of the values layer, people find it difficult to change their assumptions (including assumptions about other actors) even if they want to, partly because many such assumptions are unconscious, and not verbalized. On the hemisphere, this is close to the South Pole. Substantial change must wait for the next generation to be born, and to collectively evolve a new set of values during its upbringing. This level could involve the collective unconscious (Jung, 1969), tacit knowledge (Polanyi, 1966), Kropotkin’s concept of mutual aid (1914/1955), the “consensual mind” of Bohm and Peat (1987), the “global brain” of Bloom (2000), the “intersubjective patterns in consciousness” and “superconscious” of Wilber (1999, p128), the intellectus agens (active intellect) that Averroes derived from Neoplatonism (Davidson, 1992), and almost the memes of Dawkins (1976). Though it may not be possible to establish using conventional scientific methods that such phenomena exist, some evidence for their existence isthe fact that so many thinkers, from a wide range of cultures and centuries, seem to be in broad agreement on this issue.

Two future-oriented taxonomies were found: the “mindscape” of Maruyama (1980, 1982, 1994) and the “values memes” or Vmemes of Beck and Cowan’s (1996) spiral dynamics. The four mindscape of Maruyama progress from less advanced to more advanced; these apply to whole civilizations or cultures. Like the values memes, individuals and civilizations are said to progress through a sequence as they become older and wiser.

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Hierarchical</td>
<td>Corresponding to Weberian bureaucracy</td>
</tr>
<tr>
<td>I. Individualist</td>
<td>Corresponding to the Nietzschean or entrepreneurial view</td>
</tr>
<tr>
<td>S. Stability</td>
<td>Stability in social relationships – e.g. Confucian</td>
</tr>
<tr>
<td>G. Generative</td>
<td>Pluralist, “generating new patterns by interaction” – no historical example</td>
</tr>
</tbody>
</table>

Beck’s model is widely cited in the futures literature (including Wilber, 1999, Inayatullah, 2004b, and Daffara, 2004). In Beck and Cowan’s original form, the model has four quadrants, but only the first quadrant (of eight values memes) is applicable here. Each values meme is labelled as a colour. They are intended to progress from a primitive to an advanced level of consciousness. In that sequence, they are:
Table 4.7 The Values Memes of Beck

<table>
<thead>
<tr>
<th>Values meme</th>
<th>Description - from Wilber (2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Beige</td>
<td>Instinctual</td>
</tr>
<tr>
<td>2. Purple</td>
<td>Magical-animistic, tribal</td>
</tr>
<tr>
<td>3. Red</td>
<td>Egocentric, power, feudalistic</td>
</tr>
<tr>
<td>4. Blue</td>
<td>Mythic-membership, conformist, fundamentalist, ethnocentric, traditional</td>
</tr>
<tr>
<td>5. Orange</td>
<td>Excellence, achievement, progress, modern</td>
</tr>
<tr>
<td>6. Green</td>
<td>Postmodern, multicultural, sensitive, pluralistic</td>
</tr>
<tr>
<td>7. Yellow</td>
<td>Systemic, flexible, flowing</td>
</tr>
<tr>
<td>8. Turquoise</td>
<td>Cosmic unity, integrative, nested hierarchies of interrelationships, holism</td>
</tr>
</tbody>
</table>

By identifying a relevant world hypothesis (Pepper, 1957), mindscape or values meme for a given set of actors’ values operating at Layer 3, events in Layer 1 can be explained. For example, Wilber (2003) interprets the 2003 war in Iraq in terms of the values memes. However, the eight values memes and four mindscapes are intended only as a guide: simply a starting point for consideration of the worldviews of actors in their relevant roles, not as a comprehensive taxonomy into which every situation can be assigned. Though fundamental values hardly change, they might sometimes vary for individuals in different roles. For example, a white-collar worker in a developing country might use different values at home and at work, if the home environment is a traditional family structure and the work environment is a modern western one. (Many of Hofstede’s (1980) subjects in developing countries, all of whom worked for IBM, would have been in this position – thus casting some doubt on the generalizability of his findings.)

An example of Layer 3 in action occurs in the context of the “former Yugoslavia” – how did those ancient animosities break out so quickly in 1991-92, when several parts of the country split away? Lake and Rothchild (1996) argue against the concept of ancient animosities resurfacing on the breakup of the federation, and Szayna (2000, p13) offers the somewhat circular argument that human behaviour is always rational, because “if human behavior is irrational, of course it cannot be predicted or even anticipated.” However, abundant evidence exists, even from economists (for example the research reported by Kahneman, Slovic, and Tversky, 1982) that human behaviour is not purely rational – and as reported in chapter 2, forecasts of human behaviour are not always accurate. Fear, in particular, can be irrationally inspired, as populist demagogues have found.

The deepest values in Layer 3 corresponds to a level of autonomic arousal that is inaccessible and thus not readily amenable to change. In the Yugoslavian context this could involve fear of the secret intentions towards each actor’s group among the Other – which in that particular
case is *othered* (Said, 1978) because it follows a different religion, uses a different form of "Serbo-Croat" (a language name that no longer exists) and writes with a different alphabet.

I submit that such worldviews are mediated through roles and social situations, and as such are not necessarily consistent within individuals. Worldviews held by groups such as businesses generally embody rarely-examined assumptions in communities of practice, reinforcing "the way things are done around here" (Wenger, 1998). In the work of groups and organizations, these are the assumptions buried so deep that they are invisible, and thus seldom questioned. Even though they slowly evolve over the years, the change is barely perceptible: such assumptions are difficult to verbalize, so that they cannot readily be compared.

### 4.7.5 The place of worldviews

The original four-layer model (List, 2002a and 2003a) distinguished between values (Layer 3) and worldviews (Layer 4). The two layers were combined partly due to practical problems of separating values from worldviews, but also because the concept of worldviews turned out to have two meanings: in one sense, they are deeply embedded values—now considered the base of Layer 3. In another sense, worldviews are modes of perception: so pervasive that they affect all layers—just as inertia and trends do. Events are constructs, and worldviews (as perceptions) filter constructions of events (as in the Vietnam War / American War example above). Worldviews also determine intentions, affect cognitive beliefs ("If I do A, then B will happen"), and partly determine values. Thus it is more accurate to see perceptual worldviews as pervading the entire hemisphere, not residing in a single layer.

### 4.7.6 Interrelationships of the layers

To summarize the hemispherical model, Events (Layer 1) are driven by Motives (Layer 2) which in turn are driven by Values (Layer 3). It is important to note that the terms *Events, Motives* and *Values* are simply portmanteau labels for mixtures of concepts that have no single word in English. Thus Events includes situations and processes; motives include intentions (not necessarily explicit) and attitudes, and Values range from attitudes almost to instincts.

The chief criterion for the latitudinal placement of a concept on the hemisphere is its temporal duration. The lengthening duration of drivers in the lower layers may be associated with some qualitative difference: in particular, with less cognitive content and more affective content. The principle is that it is more difficult for actors to change at the lower layers than at the upper layers. Because this is untestable empirically, the claim of this thesis is simply that the concept of a layered hemisphere is a useful construct in anticipating futures.
In the physical world, one event can directly cause another. For instance, an earthquake can cause a tsunami. But in the human world, the decision-linking axiom indicates that events do not directly influence other events, but that their influences are mediated through lower levels of the hemisphere, and return through V-shaped paths of various depth (i.e. of impact) and width (i.e. duration).

This proposition can be illustrated by a well known example: the terrorist attacks on the US in September 2001. These came to public notice as a series of events (shown as A in the diagram below), which coalesced into a larger holon of events referred to as “nine eleven” (B), which, through the news media, caused an unusually strong impact on many Americans deep in Layer 3: almost visceral fear that they were in danger, combined with anger that some of their national symbols had been attacked (C). (According to Loye, 1996, p610, the 1945 atomic bombings in Japan produced a similar level of worldwide social shock.) The unusual penetration of an event directly to Layer 3 invoked values relating to security (D) that set in motion the “war on terror” (E) that enabled further events (F), such as a war on Afghanistan, and sporadic attacks on mosques in the US.

\[\text{Figure 4.2 Movement through layers of the September 2001 attacks on USA}\]

Just as the initial attacks had their own genesis (the result of a previous V) the outcomes of war in Afghanistan spawned a new set of consequences: a subsequent V, to the right of position F above. Reactions arising from lower layers seem to have more diffuse effects than reactions from upper layers: something that penetrates to Layer 3 (as did the 2001 terrorist attacks on the psyche of Americans) is likely to have wider-ranging and (by definition) longer-lasting effects than a V that penetrates only to, say, Layer 2 (arousing motives but not values).

In the hemispherical map, the deepest layer is difficult to describe for a particular case, but when one considers the ways in which recent events have influenced other events, describing V-shaped paths gives participants more insight into the drivers at the deepest layers.
The ladder of “five whys and five hows” (Imai, 1986) expresses the idea that the root cause of any action can be revealed by successively asking “why”; conversely, the achievement of any purpose can be revealed by successively asking “how”. A “why” question in one direction on this ladder is equivalent to a “how” question in the other direction. In the following example, the Why column should be read downwards and the How column upwards, following sequence Q1, A1, Q2, A2, Q3, A3, Q4, A4 (following the arrows). To clarify the example, only one cause is shown for each effect, and vice versa.

<table>
<thead>
<tr>
<th>Layer</th>
<th>Why</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motives</td>
<td>A1. To rid the world of terrorists.</td>
<td>Q4. How did the US rid the world of terrorists?</td>
</tr>
<tr>
<td></td>
<td>Q2. Why did the US want to rid the world of terrorists?</td>
<td>A3. By ridding the world of them.</td>
</tr>
<tr>
<td>Values</td>
<td>A2. Because terrorists make trouble.</td>
<td>Q3. How did the US stop terrorists making trouble?</td>
</tr>
</tbody>
</table>

The two dimensions of the hemisphere, time and layers, corresponding to *chronos* and *kairos* respectively, allow the separation of causality from teleology. When delineating the layers of a particular hemisphere, the mechanisms (answers to questions beginning “how”) move horizontally forward, while reasons (answers to “why” questions) correspond both to previous events and the vertical transmission of purpose between layers.

Given the way in which humans make mental connections through cognitive proximity (Ausubel, 1968; Karmanos, 2003) it is likely to be more productive to seek proximate causes and effects than ultimate ones: in other words, to travel, when possible, up and down through the layers of the hemisphere one at a time. By jumping immediately to the bottom (or “root cause,” in TQM terms) or to the top (or specific event) we may not see how the processes actually come to occur, how the mechanisms work (Pawson and Tilley, 1997; Machamer, Darden, and Craver, 2000).

Also, on accepting that no event happens for a single reason (the multi-cause axiom), and that every cause has multiple effects (the multi-effect axiom), instead of a single ladder, we are faced with multiple ladders – or a set of scaffolding. The intention in this Process is to focus on the layers, more than on the progression of time. Returning to the twin concepts of time
(chronos and kairos), chronos is shown horizontally on the hemisphere—the analogy is the earth turning at a constant rate—while kairos progresses at an angle through various layers.

If a map of the hemisphere is drawn using nodes and arcs (boxes and arrows), the nodes at the top level will be events, or holons of events, with arcs expressing attributions of causality. At the second layer, however, the arcs on the top layer become the nodes at this layer. At the third layer, values are the nodes used to explain the changes in motives. In other words, the nodes in each layer would be derived from the arcs in the preceding layer, as follows:

```
1. Events
2. Motives
3. Values
```

The entire hemispherical model, with its three layers, assumes that in the world of human futures (to which this model restricts itself) forces for change flow in both directions. In other words, this framework suggests that values indirectly influence human events, while those events also influence values, indirectly; but because of the inertia of values, the latter process occurs far more slowly, except when large shocks occur.

4.8 Review of this chapter

This concludes the development of the conceptual framework of the future. It is characterized as a "working model" because its main purpose is to inform the development of the Process. It makes no claim to be comprehensive, and some difficult philosophical questions (such as the distinction between reasons and causes) have simply been bypassed—on the ground that if philosophers have failed to agree for centuries, this thesis is unlikely to provide a solution; and that is not its purpose.

To recapitulate, the model was constructed by (1) defining a scope, (2) defining the central concept, the future, in a dual way (3) stating a set of axioms (or assumptions), and (4) outlining the basic principles of the model. These were (a) a decomposition of forces that could affect futures, (b) the principle of holons, (c) linking the holons by influence rather than strict
causality, and (d) the concept of the layered hemisphere, in which events are influenced by motives, and motives by values, each of these being slower to change than the previous layer.

As noted above, the model presented here is a minimal one. No claim is made that this model in any way supersedes or replaces other models of the future (nor, for that matter, of history, or of social change). The purpose of the conceptual framework presented in this chapter was to set the groundwork for the hemispherical model, which was kept deliberately simple so that it could readily be explained to participants in scenario workshops, and help them to explore possible futures in more detail than would have occurred without such a conceptual framework.
Chapter 5: Development of the initial scenario mapping process

5.1 Introduction

This chapter develops the principles of a Process of Scenario Network Mapping (SNM) and argues that this Process meets the criteria developed in the preceding chapters, and is thus a starting point for testing in case studies. The inputs to this chapter are:

1. The principles of need for a new method of anticipation, from chapter 2.
2. The design criteria developed in chapter 3.
3. The conceptual framework developed in chapter 4.
4. My initial ideas for the possibility of network scenarios.
5. The relevant literatures.

Using those inputs, the chapter creates an output that is a specification for a futures Process that meets the design criteria. This provisional design enables all the criteria to be fulfilled—though it cannot ensure that they are fulfilled thoroughly. (That requires some iterations of the Process, to detect and correct any faults—as covered in later chapters.)

5.2 Design principles for a futures studies method

This Process was derived by drawing together ideas from a wide range of sources and discipline areas, in addition to futures methodology. The main disciplinary groups were systems thinking, psychology, networking and visualization, participatory development, history and sociology, and the philosophy of causation. Combining these concepts resulted the inclusion of seven key elements in the Process: it is holonic, graphical, participative, narrative, morphological, critical, and actor-focused.

- A holonic approach (key reference: Koestler, 1967). As the complexity of scenario networks could become overwhelming, there is a need to have some way of arranging them. One solution lies in systems thinking, in particular the concept of holons. As discussed in the previous chapter, a holon is a system that can be viewed in three ways: as a whole, as an assembly of sub-systems, or as part of a larger system. Dividing a large number of nodes into holons, and minimizing the links between holons while maximizing the links within holons, makes it possible to see the wood for the trees. On reviewing the scenario network
a few years later, nodes that no longer seem relevant can be combined into single holons, while nodes of expanding detail can be separated into several distinct holons.

- **A graphical approach**, adapting the principles of cognitive mapping (Huff, 1990). Presenting the scenarios in the form of a diagram with links between the mini-scenarios enables systems to plot their progression through time on the network, to help determine what policy changes might be needed. The end product required is a map of the future that can be used to produce the hemisphere diagram shown in the previous chapter.

- **A participative approach**, as opposed to expert-driven (Cornwall and Jewkes, 1995). An apparent weakness of the more traditional methods of building scenarios is that the construction is done by experts, with the possibilities then presented to industry members for fleshing out. Sometimes those participants may not fully understand the implications, and the critical uncertainties chosen by the experts may not apply in a particular situation. Scenario networks, in contrast, are more detailed, and therefore must be fleshed out by people working in the social entity under study. Though this is a little more time-consuming, the resulting quality of understanding among those involved can be much higher, as has been found with the building of cognitive maps in groups (Vennix, 1996).

- **A narrative approach** (key reference: Polkinghorne, 1988). Though many other approaches to scenario building use narrative to some extent, the intention for SNM is that a scenario network would consist of a web of narrative, with stories branching off one another.

- **A morphological approach**. This is a deductive method of considering all logical possibilities, as outlined by Zwicky (1969) and Ritchey (1998). Most crudely, for an organization, the possibilities are whether it will continue to exist or not, and whether its functions will still be performed in the same way, or whether they will not be performed.

- **A critical, layered approach** (Inayatullah, 2002b), similar to Causal Layered Analysis, as explained in section 5.2.5 below: probing below the surface level of participants’ expectations for the future, in order to uncover the drivers of those expectations.

A scenario network developed using the above seven principles can serve as an outline of the future, showing how sets of events are likely to flow from previous sets of events. Each of the principles is now justified.

5.2.1 Why a holonic approach

As holons can take a number of forms, this section considers three aspects of the holonic principle: how system boundaries can be delineated, the types of inter-relations among systems, and the nature of enveloping systems.

5.2.1.1 Impinging systems

The relevance of this to scenario mapping is that the target system (the one whose future is being focused on) has fuzzy rather than delineated boundaries. The word “fuzzy” is used here in a sense related to Zadeh’s “fuzzy logic” (Zadeh and Kacprzyk, 1992): while there are no specific boundaries, the outer reaches of the holarchy become successively less relevant to the target system. Specifically, systems that impinge on the target system directly can be seen as first-order neighbours. (In the management literature, these are often labelled “stakeholders.”) Those that impinge on the first-order neighbours are second-order neighbours...and so on.

Thus (returning to the argument of Phillips, 1969) the boundaries of a holon can be set arbitrarily, but this will in the end not matter, if boundaries are frequently reviewed and adjusted (Ulrich, 1994; Boyd, Brown, and Midgley, 2004). Holons have boundaries within boundaries, and as the level of impingement fades while the order of neighbours grows, it may be true that every part of the universe has some effect on every other part, but if that effect is so small as to be undiscernible, the definition of the outermost boundaries has no practical consequences for the system under study (hereinafter, the “focal system”).

What precisely does “impinging” mean: how can one know if a specific system impinges on another? The term has several possible interpretations, but the most useful may be to define impingement in terms of messages or communications. If there is no communication between two systems, they cannot impinge on each other directly. For example, in the business world, a company’s competitors impinge on it through the inquiries made by potential customers. This can be described as second-order impingement.
I posit that, other things being equal, the more distant the order of another system from the focal system, the less impact it will have on the target system's future. However a pervasive force, when exerted by a large number of low-order neighbours, can be stronger than a force exerted by a first-order neighbour. Economic pressure is an example. A recession, with its general effect on most sectors of an economy, is a pervasive force in this sense.

5.2.1.2 Inter-related systems

The axiom of social impingement states that the future of a system is contingent on the future of all its interrelated systems. To describe multiple pasts, presents, and futures in terms of systems theory, it is useful to address a specific variety of systems theory. Of the eight major systems theories summarized by Leonard and Beer (1994) and the nine groups of theories summarized by Daellenbach (2003), the Soft Systems Methodology of Checkland (1981) was judged the most applicable to the present purpose.

Here it is necessary to distinguish between the focal system being studied and its impinging systems. Each system has inputs from various sources, processes them in some way, and produces outputs, which go to various destinations. It has definable boundaries, across which its inputs and outputs are transferred. In the case of scenario networks, a system is always a social system: it may be an organization (or part of one), a region or community, an industry, a stakeholder group, or even an individual. More questionably, such a system can perhaps be an abstract concept that exerts influence diffusely through many actors, such as "the economy." Any system can be viewed in five ways:

1. the focal system being studied, and four types of systems that impinge on it:
2. subsystems of that focal system;
3. enveloping systems, of which the focal system is itself a subsystem;
4. directly impinging systems, which in some ways communicate with the focal system;
5. second-order impinging systems – which communicate with the impinging systems, and thus indirectly with the focal system.

Of course, it is possible to have third-order and higher-order impinging systems. Though Bell's sixth assumption (Bell, 1996, as described in section 4.3.1 in chapter 4) would place no limit on this, for practical purposes one must stop at some point. Here it is relevant to note the "small worlds" studies, following the experiments of Milgram (1967). Barabási (2002) summarizes these studies, which produced the concept of "six degrees of separation" – that when the systems are individuals, a sixth-order system can connect anybody in the world with anybody else. If a specific third (or higher) order system is known to impinge on the system
being studied, there is no reason why this could not be included in the study, but it is not feasible to study all the systems that impinge at that level. In fact it is not even feasible to study all second-order systems, in most cases.

Bearing in mind the concept of holons, the above five types of system can be described as "views" rather than types of system. In the context of a set of intercommunicating systems, boundaries can be unclear, suggesting that a system is a mental construct: in other words, any system could be regarded as the focal system — similar to focusing on an individual in a family tree, on a single page on a web site, or (to generalize) on one node in any hierarchical structure. The underlying principle is that all of these views affect each other's futures; and therefore that it is not sensible to inquire into the futures of one system without considering the futures of the others with which it is linked.

5.2.1.3 Enveloping systems
The concept of enveloping systems is exemplified by the painter Hundertwasser's concept of "five skins," in which humans live. Hundertwasser described these five skins to his biographer Restany (1998) as:

1. the human skin
2. clothing
3. the home
4. the social environment (from family to national level)
5. the biosphere.

As well as a progression in the size of the "skin," this concept embodies a time dimension. Hundertwasser's insight was that as people mature, their worldview focuses on successively larger skins: from a newborn baby's focus on its bodily comfort, to a sage's concern with the wellbeing of the world — and that this change in focus is necessary for humanity to thrive.

5.2.2 Why a graphical approach
In recent years there has been widespread recognition of the value of displaying data in graphical form (as in Flood and Carson, 1993, and Coyle, 1996). For example, a Poynter Institute study using eye-tracking equipment found that "new, unfamiliar, conceptual information was more accurately recalled when participants received it in a multimedia graphic format" (Outing and Ruel, 2003).

From the graphic arts have come Tufte's studies of the effective visual presentation of information (Tufte, 1983, 1990, 1997), and similar work by Cleveland (1985). From a wide
range of other areas came a family of techniques known variously as causal mapping, cognitive mapping, argument mapping, and concept mapping – here referred to generically as cognitive mapping.

The principle of cognitive mapping seems to have originated in social psychology in the 1940s, with the works of Moreno on sociometry (e.g. Moreno, 1953). Later, it was reinvented across a wide range of disciplines. Thus Tolman (1948) used cognitive maps while studying the behaviour of rats in mazes, while Novak (1977) developed cognitive mapping in a different way, for educational purposes: if students could create a cognitive map of a body of knowledge, they clearly understood it. Novak’s work was based on the educational theories of Ausubel (1968) who suggested that learners build on prior knowledge when developing new concepts. In sociology, Axelrod (1976) developed a similar method for studying the interactions of power elites. From psychology came writers such as Buzan (1989) with “mind mapping” and Eden and his colleagues, creating visual representations of Kelly’s (1955) personal construct theory (as in Eden, 1988).

Systems dynamics uses similar maps, focusing on “stocks and flows” (Senge, 1990), complete with feedback loops. Later, management studies provided works on causal mapping (Huff, 1990; Bougon, 1992; Huff and Jenkins, 2002; Ambrosini and Bowman, 2002). Some of these researchers have produced software for creating such maps, including CMap Tools from the Institute for Human and Machine Cognition, and Banxia Decision Explorer from Eden’s group at Strathclyde.¹ Related concepts from management studies are the CPM and PERT project management techniques (Moder et al, 1983) and the industrial-network thinking of the IMP group in marketing (Ford et al, 2003).

Four main varieties of cognitive mapping exist: causal mapping, concept mapping, argument mapping, and mind mapping – though some writers, particularly in the management area (e.g. Huff, 1990), do not clearly distinguish these. All varieties use a “boxes and arrows” (or “nodes and arcs”) paradigm, and it is mainly in the meaning of the arrows that the varieties differ. The following set of distinctions is based partly on Banxia (2004):

- In causal mapping, and many management-oriented works on cognitive mapping the arrows are generally not labelled, but only signed in a particular direction. The sign indicates causal influence, but without the subtlety shown in the distinctions made by

¹ Details of CMap can be found at http://cmap.ihmc.us/ and details of Banxia Decision Explorer at http://www.banxia.com.; both were available on 30 March 2005.

- Concept mapping, as used in education (Novak and Gowin, 1984), often expresses the arrows as verbs, while the boxes represent nouns. A simple sentence can thus be expressed by an arrow linking two boxes.
- In argument mapping (Toulmin, 1958; Horn, 1998) boxes contain entire statements, with the arrows labelled by modifiers, such as "on the other hand."
- Mind mapping (Buzan, 1989) has a topologically hierarchical structure, with ideas radiating from one central concept. With this type of mapping, the arrows imply psychological association; no causality is implied.

From a futures point of view, it is interesting to note that in none of the three varieties of concept mapping is time a factor, except (implicitly) in the case of causal mapping.

Marchant (1999) developed a formal mathematical theory of cognitive maps, distinguishing between causality and what he calls "implication," and pointing out subtle differences in intention between the cognitive maps of Tolman (1948), Axelrod (1976) and Eden (1988). Marchant's preferred interpretation is that the existence of a node is an assertion of the truth of the statement that the node represents, while the arcs represent implications, such as "therefore" and "except." This fits well with the emphasis in the present study on influence rather than causation (see chapter 4, section 4.6).

The cause map is a variant of the cognitive map, first developed by Novak in the 1960s (Novak, 1977), and based on Kelly's theory of personal constructs (Kelly, 1955; Bannister and Fransella, 1980). Laukkanen (1994) created a variant that he entitled "cause maps," on the ground that other elements of cognition are not embodied in these maps. Axelrod (1976) refers to similar diagrams as digraphs, or "directed graphs." Laukkanen (1994, p334) found that managers in different types of position tended to use different types of map. For example, dealers and distributors produced different maps: the same concepts were related in different ways. By focusing on changes in methods, rather than (as with normal cognitive mapping, the apparently continuous looping of business systems), the same style of maps can be used to express futures.

A related graphical convention is the flow diagram used in systems analysis (Whitten and Bentley, 2000), in which the direction of the arrows indicates sequence. Such diagrams, like some varieties of systems dynamics diagrams (e.g. Senge, 1990) operate at a micro-level, with
many feedback loops. Paradoxically, the incorporation of feedback loops in such diagrams renders them static: a feedback loop implies "the situation is always like this." It is only when the system is reframed as a larger holon, including the entire mechanism with the feedback loop as a single box, that change in overall conditions can be depicted. Though it is possible for feedback loops to indicate rates of change rather than change itself, the underlying assumption behind a computer flow diagram or system dynamics diagram is that the structure of the system does not change; a further underlying assumption is that all change is measurable. Given that the present Process focuses on the study of human futures, it would be too restrictive to use this type of flow diagram, incorporating feedback loops.

In statistics, the technique of path analysis, developed by Lazarsfeld in the 1940s, as an extension of regression (Lazarsfeld, 1955) later led to the development of structural equation modelling (Jöreskog and Wold, 1982). With these models, the boxes are variables, and the arrows are labelled with the strength of the relationship – typically correlation coefficients, with arrows omitted for relationships that are not statistically significant. As strict causality can be difficult to establish, the arcs are not necessarily directional.

Little of this now-considerable (though scattered) body of work has been taken up by futurists. Recently, however, the work of Eden and colleagues at Strathclyde has moved from decision theory and cognitive mapping towards a form of scenario work (Howick, Ackermann, and Andersen, 2004). The same group has produced the software Decision Explorer, which has been used in several papers in journals in the futures field.

Despite these limitations and problems with cognitive mapping, it has the advantages (as argued – visually – by Horn, 1998) that information expressed in this way is more quickly and accurately absorbed than a large volume of linear text. Where multiple choices exist, and text is most clearly expressed in the form of hypertext, the visual display of alternatives greatly simplifies process tracing and the evaluation of alternatives. Thus Hodgkinson et al (1999) found that the use of cognitive mapping reduced framing bias, among both experienced and inexperienced managers. Brown (1992), reviewing 86 case studies, found a clear preference for the use of cognitive maps over repertory grids.

Thus the weight of evidence suggests that the use of cognitive maps can be a valuable aid to understanding, through (a) data reduction, (b) the clear display of relationships between concepts, (c) making contexts clearer through the proximity of related concepts, and (d)
clarifying the existence and nature of links between concepts, enabling participants to query those links.

Waddington (1978, p333) criticizes the use of “boxes and arrows” in systems analysis diagrams:

"...a diagram consisting of a series of nouns naming various items in the system, each noun probably written in a rectangular box, and each box being connected with most or all of the others by arrows going in both directions. This is simply a pseudo-analysis and is an excuse for failing to think clearly enough to specify precise verbs for what one noun does to the other."

With SNM, the boxes correspond to events (in the first layer of the hemisphere described in section 4.7 in chapter 4), while the arrows correspond to the reasons why one event may lead to another.

5.2.3 Why a participatory approach

In recent years, development co-operation agencies, particularly the World Bank, have realized the value of participation in development programs. Blackburn, Chambers, and Gaventa (2002, p61), in a World Bank publication, summarize these findings:

It has been known for some time that strong participation on the ground by primary stakeholders boosts project performance. More recently, participation has shown promise in several areas outside the project framework: for informing national policy-makers (Norton and Stephens, 1995; Robb 1999; Holland and Blackburn 1998), for planning and implementing large-scale government programs (Thompson 1995) and for encouraging good – and often local – governance (Gaventa and Valderrama 1999).

Also, as noted in chapter 2, one of the main outputs of futures exercises is “scenario learning” – an increase in awareness of future possibilities among those who take part in a futures project. Because such learning arises directly from participation in futures work, it follows that participation is necessary for scenario learning. It can also be argued that all social inquiry involves some level of participation. As Cornwall and Jewkes (1995, p1668) ask, “If all research involves participation, what makes research participatory?” Later they note that “The most important distinctions centre on how and by whom is the research question formulated and by and for whom are research findings used.” Therefore, before proceeding with this argument, it will be useful to unpack the concept of participation, and exactly how far it extends in the present case. The present study is complicated by its grounding in a double loop process (Argyris and Schön, 1978): from the functional (participants’) point of view, they were examining their futures, while from the design point of view, I was developing a Process. Since this chapter focuses on the Process, it is from the functional viewpoint that participation is justified here.
Arnstein (1969) introduced the concept of a “ladder of participation,” and Pretty et al (1995) developed Arnstein’s ladder into a more detailed model – to be applied in a context where an agency is assessing the effectiveness of a client organization’s intervention with its users. Given the connotations of ladders, the higher levels of participation for Arnstein and Pretty are shown at the top, but for consistency with the sequence of reading, the following ladder is inverted.

**TABLE 5.1 ARNSTEIN’S LADDER OF PARTICIPATION**

<table>
<thead>
<tr>
<th>Step</th>
<th>Nature of participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No participation at all</td>
</tr>
<tr>
<td>1</td>
<td>Manipulative participation (co-option)</td>
</tr>
<tr>
<td>2</td>
<td>Passive participation (compliance)</td>
</tr>
<tr>
<td>3</td>
<td>Participation by consultation</td>
</tr>
<tr>
<td>4</td>
<td>Participation for material incentives</td>
</tr>
<tr>
<td>5</td>
<td>Functional participation (co-operation)</td>
</tr>
<tr>
<td>6</td>
<td>Interactive participation (co-learning)</td>
</tr>
<tr>
<td>7</td>
<td>Self-mobilization (collective action and empowerment)</td>
</tr>
</tbody>
</table>

Though this classification is certainly an advance on defining participation as a bipolar variable, it fails to address the practical difficulties that occur when participation is offered, but not adopted. It is also not clear that it is unidimensional; several variables are mentioned in the above scale, and a more suitable formulation may be Davidson’s (1998) Wheel of Participation, which separates decentralization, consultation, communication, and control. The ladders of Arnstein and Pretty are not fully relevant to the current Process, because of the evaluation viewpoint from which they were developed. But as the purpose of the Process is to enable people to question their futures, a high level of participation is necessary, even if it cannot be labelled in terms of those two ladders. Thus a variant ladder of participation was created for the purpose of application to the development of a social inquiry process; five rungs were found sufficient, though it was necessary to add a distinction between two types of participant: clients (managers) and grassroots participants (those who actually take part).

**TABLE 5.2 SIMPLIFIED LADDER OF PARTICIPATION**

<table>
<thead>
<tr>
<th>Step</th>
<th>Level of participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No participation at all. Process is developed theoretically by experts, without case studies.</td>
</tr>
<tr>
<td>2</td>
<td>Participation as input only. Process is designed by experts, refined by using case studies.</td>
</tr>
<tr>
<td>3</td>
<td>With client (management) involvement, the Process is varied for a particular case.</td>
</tr>
<tr>
<td>4</td>
<td>Grassroots participants contribute suggestions for improvements to the Process.</td>
</tr>
<tr>
<td>5</td>
<td>Grassroots participants design the nature of the Process.</td>
</tr>
</tbody>
</table>
In those terms, the present study reaches the fourth level of participation, though with some work also carried out at the preceding levels.

Cornwall and Jewkes (1995, p1669) list differences between participatory and conventional research. The following table places this Process (as it would function if not encumbered by its development) into their framework. In the rightmost column, P denotes the same characteristics as participatory research, while C denotes the same as conventional research.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Participatory research (P)</th>
<th>Conventional research (C)</th>
<th>This Process is more...</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the research for?</td>
<td>Action</td>
<td>Understanding (action may follow)</td>
<td>C</td>
</tr>
<tr>
<td>Who is the research for?</td>
<td>Local people</td>
<td>Institutional, personal and professional interests</td>
<td>P</td>
</tr>
<tr>
<td>Whose knowledge counts?</td>
<td>Local people's</td>
<td>Scientists'</td>
<td>P</td>
</tr>
<tr>
<td>Topic choice influenced by?</td>
<td>Local priorities</td>
<td>Funding priorities, institutional agendas, professional interests</td>
<td>P</td>
</tr>
<tr>
<td>Methodology chosen for?</td>
<td>Empowerment, mutual learning</td>
<td>Disciplinary conventions, &quot;objectivity&quot; and &quot;truth&quot;</td>
<td>P</td>
</tr>
<tr>
<td>Who owns the results?</td>
<td>Shared</td>
<td>The researcher</td>
<td>P</td>
</tr>
<tr>
<td>What is emphasized?</td>
<td>Process</td>
<td>Outcomes</td>
<td>C</td>
</tr>
</tbody>
</table>

**Who participates in each stage of the research process?**

<table>
<thead>
<tr>
<th></th>
<th>Participatory research (P)</th>
<th>Conventional research (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem identification</td>
<td>Local people</td>
<td>Researcher</td>
</tr>
<tr>
<td>Data collection</td>
<td>Local people</td>
<td>Researcher, enumerator</td>
</tr>
<tr>
<td>Interpretation concepts and frameworks</td>
<td>Local</td>
<td>Disciplinary</td>
</tr>
<tr>
<td>Analysis</td>
<td>Local people</td>
<td>Researcher</td>
</tr>
<tr>
<td>Presentation of findings</td>
<td>Locally accessible and useful</td>
<td>By researcher to other academics or funding body</td>
</tr>
<tr>
<td>Action on findings</td>
<td>Integral to the process</td>
<td>Separate, and may not happen</td>
</tr>
<tr>
<td>Who takes action?</td>
<td>Local people, with or without external support</td>
<td>External agencies</td>
</tr>
</tbody>
</table>

In terms of this table, this Process is highly participative, but it does not necessarily involve action. That is left to the participants to decide on. The degree of participation has one clear limitation: participants do not determine the Process itself. If this were the case, there would be no single Process – and this thesis would not exist. However, the Process, though at its core based on the theory outlined in chapter 4, was otherwise amenable to change. A major
reason for developing it iteratively was that participants in the case studies were encouraged to contribute suggestions toward the improvement of the Process.

Moving beyond the practical benefits of widespread participation, there is also a moral and democratic argument: that humans should as far as possible be free to determine their own futures, rather than having them determined by others. The theory of Communicative Action (Habermas, 1984) is relevant here. Its key ethical principles have been translated as:

Each subject who is capable of speech and action is allowed to...
1. participate in discourses,
2. call into question any proposal, introduce any proposal into the discourse, or express his attitudes, wishes and needs;
3. No speaker ought to be hindered by compulsion – whether arising from inside the discourse of outside of it – from making use of the rights secure under [1] and [2]. (White, 1988, p56)

This extends the framework of participation beyond the concepts of Cornwall and Jewkes, expressed in Table 5.3, into the conduct of the workshops. One practical question was how Habermas’ principles of communicative action could be enabled, given the existence of power differences within participant groups, and the fact that the most articulate speakers dominate most meetings. Thus an important objective when applying the Process was to minimize power imbalances in the workshops.

Combining participatory practice with visualization, Chambers (1997) notes the participatory aspects of visual data display in development studies, using the method of VIPP (Visualization in Participatory Practice), writing that “the wall has advantages of visibility and items on it have some permanence. But with analysis on a wall, there is a tendency for one person to take over, slowing the process and limiting participation ... In contrast, the ground is freer and faster ... paper is private ... the ground is an equalizer” (Chambers 1997, p152).

Since using the ground is seldom a feasible option in Australia (where workshops are an indoor pursuit) I set out to make the wall an equalizer, trying to achieve communicative action by adopting many of the principles of Doyle and Straus (1993). This was done by:

(1) mounting very large sheets (or multiple sheets) of paper on the wall, so that several people can write at the same time;
(2) providing multiple marking pens, for the same reason;
(3) encouraging participants to “own” the display area;
(4) distributing pads of post-it notes, on which brief messages can be written, and placed appropriately on the large sheets of paper.
The combination of these four techniques was used in most workshop sessions, to give participants the power to express their thoughts without hindrance. But of course the physical provisions are only one aspect of communicative action; it is essential for the facilitator to create a social climate in which everybody’s contribution is encouraged and respected. Thus the workshops were designed to encourage dialogue, bearing in mind the principles of Asch (1952) that Emery applied to the design of the search conference (Emery and Trist, 1972; Emery and Purser, 1996). Asch’s four preconditions for dialogue are that:

1. All parties are “talking about the same world.”
2. All human beings have basic psychological similarities.
3. If people experience their similarities (rather than their difference) they developed a “shared psychological field”. This enables them to have proper conversations about things and really listen to each other.
4. Because they start to see the similarities in their shared present and future they can plan accordingly. (Asch, 1952, pp131-132)

The workshops set out to achieve these conditions both in their agendas and in their alternation between small-group and median-group tasks.

One problem with participatory approaches, mentioned by Dietz (2003, p30), is that “processes to achieve consensus further restrict the originality of results. Participation and the originality of results are thus in a state of tension which has to be balanced in such a foresight process.” The present Process eliminates this problem by not striving for consensus, but simply incorporating all ideas from participants as variant futures.

5.2.4 Why a narrative approach

The concept of scenario networks is inherently narrative-based. If, as Polkinghorne (1988, p1) states, narrative is “the primary form by which human experience is made meaningful,” projecting narratives from the recent past, as a kind of qualitative forecasting, is a way of making the future meaningful to the participants in a study. Using the associative approach to causation formed in section 4.6 in chapter 4, narrative chains can be developed to form hypotheses about possible futures.

Many elements of narratology (Prince, 1982) are included in scenario mapping, with the obvious exception that most futures do not have endings. Burke’s dramatic pentad (as discussed by Shearer, 2004, in relation to scenarios) may be usefully compared with SNM: Burke’s “act” is SNM’s event; Burke’s “agent” is SNM’s actor; Burke’s “scene” is SNM’s context, Burke’s “agency” is the means through which actors influence events, and Burke’s “purpose” corresponds to SNM’s motive layer, as explained in the previous chapter.
5.2.5 Why a morphological approach

In this Process, morphological categorization (Zwicky (1969) is used deductively, to divide possible futures into several broad streams. This has three functions:

1. To enable the complexity of possible futures to be more easily understood by grouping them (effectively an extension of the holonic principle).
2. To provide a separate focus for each small workgroup, enabling new possibilities to be envisaged.
3. To provide some endpoints at which to begin backcasting.

As an example of a morphology, the simplest division of two possible futures for an organization is derived from the question ‘Will this organization exist at the end-time of this study?’ Initially it seems that the only possible answers are Yes and No, thus meeting the criteria for fault-tree analysis. However when asking this question, one is likely to receive “other” answers, such as:

- The organization may exist, but under a different name.
- The organization may still exist, but everything about it may be changed.
- It may continue to exist as a legal entity, but in practical terms be defunct.
- It may amalgamate with other organizations and exist only as part of a larger whole.
- It may be divided into several smaller entities.

Some of the above objections could be overcome by tightening the question; but how can we then be sure that all possible tightenings are covered? One solution is to tidy all Other answers together so that we can at least recognize their potential for existence, for example:

- The organization will exist in its present form.
- The organization will no longer exist.
- The organization will exist, in some sense, but in a different form.

This converts the binary possibilities to trinaries in almost every case. An alternative solution is to consider other possible models for the organization, perhaps thinking about its competitors, international counterparts, past structures, and so on. From these examples, a set of possibilities may be deduced – but there is no guarantee that this will be comprehensive. Though the attainment of comprehensiveness is a worthwhile goal, enabling participants to probe futures that might not otherwise be envisaged, it is not possible to envisage all potential futures. It is perhaps not even desirable, because producing a categorization so tight that it covers everything may, paradoxically, lead to a narrowing of mental horizons, due to the categorizer’s belief that everything is covered, and there is no need to inquire further. (This is
In summary, total comprehensiveness is perhaps a chimera, and perhaps not necessary. Thus the morphological approach is a way of grouping all alternative that have been thought of: an aid to thinking of new possibilities, rather than a provably complete catalogue.

5.2.6 Why a critical layered approach

A problem with many of the scenarios for 2000, examined in Appendix 1, was their crucial dependence on assumptions that seem to have been unexamined, or at the very least decided on without much concern for their implications – such as the effective (perhaps implicit) decision in Europe 2000 (Hall, 1977) to exclude eastern Europe.

Recent writers on futures studies, such as Slaughter (1989), Inayatullah (2002b), and Sardar (1999) have stressed the importance of a critical approach, “probing beneath the surface,” deconstructing seemingly innocuous statements, and revealing unexamined assumptions. It is thus essential for the newly-developed Process to embody a critical approach, identifying and interrogating all assumptions and value judgements. However, this is not straightforward, as every process embodies its own set of assumptions. In this project, I have tried to make these as explicit as possible, and label them as axioms, but there are other assumptions embodied in the way the Process unfolds in a particular case. Such assumptions include:

1. It is worthwhile to consider the future.
2. The concept of “data” is not problematical.
3. Logical analysis, of the type used for this thesis (and most others) is the most valid way of increasing “scientific” knowledge.
4. Scientific knowledge is more valuable than other kinds of knowledge.

Beyond a certain point, the current academic climate does not permit the latter assumptions to be questioned, except in terms that serve to perpetuate those assumptions. In this thesis, I thus refrain from questioning any fundamental assumptions of academe.

5.2.7 Why an actor-mediated approach

What “causes” the future (or history, for that matter)? Is it actors, or is it trends? In the absence of trends, actors will cause only random changes (setting aside factors such as path dependence, as considered by Mahoney, 2000, and Pierson, 2004), while in the absence of actors and decisions, trends will occur all but imperceptibly. Thus the “cause” of the future is
probably some combination of both actors and trends, but disciplines vary. Sociology, from Durkheim and Weber onwards, has stressed the effect of social trends on human outcomes, while traditional historians focused more on the “great man” theory (after Carlyle, 1841/1935). In recent decades, though, historiographic movements such as the Annales school have moved more toward the sociological perspective (Braudel, 1980). Conversely, Lindenfeld (1999, p281) notes a recent movement among historians away from the “indiscriminate pluralism” (Fisher, 1971) of trends, toward actors as proximate causes.

Futurists, with the exception of the prospective group (Godet, 1987) have focused on trends and social forces. Consider, for example, the Millennium Project’s handbook, Futures Research Methodology (Glenn, 1999). Only one of its 18 chapters specifically deals with actors, and that chapter is by Godet and colleagues. Common futures methodologies such as cross-impact analysis, environmental scanning, and most varieties of scenario planning do not explicitly take account of actors. That may be defensible at worldwide scale, where individual actors have little relative power, and frequently change, but at the smaller scale for which the current Process is being developed, actors are usually identifiable, and readily classifiable into groups whose motives rarely change, even when individual actors change. Thus by classifying actors into stakeholder groups, their influences on the future can be more clearly traced.

The actor-mediated axiom in chapter 4 proposes that the future of any social entity is mediated through the actors who deal with that entity. Here I am using the term “actors” in the sense of Latour’s Actor-Network Theory, referring to any entity capable of outward communication (Law and Hassard, 1998). This is not the same sense as in prospective (Godet, 1987), in which only those who have enough power to directly affect outcomes are regarded as actors – embodying an assumption that such actors do not change. In practice, people who are only “stakeholders” this year may become “actors” in future – if they are provoked enough, or if the situation changes. Thus it would be unwise to summarily exclude any group, though some actors are clearly more powerful than others. In Latour’s sense, the mass media are considered actors: because actors have effect only if they communicate with one another, this Process regards news media as actors.

No claim is being made here that trends are unimportant or irrelevant: simply that trends are expressed through actors: either individual actors or coherent stakeholder groups.
5.2.8 Implications of the above design principles

Consequent on the above discussion, the following table shows the implications of each of the design principles for the Process.

<table>
<thead>
<tr>
<th>Principle</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holonic approach</td>
<td>Define the focal entity with great care. Identify its sub-systems, enveloping systems, first-order impinging systems, and important impinging systems at 2nd-order and beyond.</td>
</tr>
<tr>
<td>Graphical approach</td>
<td>Produce scenarios in the form of a &quot;map of the future&quot; using a form of causal mapping, but with explicit meanings for the arrows. Use the holonic approach to make the map &quot;zoomable.&quot;</td>
</tr>
<tr>
<td>Participatory approach</td>
<td>Involve a wide range of participants in the development of the scenarios, both from the focal system and its related systems.</td>
</tr>
<tr>
<td>Narrative approach</td>
<td>Create possible futures as a web of interconnecting story lines – though of course many of the narratives will be unfinished.</td>
</tr>
<tr>
<td>Morphological approach</td>
<td>Classify large numbers of messy possibilities by first deducing a set of morphological components.</td>
</tr>
<tr>
<td>Critical layered approach</td>
<td>Try to place the situation being studied into a broader context. Delve below the surface, asking critical questions to identify implicit assumptions. Well-informed outsiders may be best placed for this.</td>
</tr>
<tr>
<td>Actor-mediated approach</td>
<td>Since change is mediated through subsidiary, enveloping, and impinging systems, the future of the focal system cannot be known without also exploring the future of the systems that communicate with it.</td>
</tr>
</tbody>
</table>

The above set of implications provides clear guidance for the development of a Process, to be addressed below. Before doing so, however, its key concepts will be explained.

5.3 The development of scenario networks

Combining the conceptual framework in chapter 4 and the design principles above enabled the scenario network mapping process to be developed.

5.3.1 A framework for categorizing actors

Because of the importance of human groups in the futures of other human groups (embodied in the axioms in chapter 4), it is useful to begin the development of scenario network mapping by considering all relevant actors. When the focal entity is a business organization, actors are often divisible into seven groups:

1. suppliers: direct and indirect
2. customers: direct and indirect
3. peers (including competitors)
4. regulators, governments, and other authorities
5. neighbours (in a broad sense, not restricted to the geographical)
6. communications media
7. staff (internal actors)

If a two-dimensional representation is used, with power as the vertical dimension and the supply chain as the horizontal dimension, the above actor types can be shown in a star-shaped diagram, which for mnemonic purposes may be labelled the Stakeholder Star:

![Stakeholder Star Diagram](image)

**FIGURE 5.1 DIMENSIONAL LAYOUT OF THE STAKEHOLDER STAR**

The media, peers, staff, and neighbours do not fit the two-dimensional structure, so are arbitrarily placed in Figure 5.1. Since news media are potentially able to have more effect on the entity than vice versa, the media actors will have above-average power – unless the entity is a national government. The relative power of suppliers, customers, and peers depends on their size in relation to the size of the focal entity. The power of neighbours will also vary. However, regulators are always more powerful than the entity, and staff usually less powerful. The above diagram is only a starting point: a different structure may apply for any focal entity.

Stakeholders who directly communicate with the entity can influence its future, but so (to a lesser extent) can indirect stakeholders, that communicate only through others. An example is the general public's influence on legislators, transmitted by news media. Thus the stakeholder star, though helpful in remembering stakeholders, is only the inner part of a larger web of less-influential stakeholders. Note that stakeholders are roles, not individuals: one individual (person or organization) may fill several roles. For noncommercial entities, including geographical communities and concepts, actors cannot be classified so clearly into two dimen-
sions. For small entities (as when considering the future of a small business), individual stakeholders are often clearly identifiable, but for larger entities (such as the future of a geographical area), most stakeholders need to be considered in terms of activity-based roles. Thus in the Barossa Valley case (see chapter 8), the main role types were:

- residents in the area
- workers in the area (divided into regulators and wine-industry workers)
- employers in the area
- visitors to the area.

Suppliers, customers, and competitors are normally distinct, but in a geographical area (apart from a city suburb) most people who live there also work there, and vice versa. This multiplicity of roles is useful because it enables workshop participants to view the situation from multiple perspectives. For futures apart from those of organizations and geographical areas, the power dimension usually applies, but instead of a supply-chain dimension, a time-horizon dimension (as used by Jaques, 1982) can be more relevant. Mnemonic typologies used in environmental scanning, such as STEEP (Fahey and Narayanan, 1986) can help participants to recall all the stakeholders involved, and their likely influence.

The corollary of the actor-mediated axiom is that the future of any social entity is closely bound up with the future of its actors – and the less powerful that entity in relation to those actors, the less it will be able to pursue a distinct future. Therefore, to anticipate the future of an entity, it is necessary to identify its related actors, and to anticipate their futures – and so on, in a circle of ever-increasing size but ever-decreasing influence. Thus by studying the communications between an entity and its related actors, it is possible to anticipate the entity’s future – but one must also anticipate the arrival of any new actors, and changes in communications between the entity and its actors.

All social entities also have internal actors. To the extent that there is conflict within the entity, it will be necessary to study the potential futures of the internal groups separately, before studying the future of the enclosing entity.

5.3.2 The principles of scenario networks

I began this project with a simple concept of a scenario network: an extension of the scenario principle beyond the two existing formats of chain and end-state scenarios. In a scenario network, one event (as a holon) is shown as the outcome of a number of other events and trends, and in turn leads to further events and trends. Though the concept seemed obvious to
me for some years before starting work on this thesis, such a concept did not appear in the
futures literature until very recently (see chapter 10). However, some writers have approached
such a method, including Kahn (1965) with a combination of chain and fan scenarios, the
Futures Group’s Technology Sequence Analysis (Gordon 1994a), and Eden’s style of cogno-
tive mapping (Eden and Ackermann, 1998). The concept of a Bayesian network (Almond
1995) in statistics is similar, as are some aspects of technology roadmapping (Phaal, She-
habuddeen, and Assakul, 2002). None of these writers has grounded their method on an
integrated conceptual framework (as in chapter 4, for example) to establish a theoretical and
methodological basis for networks of scenarios.

This would be an approach that did not bundle groups of events into static scenarios, but
would treat a set of possible events as a small scenario in its own right, such that the focus of
interest becomes the connections between these mini-scenarios rather than their content. This
focus on the links between scenarios is perhaps the key difference between normal scenario
planning and scenario network mapping: the overriding question is not so much “what might
happen?” as “how might it come to happen?” Since there could be hundreds of mini-
scenarios, some method is needed for helping to order them, and helping to ensure that no
strong possibilities are overlooked. Hence, using the morphological principle, a number of
broad scenario paths can be deduced, and the mini-scenarios can be placed on and around
these paths. Using the holonic principle, a specific number of scenarios need not be specified:
rather, separate clusters can be defined and redefined, as looming futures become more
relevant. The scenario ensemble can be simply extended, rather than rebuilt, as would be
necessary with the standard methods.

5.3.3 Basis of Scenario Network Mapping (SNM)
The original developers of the scenario method (e.g. Kahn, 1961) describe a scenario as being
both an end-state and the sequence of events which led to that state. In practice most atten-
tion seems to have focused on the end-state, with much less written about the sequences of
events. These two types of scenario are described (e.g. by Schoemaker, 1993) as “snapshot
scenarios” and “chain scenarios.”

The germ of Scenario Network Mapping (henceforth, SNM) was a combination of the
snapshot and chain approaches into a web-like form. Though such a method had long seemed
obvious to me, it has not been adopted as part of scenario planning. Other writers have
suggested such a dendritic approach to the future, such as Slaughter (1995a, p32), and the
philosopher Alasdair Macintyre (1985, pp95-96):
"My own future from my point of view may be representable only as a set of ramifying alternatives with each node in the branching system representing a point of as yet unmade decision making."

This is also similar to the "web of causation" concept used in epidemiology (Timmreck, 1998), but whereas the dendritic approach has possibilities that never recombine, the web-like approach allows for multiple paths to the same outcome.

Using a timescale extending from left to right and a vertical dimension with no intrinsic meaning, an ensemble of snapshot scenarios can be graphed thus:

![Figure 5.2 Representation of snapshot scenarios](image)

A chain scenario can be graphed thus:

![Figure 5.3 Representation of a chain scenario](image)

Using the same conventions, a scenario network is shown thus:

![Figure 5.4 Representation of a scenario network](image)

(The junction of two lines without a node signifies an "and" relationship, in which the preceding nodes act together to influence the following node.)
SNM does not use individual scenarios in the traditional sense: its emphasis is on paths through nodes. Whereas standard methods of scenario planning create a small number of detailed scenarios, SNM creates a combination of paths through a network, replacing detailed description of a few possibilities by the (cumulatively) detailed description of paths through which those possibilities might be attained. Such a network of scenario fragments would be similar to a map showing roads connecting many cities with many other cities. Within this network, different travellers can trace possible futures from whichever city they begin, to the various cities where they might end their journey. Though no two travellers might trace an identical path, the structure could be the same for all of them.

Scenario networks combine elements of end-state and chain scenarios, but as the name suggests, they are influence maps rather than simple chains, and instead of the usual two to four scenarios (in the Shell tradition) there might be several hundred nodes in a network. Just as each city has its own street map, each node is in itself a miniature scenario: a transient situation, not necessarily long-lasting. Its fruition is influenced by the fruition of preceding nodes. There can be multiple paths to and from each node, and, potentially, multiple sets of situations that lead to a node. The concept of "causation," much discussed by philosophers of science is interpreted as a concept of influence (following Gerring, 2003), because of the excess baggage the traditional Humean concept carries: the rigidities attached to it, the ambiguities, and the problematic translation between the physical analogy of causation and the social construction of most of the concepts described in scenarios.

As an undifferentiated network of with several hundred nodes becomes very difficult to follow, to simplify the networks, similar paths can be grouped together – separated by "mountain ranges," to use a geographical analogy, and similar to the chreods of Waddington (1977). The morphological approach, outlined in section 5.2.5 above, proved useful for identifying those paths, which group together potential events likely to influence one another.

5.3.4 Using the Leaf of Goals to express intent structures

Another aspect of scenario network mapping is its teleological approach. Traditional scenario planning, when studying the futures of an entity, tends to emphasize the power of external forces. Thus the Critical Uncertainties method (as described by Schwartz, 1991), sets up two or three critical variables, describes up to 8 future worlds as combinations of extremes on those variables, and examines how the entity could react to each of those. There is almost an underlying assumption that the entity's environment (tellingly, labelled its "world") cannot be manipulated, only reacted to. On the other hand, traditional strategic planning tends to
embody an underlying assumption that the plan is achievable, simply by defining objectives and setting out an action plan to attain them (as noted by Mintzberg, 1994).

The stance taken by scenario network mapping falls between those extremes, simply acknowledging that the future of an entity is a function of both its own intentions and the pressures of its environment. Of course, the more an entity dominates its environment, the more predictable its future can be. However – as demonstrated by the Iraq war of 2003 and its aftermath – even what is probably the most powerful physical force in the world (the US military establishment) was unable to foresee and control the outcomes. And at the other extreme of power, even the children of subsistence farmers in a developing country still have options open to them, as demonstrated by those who leave the farms, if only for a life of subsistence in a city squatter settlement.

Whatever their immediate actions, organizations and individuals alike may have a relatively small number of final goals (here using the word goals to encompass all purposive behaviour, including goals, intentions, objectives, and aims). For both organizations and individuals, there is perhaps a single ultimate goal. This has been described as “to survive well” (Ackoff, 1974, p61).

Considering a leaf of the commonest shape, thus...

...the ultimate goal can be symbolized by the pointed (rightmost) end of the leaf. Such a goal can usually be accomplished in several ways (under the principle of equifinality of von Bertalanffy (1956): almost equivalent to the multiple-cause axiom). A public company, for example, might be legally bound to maximize the value of shareholder’s funds, but even with this single goal it has a number of choices: it is able to choose its business activities and whether the funds should be maximized on a long-term or short-term basis. Each of those possibilities could be accomplished in several ways, and each of those could in turn be done in several different ways. Working back from the outer end of the leaf, more and more veins become visible, and the leaf becomes steadily wider.
The inner end of the leaf, attached to the stem of the plant, symbolizes the starting point. At any given moment, several alternative purposive actions are available. Though many actions are possible in the longer term, not all of these are immediately available, because many of them require preparatory action. Having made any decision, various steps are necessary, and not all of these can be accomplished immediately. Though anything might be possible, it takes time, and preparatory steps are needed. There are practical limitations to what can be done in the short-term, and these are usually due to resources: not enough money, not enough people, or not enough time – as well as delays in scheduling the actors who will be involved.

The leaf of goals may be defined with three rules:

1. Goals are holonic, in that every goal both contributes to at least one superordinate goal and contains at least one subordinate goal.
2. Equifinality applies: there are (usually) alternative ways of achieving any goal.
3. As there is only one final goal, and few actions that can be undertaken immediately, it is at the level of intermediate goals that the choice is greatest.

Following those rules, the leaf takes shape: growing wider from the present, then narrowing toward the more distant future. Broad objectives can be interpreted in multiple ways, so actors may agree on a broad objective (such as world peace) but disagree on how to attain it. By working from the far end of the leaf back toward the stalk, it may be possible to resolve conflicts, finding the point at which shared long-term goals diverge into different shorter-term goals. In that respect, the leaf of goals is similar to the TRANSCEND method of peacebuilding developed by Galtung (1996 and 2000).

It does not follow that it is possible, ant-like, to travel along this leaf in time: rather that the leaf always exists, continually beginning at the present, and always ending in a future which is never reached – or always present. In the same way that a tree steadily grows new leaves and drops the older ones, the leaf of goals is updated by renewal of the diagram. In other words, the horizontal dimension of the leaf maps kairos (intent for progress) rather than chronos (clock time), as explained in section 4.2.

Several writers have developed similar concepts. Eckblad (1981), drawing from the lens model of Brunswik (1952) and Piaget's studies of children's thinking (1971), describes motivational "schemes." Because Eckblad is a psychologist, these schemes apply in a much shorter-term context (of individual intentions) than does the leaf of goals. The concept of schemes (vari-
ously referred to by other writers as *schemata* or *scripts*) is developed further by Lord and Kernan (1987), who discuss the use of scripts in purposeful behaviour. Jacobson (1992), writing on object-oriented software development, describes a similar concept, with the shape of a yacht as the metaphor. Nadler and Hibino (1994) use what they call “purpose arrays,” equivalent to the distal edge of the leaf. The pattern language of Alexander and his associates (Alexander et al, 1977), developed for urban planning, and in recent years much used in information systems development (for example, Gamma, Helm, Johnson, and Vlissides, 1995, and van Duyne, Landay, and Hong, 2003) is another instance of an approach that incorporates multiple scales, in that case by locating patterns within patterns.

Abell (1987, p101) sets out a related theory in which he develops a “comparative narrative method” which he contrasts with the “variable-centred” method normally used in sociology. He presents a way in which a narrative can be expanded: sequences of actions can be unpacked by breaking them into components. Each sequence comprises a narrative, as Abell defines it. For example, the entire process of getting up in the morning can be subdivided into a number of components, such as waking up, getting out of bed, switching off the alarm clock, and so on. The comparative part of Abell’s analysis lies in comparing two or more sets of actions by collapsing them back into more general components. Using this method, it is possible (so Abell maintains) to find patterns in historical data, and create empirically grounded generalizations.

All of these are linked to the holon concept, but all are intrinsically hierarchical rather than fractal. Such structures are useful when an underlying hierarchical structure exists in the data, because different scales use different data types (as in Alexander’s pattern language), but when variables have no inherent order, hierarchical holons can obscure relationships in data. Thus the difference between the Leaf of Goals, and the schema-like concepts of Brunswik, Piaget, Eckblad, Alexander, Nadler and Hibino, and Abell is that the former can include non-hierarchical connections within the diagram: for example, one action may serve several sub-goals. To use the terms of Deleuze and Guattari (1987), schemata are arborescent, while the leaf of goals (like a scenario network map) is rhizomatic.

Turning to the practical implications for futures, one can inspect the leaf from two angles:

1. Working from the present to the future: begin with the actions possible immediately, and build from each of those a number of successive actions. This amounts to a futures wheel (Glenn, 1972) of capabilities and intentions. If several actions are possible now, and each
of those leads to another few, and each of those to some more - and so on - a huge number of possibilities becomes available after a few iterations. However, because the system is working towards fulfilling its (perceived) ultimate goals, most of the possible actions will be discarded from consideration, because they will not be judged to contribute towards final goals.

2. Working back from the final goal: from the tip of the leaf toward the stem. If the single ultimate objective, as suggested by Ackoff (1974, p61), is simply to “survive well,” there is usually some choice of directions. These possible directions can be viewed statistically as “degrees of freedom,” or their psychological equivalent of “affordances” (Gibson, 1977; Norman, 1988). In futures terms, this working backward is analogous to backcasting (Robinson, 1982, 1988; Dreborg, 1996), but using multiple paths, and based on intentions rather than events. Each broad direction can be achieved in a number of ways, and for each of those ways, several implementation steps are possible - and so on. So the leaf grows wider, as one works backward to the present. Many of these possibilities will occur in several paths, and the rate of increase will steadily slow, until the widest point of the leaf is reached.

Referring back to the actor-mediated axiom in chapter 4, a practical implication of the leaf of goals is that when assessing possible goal-directed actions, it is not only the focal entity’s intentions that must be considered, but also the intentions of the other actors that affect it. Each actor will have its own leaf of goals, though their leaves often converge toward the distal end (cf. Atlee, 2003, chapter 12, and Maclean’s, 1991). As long as impinging actors can be identified, and their long-term intentions are known, the effect on the focal entity of this combination of intentions can be assessed. In this way, SNM differs from traditional futures methods, which refer to “forces and drivers,” but often do not investigate the actors through which these forces could be mediated.

5.3.5 Differences between normal scenario planning and SNM
Compared with the standard method of scenario planning (in so far as there is a standard method), scenario network mapping has these major differences:
TABLE 5.5 DIFFERENCES BETWEEN NORMAL SCENARIO PLANNING AND SNM

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Normal scenario planning</th>
<th>Scenario network mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time progression</td>
<td>“snapshot” or “chain”</td>
<td>A combination of both, with multiple and potentially interlinking chains</td>
</tr>
<tr>
<td>Number of scenarios</td>
<td>Normally 3 to 5</td>
<td>Indefinite number, because of the holonic approach. Often about 100-200 nodes, which can be reduced to 30-40 holons, and grouped into 3-8 broad paths</td>
</tr>
<tr>
<td>Amount of detail in each scenario</td>
<td>Detailed descriptions of endstates – often several pages for each</td>
<td>Brief descriptions of nodes and of paths between them, expandable as necessary</td>
</tr>
<tr>
<td>Controllable vs uncontrollable</td>
<td>Focuses on the uncontrollable</td>
<td>Covers both the controllable and the uncontrollable, since they interact</td>
</tr>
<tr>
<td>Use of endpoints</td>
<td>The basis for descriptions</td>
<td>“Milestones” (not quite at the end) used only as starting points for backcasting</td>
</tr>
<tr>
<td>Forces most influencing futures</td>
<td>“trends” and “drivers”</td>
<td>Actor groups in which the entity is embedded</td>
</tr>
<tr>
<td>Focus</td>
<td>States and conditions at defined endpoint</td>
<td>Transitions between nodes</td>
</tr>
</tbody>
</table>

Having outlined the main differences, there are of course many similarities between SNM and normal scenario planning, including the focus on alternative futures, and the development of scenario learning for participants. But instead of the final images being describable (as in normal scenario planning) as “Scenarios A or B or C might happen to us,” SNM images are less static and more instrumental: “If A happens and we do B, then we could reach C, but if we decide on D, and then E happens, we might reach F.”

5.4 A process for constructing scenario networks

Having outlined the concept of a scenario network, the next consideration was how a scenario network should be constructed. I designed a five-stage process to be developed in a workshop situation including with a broad range of stakeholders connected to the social entity whose future was being studied.

1. **Tracing the past through to the present.** Build a scenario network of the recent past of the entity, including counterfactuals: events that might have happened, but so far had not.

2. **Probing the present.** Enumerate the stakeholders of the entity, their intentions and motivations toward the entity, and the intentions and motivations of other powerful actors.
toward those stakeholders. Differences between stakeholder groups can reveal the extent to which multiple presents existed. Then create a relevant leaf of goals (known or presumed) for each of the stakeholder groups most likely to influence the entity’s futures.

3. **Looking ahead from the present.** Build a futures wheel (Glenn, 1972) to consider some possibilities for that entity, that could arise from present conditions.

4. **Creating morphological paths, and backcasting along them.** Set up a mutually exclusive set of scenario paths using basic morphological analysis (Zwicky, 1969, Ritchey, 1998), then backcast (Robinson, 1988) along each of those toward the present — but using a dendritic form of backcasting, unlike the linear model generally used.

5. **Midcasting: anticipating discontinuities.** It cannot be assumed that the network formed by backcasting (working back in time) would join the network created from the futures wheel (working forward). Also, a network thus formed might well be too logical, and unable to take account of discontinuities (Brooks, 1986, Petersen, 1999, Rockfellow, 1994). To bridge the gap and overcome this weakness, I developed the concept of midcasting, as described in section 5.4.6 below. (An earlier version was published as List, 2001b and revised as List, 2004a).

Note the combination of the inductive (futures wheel and backcasting), the deductive (morphological paths), and both ductivities together (midcasting). On a chart in which time moves from left to right, the processes can be shown thus. To keep the diagram simple, only single paths are shown. The stakeholder study at stage 2 above, not being time-related, is not portrayed on the chart.

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**FIGURE 5.6 TIME-AXIS DIAGRAM OF THE ESSENTIAL PROCESS**

1. Tracing the past
   2. Probing the present
   3. Looking ahead
   4. Backcasting along morphological paths
   5 Midcasting

past present future

---

2. To coin a useful term, otherwise lacking in English.
After a chart in the above format (though with multiple paths) has been constructed, the next stage can be undertaken:

6. Creating layers of the hemisphere. When the nodes in the event layer (top-level) scenario network are complete, participants can focus on the links between the nodes, and the nature of the influences between each pair of nodes. In a process analogous to mathematical differencing (Quarteroni, Sacco, and Saleri, 2000) a second scenario network can be created, this time linking together the motives that linked the events in the top layer. Appendix 2, a typical detailed agenda for a set of workshops, supplies more practical detail.

The preceding description of the first five stages describes the Process as initially conceived. However, the Process evolved throughout the case studies, as new situations and new types of entity were drawn in. An early version of the process was presented at the World Futures Studies Federation conference in Romania in 2001, and later published in Futures (List, 2004a). In response to the first few case studies and extended reading and reflection, a revised approach was presented at the WFSF conference in Japan in 2002 (List, 2002a), and subsequently published in the Journal of Futures Studies (List, 2003a). The main addition to the Process described above was the concept of the layered hemispherical model.

5.4.1 Multiple sessions for multiple perspectives
A number of recent writers have noted the advantages of adopting multiple perspectives on an issue. Morgan (1997) wrote of eight metaphors of an organization. Linstone (1984; 1999) and Mitroff and Linstone (1993) discuss the T-O-P approach, considering Technical, Organizational, and Personal perspectives. Each of these perspectives is associated with a particular time horizon and scenario type: T implies a long-term view and a probable future; O a medium-term view and a preferable future; and P a short-term viewpoint and a possible future (Linstone, 1999, p231). In the present case, the most suitable application of the multiple perspectives principle seemed to be a division in terms of time: scrutinizing the future from various points of view, by comparing it with (a) the past, (b) the present, (c) ultimate visions, and finally from all three viewpoints at once.

The initial phases of the Process involved four workshop meetings, each of half a day (plus preliminary meetings required for organizing the workshops). Appendix 2 gives an agenda. When, later, the Process was extended to include the hemispherical analysis, an additional meeting was generally found necessary. This is discussed in more detail in later chapters.
5.4.2 **Notation for scenario network maps**

From the toolbox of techniques used in futures studies (such as Glenn, 1999) two methods stand out as ideally suited to creating a scenario network based on the above principles. These are the futures wheel and backcasting. They are used (together with midcasting, described below) to create a map of scenario paths for the main system.

On this map, time progresses from left to right, with the present time at the centre. Because not all associated systems progress at the same rate, some will be precursors for others. Thus some of the forces affecting the future of the main system will have arisen in the past. To better take account of the multiple pasts, it is useful to begin a scenario map approximately as far back in the past as one wishes to peer into the future. Each system and subsystem will have its own map, with a general layout as in Figure 5.6 above (though the single line of each type in that map is replaced in a real map with clusters of interconnected events. The following notation of nodes was designed to be as self-evident as possible, but for maximum clarity is now explained.

![Diagram showing scenario network notation]

### In the future: event A may lead to event B, due to x.

### In the past: A was a major contributing factor to B, for influences/factors/causes/reasons x.

Event C occurs only after both A and B have occurred; influences x and y explain why A and B lead to C.

Event A leads to either B or C, but not both; x explains how B derives from A, while y explains how C derives from A.

A may have other inputs (x) and outputs (y). Inputs are from the left, outputs to the right.

**Figure 5.7 Notation used in scenario network mapping**

Each of the above diagrams represents a basic theory (according to the principles of Dubin, 1978) and, if those events occur, empirical evidence can be gathered to evaluate the theory.
Labels such as “A” were used above to clarify the examples, but in real diagrams, events should be described in whole sentences, including subject, verb and object – not just single words or phrases, which are often ambiguous. In view of the multiple-causes and multiple-effect axioms, neither incoming nor outgoing arrows should be assumed to be sufficient: it is as if every node has an additional outgoing arrow labelled “other effects” and an additional incoming arrow labelled “other influences.”

Unlike a chain scenario, a network scenario will usually have a variety of precursors for each event, as well as a variety of consequences. This multiplicity of links to a node is in fact another way of expressing cross-impact analysis (Helmer, 1977) – in more than the two dimensions normally used, but without exhaustive consideration of all pairs of events. Where some influences are stronger than other influences, this can be denoted by using thicker lines for the former. Using the “equation for the future” described above, the relative strength of the various components can be graphically displayed on the scenario network map. For example, some possible events will be more endogenous; others, more exogenous.

5.4.3 Locating the future’s roots in the past

In order to get participants accustomed to the concept of causal mapping, it is convenient to begin with what they see as “known facts” rather than conjecture about the future. Thus the Process includes a session that studies the past of the entity. There are three components to this session, referred to as Timelines, “Unfinished Business” and “Prouds and Sorries,” and each lasting around one hour. Like most elements of the SNM Process, each component begins with participants working in small groups (with 3 or 4 found to be usually the best size), then each small group presenting its findings to a plenary session of all participants (usually 10 to 20 of them).

Timelines is simply a graphical display of the main events in the recent history of the entity. Though it sounds straightforward, participants in the case studies were usually surprisingly uninformed about such matters, even when they had been asked in advance to bring relevant documents to the workshop. The timelines graph is a wall-chart, about 3 metres wide and 1 metre high, with the time dimension running from left to right, and an approximate intention (kairos) dimension running vertically up the graph, with the top of the graph representing highly intentional events (from the entity’s point of view) and the bottom representing externally impinging events. As with most other charts in these workshops, items on the graph usually take the form of sticky notes, about 8 cm square, on which participants have written the names of events. This enables easy rearrangement of items when necessary. When all
notes are in place for a timeline, associative links can be drawn with a marker pen, or denoted by a length of coloured ribbon. After the workshop, the chart can be entered on a computer file, using either concept mapping software (more suitable for the task) or a spreadsheet (because most participants have such software, but not concept mapping software).

**Unfinished business** is an exercise that backcasts from the recent past (or the various recent pasts of different stakeholder groups involved in the Process) to discover the motive forces behind recent developments. These are factors, often currently quiescent, that still have ability to affect the entity in the midrange future.

**Prouds and sorries** is an approach used in future search (Weisbord and Janoff, 1995) and appreciative inquiry (Elliott, 1999). This method is used when organizations are considering major change, and want to ensure that they retain the best elements from their pasts ("prouds") and also ensure they do not retain the elements they regret ("sorries"). It usually begins with vignettes recounted by members of the focal entity. From these stories, implications are extracted. If participants are divided into stakeholder-specific groups for this exercise, the nature of their multiple pasts and presents usually becomes clear: they are proud and sorry about different things, of which members of other stakeholder groups were often not aware.

### 5.4.4 Delineating actors' influences

This second phase of the Process begins by identifying as many actors as possible that impinge on the entity in some way, using the Stakeholder Star (see section 5.3.1 above) that divides actors into seven broad groups, plus intermediaries to each group, and more distant actors that impinge on the entity indirectly.

When the actors have been defined, each actor (or group of actors, in the case of the minor ones) is dealt with in turn, by considering

1. What pressures (including forces, and expectations) does this actor (or group of actors) place on the focal entity?
2. What pressures does the focal entity place on this actor, or group of actors?

The pressures in both directions are listed (as demands) and then ranked. A follow-up question for each pressure is to what extent that pressure might change, and what might bring about such change. Often, there is only one clear pressure from each actor.
Another useful indication of actor influence is the relative size/power of the actor relative to the focal entity, and to what extent the entity can resist forces from that actor. This consideration is then reversed, asking how important is the focal entity to each other actor, and to what extent the other actor could resist the entity's pressures.

5.4.5 Looking ahead from the present

The futures wheel is a simple method which begins with considering a possible event or state, then looking at the consequences which might flow from that event, then the consequences that flow from each of those consequences ... and so on. Though a diagram of the resulting hierarchy is typically described (Glenn, 1972) as wheel-shaped, it can also be drawn as a tree-like diagram – in fact, very like the broadening stage of the Leaf of Goals. Such a futures wheel corresponds to the “five whys” (Mizuno, 1988), but need not involve planning.

Conventionally, the futures wheel begins at the present and moves outward into the future. When taking multiple pasts into account, the futures wheel should begin in the past and make its way to the present, anchoring there before plunging into the future. To begin the futures wheel in the past helps participants in the process identify any continuing trends. Another advantage of rolling the futures wheel through the past – not unlike the medieval concept of the Wheel of Fortune (Boëthius, 525/1943) – is that unforeseen side effects of past decisions can be made visible, by comparing counterfactuals with perceived reality.

It need not be a problem that some of the possibilities produced by the futures wheel were in the past but do not seem to have occurred. It may be that some of these events and trends are already in train, but we do not know it yet. And after all, the lens of the present is arbitrary; tomorrow it will have moved. A question to consider at each turn of the futures wheel is what effect each of the associated systems is likely to have on the main system, at that stage. Participants also consider the possible emergence of new systems that could affect the focal system. This is achieved by considering the effect of the pressures of each related system on the focal system’s structure, its procedures, and the attitudes of those involved in it.

5.4.6 Anticipating discontinuities with midcasting

Following the terminology of forecasting, incasting (Schultz, 2003), hindcasting (Harrald and Mazzuchi, 1993) and backcasting (Robinson, 1982, 1988; Dreborg, 1996) I developed a method for identifying discontinuities, initially labelled middlecasting (List, 2001b), later changed to midcasting. The latter label has more accurate implications, because “middle”
implies the centre of a time sequence, but discontinuities can occur at any time. Midcasting was developed for two reasons:

(a) To fill a gap that appeared in the early attempts to create a scenario network, which involved looking ahead with the futures wheel / multiple pasts approach, and looking back from morphologically derived “milestones” using backcasting. The two sets of networks thus created failed to meet convincingly in preliminary examples.

(b) Because the initial method of creating a scenario network map made it effectively difficult to place wild-card events (which by definition lack related antecedents) in the map.

The purpose of midcasting is to introduce events and forces which do not flow directly from the futures wheel or from backcasting. This is the point for the introduction of events not brought about by the direct actors. It can include natural events and disasters.

Midcasting was inspired by Brooks’ surprise theory (1986), and by the writings of Timmerman (1986), Petersen (1999), Ayres (2000), and van Notten, Rotmans, van Asselt and their colleagues (2001-2005). It can be most clearly described by the instructions for carrying it out: “Think of a possible event that may occur in the future of [this social entity]. For that event to occur, what would have to happen beforehand? And what later events would follow?” The result is a three-part sequence, with the main event in the middle, several preceding it, and several following it: a divergent lens structure. The form is that of the problem tree used in participatory development, with ZOPP (Helming and Göbel, 1997; COMIT, 1998) and some related methods (Rietbergen-McCracken and Narayan, 1998). For the purpose of SNM, it has been relabelled, more appropriately, as an event tree.

The initial approach to midcasting was to envisage events that would impede, enhance, or otherwise seriously affect the paths in a scenario network. These events would occur at any time, almost randomly, but would not be a logical consequence from the present (as in the futures wheel), nor a logical consequence of working back from the future (as in backcasting). The timescale for a midcast event might range from weeks to years.

Though the initial form of midcasting worked well in the first case in which I tried it, that may have been because I played a large part in developing the scenario network for that case. But in another case, when I left it entirely to a group of managers, they failed to consider some possibilities for their organization that seemed obvious to me. Reflecting on the latter case, I determined that a more systematic method of midcasting was necessary, in order to make the entire process more robust. It would at least build a framework into which wildcard events
could be placed. I therefore designed a systematic approach to midcasting, creating a matrix of few enough cells that each could be considered in a little detail. This was done by combining three dimensions of relevance:

1. subject matter domain
2. influence path
3. scale of effect.

**Dimension 1: subject matter domain**

Subject domain categorizations are widely used in strategic planning, marketing, and futures studies, most with a mnemonic acronym, expressed variously as STEEP or PEST.3

STEEP  (Fahey and Narayanan, 1986) = Social, Technological, Economic, Environmental, Political.


Though these are useful means of classifying events and trends that have already occurred, my fieldwork found four or five categories to be inadequate. Because those categories must be so broad, participants do not comprehend their full extent, particularly with the catch-all “social” category. Thus for imagining possible futures, a more specific set of categories was sought. On the other hand, two factors limiting the number of categories were the practical limitations on the concentration levels of participants (the more categories, the longer it takes to consider them all), and Miller’s (1956) finding that short-term memory cannot simultaneously grasp more than “7 plus or minus 2” categories. Since 7 minus 2 had proved insufficient, a revised goal was 7 plus 2. These considerations ruled out:

1. Exhaustive taxonomies, used in libraries and reference books – to cite a few well-known examples: the Dewey Decimal System, the Library of Congress System, and Roget’s *Thesaurus*. Though these are all hierarchical, to use only the top level of each hierarchy did not seem conducive the purpose of this exercise: to help participants envisage wild-card futures for their entity.

2. Further development of Linstone’s (1984) TOP (technological, organizational, personal) and Morgan’s (1997) Images of Organization. These are somewhat different from subject domains, in that any development can be viewed through each of these lenses. Though invaluable for other purposes, they were not relevant for midcasting.

---

3. PESTEL (adding L for Legal to STEEP) is also used, mainly in Britain.
3. The KEDS/TABARI and CAMEO coding frames (Gerner et al, 2002), designed for the content analysis of news events, were candidates for the taxonomy. Though these seemed attractive at first, they turned out to be more related to the format of news stories than a typology of events, and again were too detailed.

4. Marien's well-established environmental scanning framework has 17 categories (Marien, 2002) but that number would have been too large for use in a workshop situation.

Voros (2001) compared the STEEP taxonomy with Wilber's (1997) four-quadrant model of consciousness, and pointed out that STEEP covered only one quadrant: the exterior-collective. The individual and interior quadrants were omitted. Accordingly, I reviewed the coverage of some recent global scenarios: the Millennium Project's State of the Future annual reviews, the Future Survey newsletter edited by Michael Marien (World Futures Society), Glenn and Gordon (2002), and Petersen 1999). This review empirically confirmed Voros's judgement, finding that STEEP omitted four major areas of content:

Omission 1. Issues related to health and biology: not quite social, nor quite environmental (Wilber's individual-exterior quadrant).

Omission 2. Moral and ethical value, religious issues, consciousness, and the like. This corresponds to Wilber's individual-interior quadrant.

Omission 3. The world of arts, the imagination, entertainment, and cultural affairs. Though the STEEP and PEST categorizations could cover this under "social," this underplays the effect of the human imagination on the course of world events. The imaginative/artistic domain can strongly affect the future: a single imaginative work, stretching the Zeitgeist, can catalyse a change in perceptions. Here one might cite the works of Jules Verne and Arthur C Clarke, George Orwell's Animal Farm and 1984, and films such as Blade Runner. All of these have had effects, direct or indirect, intended or otherwise, on public policy or individuals' futures. This group corresponds to Wilber's interior-collective quadrant.

Omission 4. Information and communication, and their related institutions partly match the Technological element of STEEP, but since software is now widely referred to as being a "technology" (Dalle and David, 2003) it seemed more helpful to have a separate category for information and communications, focusing on the software aspects rather than the technology. This includes computing, telecommunications, and the media; it does not correspond directly to any of Wilber's quadrants.
Using those five original and four new categories, I attempted to construct a new mnemonic acronym, with no repetition of letters. The best combination found, in terms of pronounceability, meaning, and memorability was FARTHINGS:

<table>
<thead>
<tr>
<th>TABLE 5.6 A TAXONOMY OF CONTENT DOMAINS FOR MIDCASTING</th>
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</table>

Though that 9-class categorization still leaves “social” as something of a catch-all, it formed a starting point for the categorization of wildcard events. Though there may be some overlap between the categories, that is preferable to omissions, since the purpose of devising the acronym was to help ensure that no possible major development is overlooked.

**Dimension 2: Scale of effect**

The second dimension of midcasting is the scale of effect, both geographically and in terms of global social impact. The closer a wildcard event to an entity, the more likely the entity will be affected. For example if the entity is a factory and the wildcard event is a newly discovered type of water pollution, the effects will be very different if that pollution is in the neighbourhood of the factory, rather than overseas. Thus the scale might be viewed as a series of concentric circles: local/city, inside state/county/regional, inside national, inside continental, inside worldwide. In practice, three values (local, national, and worldwide) turned out to be enough, in the cases used to develop the Process.

**Dimension 3: Influence path**

To the extent that a wildcard event affects an entity, that effect usually takes place via an actor in the entity’s network of impinging systems. If the entity is a business, the effect of a large-scale discontinuity may be mediated through several stakeholder groups, including customers, suppliers, and government. A small-scale discontinuity may have a direct, unmediated effect – such as a fire in a firm’s office, destroying its customer records. Generally, the effect will be indirect; the shorter the chain, the stronger the effect.
Combining the dimensions
As dimensions 2 (scale of effect) and 3 (influence path) will vary for different types of entity, and because the purpose of morphological midcasting is to help participants envisage discontinuous events, there is little value in pre-constructing an all-purpose matrix. Instead, it will be more effective to use the above components to re-create a matrix for each foresighting exercise. Thus midcasting can be performed by explaining the FARTHINGS categories, and asking participants in a workshop to consider each in turn: “Think of unexpected development in this category that might have an influence on the future of [the focal entity].” Having decided on developments, participants can then be asked to determine the most likely influence path for each, and its likely scale of effect on the entity.

5.4.7 Selecting paths of possibilities
The Scenario Network Mapping method could be expected to produce scores of small scenarios, which might not be directly related to each other. Thus a network map produced on this basis could be difficult to interpret. To simplify it, the concept of scenario paths was introduced. Following the road-map analogy, just as towns in a heavily populated country can be reached through a structure of highways and back roads, this need was equivalent to a highway system. Such a system is created deductively: a set of mutually exclusive long-term possibilities for the entity under study.

However, I wanted to avoid a problem that occurs with traditional scenarios: the concept of “endstates.” Traditional scenario planning (as described by Schwartz, 1991) involves creating scenarios around “endstates” or “snapshots.” Though the concept of a stable endstate is common (the Endless-rainbow axiom), endstates are never actually reached:

“...transition from state A, the present, to a state B that's sustainable. The problem is that there is no such state. You have to assume that the transitions are going to continue forever and ever and ever.” (Complexity theorist George Cowan, quoted by Waldrop, 1992, p356)

“The stages into which you analyze a change are states; the change itself goes on between them.” (William James, 1909/1996, p236)

Though endstates may be part of an imagined future, they exist only in the mind. By separating chronos and kairōs, an endstate can be seen as an aspect of the latter, rather than a point in time. In fact, the concept of an endstate is a westernized notion, from an achievement-oriented culture: contrast the Christian and Islamic concept of Heaven as a place resembling a tourist resort, with the Buddhist concept of Nirvana: more a state of mind (Eliade, 1949).
Therefore, instead of endstates, the backcasting moves back from a set of milestones: a knowable point on each selected path. Scenario paths can be defined in two broad ways: the participative and the morphological.

1. Participative methods include Andersen and Jaeger’s scenario workshops (1999), search conferences (Emery and Purser 1996), Weisbord and Janoff’s future search (1995), appreciative inquiry (Cooperrider, 1986) and my own co-discovery conference method (List 2002b and 2004c). The wider the range of participants in the definition process, and the more types of viewpoint included, the less likely it is that a possible development will be overlooked (Galtung 2003a, 2003b).

2. Morphological methods (Zwicky, 1969) and the related fault-tree analysis (Roberts, 1992) are based on logic rather than participants’ imaginations, and involve defining a set of mutually exclusive possibilities. These can either be developed for the particular case in hand, or a standard set can be used – such as Amara’s (1981) tripartite division of scenarios into the possible, the probable, and the preferable, Emery’s division into preferred and default futures (Emery and Purser, 1996), and Dator’s (1998) four generic scenarios: continuation, collapse, disciplined society, and transformational society.

The difference between the participative methods and the morphological methods is that the former work inductively, from the particular (ideas of participants) to the general, while the latter work deductively, from the general (logical alternatives) to the particular. In practice – as I discovered – it is beneficial to use both methods together, priming participants by suggesting several morphological sets, then adjusting these to fit the entity being studied. Combining the inductive and deductive approaches can help to illuminate dark corners that participants (often managers of the focal entity) may not initially have liked to consider – such as the demise of the organization that employs them.

An advantage of scenario paths over endstates is that the paths are routes rather than an ends. After the paths are delineated, a “milestone” is defined, corresponding to partial attainment of the relevant actor’s goal. From each of those milestones, backcasting can begin. It is then possible to backcast to more concrete and attainable situations. However, because milestones are points rather than endstates, there is still opportunity to mentally move beyond them: toward eutopia (classical Greek for “good place”: Peters and Humes, 2003) – as opposed to the utopias or dystopias that endstates can appear to be.
5.4.8 Backcasting multiple chains

Backcasting (Robinson 1982, 1988; Dreborg, 1996) is like a chain scenario in reverse: participants begin at a milestone, then work backwards in time to determine what events must take place for that outcome to occur. Backcasting is similar to the CPM and PERT planning methods used in the engineering and construction industries and NCRI/Nervewire's "Future Mapping" (Mason, 1998). In the case of this Process, and bearing in mind the leaf of goals, backcasting is modified, to allow for the fact that there can be multiple ways of achieving a goal. The futures tree of Alexander and Serfass (1999) is similar to backcasting, with multiple paths coming back from a single main goal. Their variant of backcasting resembles a futures wheel in reverse, rather than a chain scenario in reverse. For this Process, the backcasting component extends and reverses this futures tree, by defining multiple (and perhaps recombinant) paths to several possible endpoints.

Just as the futures wheel can begin in the past, backcasting need not end at the present. Nor need backcasting avoid describing precursors for events that seem not to have happened – sometimes revisionism is necessary, and counterfactuals or alternative histories can be seen to have always existed. (A recent example, covered in chapter 8, is the 2003 war in Iraq, for which the initial reason given was Iraq's "wepons of mass destruction.")

Backcasting from these multiple presents helps to reveal the multiple pasts – for example the pasts of subsystems and stakeholder groups, a received organizational view, and maybe some revisionist views.

5.4.9 Linking the elements

Having established possible forward, backward and discontinuous chains of events, the final step is to link them together, creating chains of association. When the chain of events flowing forward from the futures wheel meets the chain of events flowing back from the backcasting, both sequences can be refined in the light of the other. It may require several iterations before the initial states can plausibly lead to the final states. Midcast elements are inserted into the sequence at appropriate points.

Sometimes it is possible to introduce a degree of quantification. Time lags (or at least ranges of lags) can be shown between related potential events. Approximate probabilities can be estimated, along with confidence intervals for these. The degree of effect of events on the system will vary, and some events could be noted as being crucial to encourage or avoid.
When a scenario map is complete, it is possible to trace a large number of different routes through it. Sequences may flow through several possible routes, so that even if some events fail to occur, outcomes may be much the same. For example, World War I may still have taken place, even if Princip had not had the opportunity to assassinate Archduke Ferdinand in Sarajevo (Kahn, 1961, pp357-375; Glennan, 2000, p20; West, 1942).

### 5.4.10 Use of the axioms

The following table demonstrates how the axioms stated in the previous chapter are applied in the Process.

<table>
<thead>
<tr>
<th>Axioms of predictability</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuity: Futures have roots in the present and past.</td>
<td>Hemisphere model placing the present in the centre (horizontally).</td>
</tr>
<tr>
<td>2. Limited knowledge: Though future events cannot be fully known, nor can past or present events.</td>
<td>Assuming that each actor group has a different construction of the past and present.</td>
</tr>
<tr>
<td>3. Partial predictability: Futures are partly predictable: the less specifically an event is predicted, the more predictable it is.</td>
<td>Use of broad holons instead of specific scenarios.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Axioms of interconnection</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Endogenous/exogenous: The future of any social entity is partly planned by itself, and partly unplanned.</td>
<td>Combining actors’ intentions and external forces on the same scenario map.</td>
</tr>
<tr>
<td>5. Holonic perception: Any system can be seen both as a group of sub-systems and as part of a larger system.</td>
<td>Use of holons to incorporate events, situations, and processes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Axioms of impingement</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Social impingement: The future of a social entity is influenced by others it communicates with.</td>
<td>Multiple actors’ networks can be shown on the same scenario map.</td>
</tr>
<tr>
<td>7. Communication proximity: The fewer intervening actors, the more the entity will be influenced.</td>
<td>Use of Stakeholder Star to plot distances between actor groups.</td>
</tr>
<tr>
<td>8. Power influence: The mutual influence of any two communicating actors is determined by their relative power.</td>
<td>Use of Stakeholder Star to select more powerful actor groups to include on the scenario map.</td>
</tr>
<tr>
<td>9. Embeddedness: The exogenous future of any entity is largely the result of exchanges between it and other entities.</td>
<td>Use of Stakeholder Star to consider likely and possible exchanges with more powerful actor groups.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Axioms of permanence</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Endless rainbow: There is never an end state.</td>
<td>Backcasting on scenario map does not extend as far as actors’ end goals being fully attained.</td>
</tr>
<tr>
<td>11. Desired stability: Though there is no end state, humans are comforted by acting as if one exists.</td>
<td>Use of leaf of goals and backcasting, to work back from end goals to the present.</td>
</tr>
<tr>
<td>12. Plateau horizon: The rate of perceived change varies, and plateaus may appear to be permanent.</td>
<td>Use of midcasting to foresee possible discontinuities helps dispel the impression of a plateau.</td>
</tr>
</tbody>
</table>
13. Multi-cause:
Almost no human event ever happens for a single proximate reason.

14. Multi-effect:
Almost no human event ever has a single result

15. Enchainment:
An effect of one event may be a cause of a subsequent event.

16. Decision-linking:
No human event directly causes another event: they are linked through decision (or indecision)

— Axioms of causation —

<table>
<thead>
<tr>
<th>Axiom</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowed for in Motives layer of hemisphere model.</td>
<td></td>
</tr>
<tr>
<td>Allowed for by branching in scenario map in Event layer.</td>
<td></td>
</tr>
<tr>
<td>Event layer on hemisphere allows this, through use of futures wheel, backcasting, and event trees.</td>
<td></td>
</tr>
<tr>
<td>Events on the scenario map are separated by intentions.</td>
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</tbody>
</table>

5.5 Review of this chapter

This chapter concludes by comparing the Process, as described above, with the criteria established in chapters 2 and 3. Now that the new Process has been outlined, it becomes possible to compare it against the criteria from those chapters. Finally in this chapter is a discussion of the problems, limitations, and shortcomings of the Process as designed.

5.5.1 Comparison of method with criteria

Chapter 2, on reviewing trends in methods of foresighting, determined that an appropriate new method would satisfy these broad design indicators:

I1 scalable across a wide range of entity types and futures scopes;
I2 verifiable: occurrence or non-occurrence can later be established;
I3 transparent: assumptions visible and therefore challengeable;
I4 nimble: quick to develop and change;
I5 eclectic: using a diverse range of input data;
I6 usable: facilitating action to anticipate change.
I7 It would include aspects of critical futures thinking, technology roadmapping, and the anticipation of discontinuities.

Chapter 3, based on a review of the literature on evaluating futures methods as well as conclusions from the study in Appendix 1 of scenarios for 2000, arrived at the following design criteria:

D1 Enable a reflective process, but with efficient use of time.
D2 The process should be quick, and efficient, and nimble.
D3 Integrate various methods, approaches, and data types.
D4 Include wide diversity of viewpoints / broad range of scenarios.
D5 Probe behind the issues, focusing on underlying drivers.
D6 Extend the focus beyond the short-term future.
D7 Include a means of anticipating discontinuities.
D8 Look back into the past to see the future emerging.
D9 Consider how technological and social aspects may interact.
D10 Use an approach that helps to ensure comprehensiveness.
D11 Include narratives to describe change processes.
D12 Output should be readily understandable by all concerned.
D13 Focus on the situation of the entity in its changing environment.
D14 Produce the output in a format conducive to “drilling down.”
DE1 Organize workshops involving a wide range of stakeholders.
DE2 Participants have a clearer perception of their desired futures.
DE3 Output must be trackable and confirmable.

Criteria beginning with D are purely design criteria: properties of the design of the Process. Criteria beginning DE are assessable at both the design and the execution stages. The method outlined in this chapter fulfills all of the above criteria in various ways, as the following table demonstrates. The following table reports on the fulfillment both of the indicators from chapter 2 and the criteria set up in chapter 3.

### Table 5.8 Summary of Fulfillment of the Design Criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Means of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1, D14</td>
<td>Output in format conducive to re-analysis and expansion of detail as needed. Enabled by defining scenarios as holons. Each holon can become an entire scenario network.</td>
</tr>
<tr>
<td>I2, DE3</td>
<td>Verifiable / trackable and confirmable. Upper (event) layers can readily be verified. Attitude and value data can be gathered through surveys.</td>
</tr>
<tr>
<td>I3</td>
<td>Transparent: assumptions visible and thus challengeable. Graphic layout makes assumption trails clear.</td>
</tr>
<tr>
<td>I4, D2</td>
<td>Nimble: quick to develop and change. Enabled by holonic approach, providing a broad structure first; details can be added later. Large number of small scenarios: can be easily rearranged or individually modified.</td>
</tr>
<tr>
<td>I5</td>
<td>Eclectic: using a diverse range of input data. Enabled by impinging-systems approach and the layered methodology.</td>
</tr>
<tr>
<td>I6</td>
<td>Usable, in anticipating change. Graphic layout can be used like a road map of the future, to check current location.</td>
</tr>
<tr>
<td>I7, D7</td>
<td>Include elements of (a) critical futures, (b) technology roadmapping, and (c) anticipation of discontinuities. Included in the form of (a) layered approach, (b) graphical display, and (c) midcasting.</td>
</tr>
<tr>
<td>DE1</td>
<td>Organize workshops involving a wide range of stakeholders. Participative design method, with roots in Search Conference, Future Search, Appreciative Inquiry, and similar OD interventions.</td>
</tr>
<tr>
<td>D1</td>
<td>Enable a reflective process, but with efficient use of time. 4 main sessions, separated by periods for reflection. Process can be completed in a month.</td>
</tr>
<tr>
<td>D3</td>
<td>Integration of various methods, approaches, and data types. Includes many elements of other futures methods. Each node and transition can be a separate data type, as relevant in that situation.</td>
</tr>
</tbody>
</table>
The above table demonstrates that the method outlined in this chapter fulfills all the design criteria, due to the combination of principles included in the Process. Note that the Process as defined to this point is simply one method that meet the criteria: there may be many other futures methods that also meet the criteria.

However the fulfilment of design criteria is not sufficient to guarantee the viability of the Process, because the success of any process hinges on how well it is performed – often incorporating small changes arising from experience during its execution. Some modifications may relate to the process, but the criteria themselves (which were developed before gathering empirical data) may also need to be modified. In other words, the experience of execution of the Process may modify the design criteria. (In fact, many modifications were made to criteria during the case studies. Some criteria were added, some were combined, and many were reworded. To avoid confusion, the criteria listed above are the final versions.)

Therefore it was not feasible to finish the thesis at this point, simply stating “Here is a method that must be viable, because it fulfills all the design criteria.” Consequently, chapter 7 develops a method for working through the Process in a variety of situations, chapter 8 analyses each of those situations, and chapter 9 compares the outcomes with the criteria for execution, and offers some changes to the Process described above.
5.5.2 Limitations of the Process developed in this chapter

The scenario network approach has several obvious problems and disadvantages. The major practical problem is that of complexity. It would be useful to be able to show an entire scenario network on a single sheet of paper, but all attempts at this have produced a tangled mess of lines. (Though several examples are presented on a single page in Appendix 4, these are summaries rather than full networks.) Though this complexity reflects the messiness of reality, it is difficult to interpret clearly. A software-based display is possible, and several graphical packages exist that can be used for this purpose. Having tried some of these, their major disadvantage is that, though they clarify the links at a small scale, one loses the broad sweep of potential events, because of the limited size of a computer screen.

A further limitation of a scenario network map is its inability to clearly show feedback effects. Because the horizontal axis is time, the only way to show feedback (without creating a confusing combination of a flow charts and a cognitive map) is by repetition of links and events.

A more fundamental objection is that a set of arcs and nodes, no matter how complex, can never reflect all possibilities. Are there really distinct paths through such a network, or is it all one undifferentiated mass? Humans have a predilection to detect patterns where none exist, and to use these for prediction - including "reading" tea-leaves, seeing constellations in the night sky, and the Rorschach inkblot test. Perhaps, in some cases, there are an infinite number of possibilities, not a small number of paths. Oversimplifying the possibilities by drawing paths may blind us to reality. Discussing the biological counterpart of this problem, Waddington (1977) mentions the concept of *chreods* or "necessary paths": some biological combinations, though theoretically possible, are not found - creatures with five legs, for example. If certain combinations of situations are less likely than others, this could be represented on the scenario map by introducing a third dimension, analogous to hills. The easiest (thus perhaps most likely) scenario paths would be in the valleys: what Waddington (1977, p106) describes as "epigenetic landscapes." The practical difficulty, of course, lies in defining these probability densities. Therefore, while acknowledging this problem, I have set it aside, because it would be a major (and exceptionally difficult) study in its own right. In the meantime, paths are determined participatively and morphologically, as explained above.
Chapter 6: Methodology

6.1 Introduction

This chapter both describes and defends the methodology chosen for this thesis. It investigates the possible ways of solving the research question, by investigating the means by which other research methods have been developed — but found no methods that had been systematically developed. Next, it describes the chosen set of methods, the reasons for making the choice of action research, and the particular type of action research found most relevant. The chapter concludes with a brief section identifying the limitations of the evaluation method and the provisions for rigour incorporated in this research.

Because of the central research question, this thesis is unusual in that it involves two interwoven studies: not only developing the scenario network technique, but also evaluating the success of the development work. Therefore, in principle, two methodologies are involved: the development method and the evaluation methodology. Initially, it seemed self-evident that the most appropriate way to develop a method was to work through a number of widely varying cases, to discover which components worked well, which needed improvement, and what interactions might exist between the different components.

Thus from one point of view, the methodology was developed iteratively, and therefore the methodology used for development should be the same as the methodology being developed; a solution referred to in the computer systems environment as "bootstrapping." But on the other hand, simply developing the methodology may not be sufficient for a thesis, because there is also a need to justify and instrument the development process itself. Nor was it feasible to separate the development and the evaluation, because they both concerned one process, with one group of people (for each case). In summary, the only feasible solution was to use some form of action research.

6.2 The choice of a development method

This section explores the literature of social research in an attempt to discover criteria for a useful method for developing a methodology.
6.2.1 How other social inquiry methods have been developed

The first issue was how to go about developing the proposed method: not quite a research method, nor exactly a planning method, but a hybrid of the two: the term "social inquiry" (used in the broad sense of Dewey, 1938/1986, chapter 24) covers it well. I began by reviewing the literature to determine how other social inquiry methods had been developed. When setting out on this thesis project, I assumed that many other people would have written a thesis in which some type of social inquiry process was developed. My intention was to find how others had developed inquiry methods for their doctoral theses, and choose the most appropriate of these for developing the Process.

However, after a lengthy search, I found only one relevant thesis: that of David Cooperrider (1986), the developer of Appreciative Inquiry1. Cooperrider did not set out with the intention of developing a research process. His original intention was to evaluate the effectiveness of management in a large hospital, using action research. However, being highly impressed with the hospital's collegial management system, he developed the germ of the Appreciative Inquiry method (which is now widely used in OD work). Since he had no initial intention of developing a process, the development process itself was not described in his thesis. In fact, the first 61 pages make no mention of appreciative inquiry; they are mainly about action research. Thus the sudden appearance of the term "appreciative inquiry" on page 62 caused me to turn back and check that no pages had been omitted. A single case (management of the hospital) was used in the development. Later writers on Appreciative Inquiry (e.g. Elliott, 1999) developed the method further by exercising it in a variety of situations, particularly in organizations and communities in developing countries.

Since Cooperrider's thesis did not record the methodological development process in detail, I extended my literature search to include other work by social scientists, published as books or articles – but preferably as books, because of the detail I hoped to find. My search sequence, in descending order of relevance was on (1) futures studies methods; (2) qualitative methods of social inquiry, and finally (3) quantitative methods. Choosing well-known and widely used methods in each case, the specific literature searches were as shown in the following table (which, for completeness, includes Cooperrider's work). For each method I identified a early and thorough reference, which could have been expected to have included citations to the development of the method.

1. Almost when this thesis was completed, I discovered the thesis of Juanita Brown (2001), in which she developed the World Café method, seemingly without varying it from its initial form, but with a prior gestation period of around five years' work in developing methods for facilitating dialogue.
In brief, almost all of this research drew a blank. The original sources were often very scanty, when it came to describing the development of the method: seldom more than several paragraphs. As an example, the following section reviews attempts to unearth the original development of the focus group and of action research.

6.2.1.1 Development of the focus group

Even for such an extensively documented method as focus groups, and even given the existence of two versions of a book by Merton, the acknowledged developer of the method (Merton & Kendall, 1946; Merton, Fiske & Kendall, 1956 and 1987) as well as a recent book on the history of the method (Morrison, 1998), the most detailed account I found of the initial development of focus groups occupied only a single page, recounting a 1941 meeting between Merton and Lazarsfeld. Also, this page was about focused interviews, which are not the same thing as focus groups, but from which focus groups were evidently derived. As with Cooper-rider's thesis (1986) it seemed that the origination of the focused interview was almost serendipitous: a discovery, as opposed to an invention.
Merton, Fiske and Kendall (1987) and Morrison (1998) describe Merton's role in the origin of focus groups, as beginning with his attendance at a group workshop with Paul Lazarsfeld in 1941. Merton criticized the procedures, and Lazarsfeld invited him to "show us how the interview should be done." Drawing on his experiences interviewing unemployed people in the 1930s for the WPA, Merton then developed the principles of focused interviewing. He distinguishes between the "focussed interview" and the "focus group." The 1956 rewrite of the manual by Merton, Fiske, and Kendall, and the paper by Merton and Kendall (1946) do not distinguish between the focused interview of an individual and a focused group interview. In fact Merton, Fiske, and Kendall (1956) devote no specific section to the group interview, but simply suggest that the methods for interviewing individuals can also be applied to groups of individuals. They do not discuss the contribution added by interaction between participants.

6.2.1.2 Development of action research

Though the founder of action research is generally acknowledged to be Kurt Lewin, in his 1946 paper, some writers have traced much earlier origins. For example, Hart and Bond (1995) acknowledge the work of Collier and others in the 1930s and early 1940s in the USA, and McKernan (1991) sees action research as having developed from the Science in Education movement in the USA in the late 19th century. However, Lewin's 1946 paper was the first to use the term, though its focus was resolving problems in inter-group relations; action research is barely mentioned. From the context, it appears that the method was fairly new, but nothing is stated in that paper about how the method was developed, or by whom. The key contribution to action research in Lewin's 1946 paper is the cyclic concept of planning, action and reflection.

6.2.1.3 Development of the consensus group technique

Given this surprising absence of documentation, I turned (as a last resort) to a qualitative method that I developed myself: the consensus group technique (List, 1997; List, 2001a; List and Metcalfe, 2004). This method, beginning in 1987, gradually evolved because:

(a) In my work as research manager for a broadcasting organization, I was expected to provide audience research data for many more regional radio stations than the research budget could afford.

(b) Many of the regional managers were interested in doing their own small-scale research.

(c) As their education (generally in journalism) had focused more on linguistic than mathematical skills, this indicated that qualitative methods might be more successful than surveys.
However, they had neither the training in psychology nor the experience necessary to moderate and analyse focus groups effectively.

Nor did they have skills in the use of software, except word processing.

They had vested interests in finding that their work was successful.

Thus the need was for a social research method that would use the verbal skills of journalists, could be easily learned, could be done at low cost without special software, and would produce undistortable findings. My position as research manager enabled me to facilitate and coordinate the development of a method that fulfilled these criteria.

Development of the consensus group technique began in 1987 with some experiments combining elements of nominal groups (Delbecq, van de Ven, and Gustafson, 1975) and public meetings, as well as the “new interaction method” of Doyle and Straus (1993). Since part of my work involved qualitative research, I began to vary the moderation and analysis procedures of group discussions I conducted, to better meet the above criteria. Through trial and error, over a period of ten years, the consensus group method gradually emerged. I did not set out initially to create a new research method, originally regarding it as a variant of the focus group. It was not until the 1990s, after at least five years of sporadic development (and around 20 studies), that I realized how different this method had become from standard focus groups. The only development of the method involved noting problems of implementation, and using the next opportunity to try to overcome them. By 1997 the method had become stable enough that I could give it a name, outline it in a manual for broadcasters in developing countries (List, 1997), and train others in its use.

Because the method was developed for practical rather than academic purposes, and I was employed as a non-academic media researcher, no particular attention was paid to documenting the development process. To generalize, that process was:

1. Client has specific need.
2. Review existing research methods, finding none that seem meet the need.
3. Imagine a new method that might do so (based on knowledge and experience of using other methods).
4. Trial that new method.
5. Review the client’s need in the light of the outcome.
6. Reflect on possible ways of making the method more effective.
7. Continue to cycle between stages 4 and 6. If the method does not reach a threshold of perceived effectiveness, go back to step 3.
Step 5 (reviewing the client’s need) turned out to be crucial: it re-examines the function that the method was designed to fulfill. Even if the method does not fulfill the function originally perceived, the perception of need in a large organization is never clear-cut; often it is not initially evident that an expressed need has another underlying purpose. Therefore, the development cycle was not simply a matter of evaluating the new method against fixed criteria. Both the criteria and the method were continuously evolving; by varying the two factors together they were more able to fall into alignment – labelled the “Swiss cheese” effect by Reason (1990).

6.2.1.4 Outcome of the review of how other methods were developed

Some conclusions from the methods summarized in Table 6.1 are that:

1. Most of these methods seem to have been developed long before they were first documented.
2. Some of the methods seem not to have been developed intentionally. Rather, the developers realized after several iterations that an inquiry method was being formed.
3. Some of the developers seem to have begun with one or two central ideas, and developed the method from those ideas. Thus the focus group began with the ideas of a group interview and the focusing sequence; action research began with the planning-action-reflection cycle, and the consensus group technique began by combining focus group principles with the meeting procedures of Doyle and Straus (1993).
4. I found no evidence that any of these methods had been systematically developed from the start.

In general, the development seems often to have been opportunistic: a problem presented itself, a researcher improvised a solution based on one or two central ideas, found that it seemed to work, and eventually published it as a new method. Often, others took it up in a modified form, developing it further. However, the fact that the above methods were developed in something of a haphazard fashion is no reason why a more systematic approach would not be more productive – and perhaps enable more rapid development, to a point where the method was settled.

I eventually realized that my own experience in developing the consensus group method, far from being atypical (as I had previously thought), could in fact be the norm. Given the failure to find even one well-documented account of the development of a research method, the inescapable conclusion for the present Process was that I was very much on my own. In other words, my task was twofold:
developing the method of futures studies, and
devolving a method for developing that method.

Following Chapter 5, which has covered the first of those two tasks, the second will now be considered.

6.2.2 Eight considerations for choice of a development method

The possible ways of developing a research technique can be categorized as a set of choices, of which eight were clearly relevant to the present study. The following table presents these choices, and summarizes the answers obtained. Justification for these answers is provided in the remainder of this section.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Answer for SNM</th>
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<tbody>
<tr>
<td>1. Does the development of the method require empirical data?</td>
<td>Yes</td>
</tr>
<tr>
<td>2. If so, can the developer rely on existing (secondary) data – or must primary data be collected?</td>
<td>Mainly primary, some secondary</td>
</tr>
<tr>
<td>3. If empirical data is necessary, is a “gold standard” quantitative method (such as a controlled experiment) feasible?</td>
<td>No</td>
</tr>
<tr>
<td>4. Should a summative or formative approach be used?</td>
<td>Formative</td>
</tr>
<tr>
<td>5. Are formal hypotheses appropriate in these circumstances?</td>
<td>No: use evidence-based approach</td>
</tr>
<tr>
<td>6. Should the method be developed in a single study, or multiple studies?</td>
<td>Multiple cases</td>
</tr>
<tr>
<td>7. If multiple studies are used, should they be sequential or simultaneous?</td>
<td>Sequential</td>
</tr>
<tr>
<td>8. If a quantitative method is not feasible, which qualitative method (or combination) is most appropriate?</td>
<td>A form of action research</td>
</tr>
</tbody>
</table>

The following diagram presents the above sequence of decisions in graphical form. For the sake of clarity, the process is shown as a sequence, though in practice some of the decisions had to be made simultaneously.
Figure 6.1 Sequence of Methodological Decisions
Issue 1. Use empirical data?

The first issue to address was whether the research question was one that required empirical data, or whether it could be resolved theoretically. Alvesson and Sköldberg (2000) discuss this question, pointing out that empirics are not always necessary for the development of a theory.

Though it would be possible to develop a method purely “on paper,” any method derived solely from introspective sources (not necessarily from a single person) would run a serious risk of being found deficient when put into practice, on the first occasion it encountered an unexpected set of circumstances. After working for some years in media research, my experience was that it is never possible to predict exactly how a study will turn out – either in terms of findings or of methodological issues. Thus it seemed likely that a “thought experiment” approach (Horowitz and Massey, 1991; McAllister, 1996) would be likely to miss important issues and might not uncover some important problems. Also, because the focus of this Process was to be anticipating the future, and the future is notoriously unpredictable, it seemed particularly unwise to try to develop a method without using empirical data. Therefore an empirical approach was chosen.

However, a method cannot be developed using only empirical data, which has no intrinsic purpose. To anticipate a later section of this chapter, an action research approach was chosen because of its cycling between the empirical data and the conceptual framework set out in chapter 4. By beginning with extensive reading, not rushing into the fieldwork phase of the research, discussing my ideas with other futurists, presenting several preliminary papers, and taking part in email discussion groups about the future, I was able to improve the planned technique before beginning the fieldwork.

Issue 2. Collect primary data?

Given that empirical data was necessary, the question arose as to whether it was possible to rely on existing data (either published or unpublished) or whether primary data had to be collected. Because the method I was proposing to develop was one that relied very much on the participation of individual stakeholders, it was clear that the empirics would need to come from primary sources. However, because it was possible that the use of secondary data would reveal different issues from the use of primary data, a decision was made that at least one example should be based on secondary data – but that such secondary data should be very different from the example using primary data.
Issue 3. Quantitative or qualitative approach?

(a) Implications of a quantitative approach

The quantitative approach normally involves deriving hypotheses from theories, expressing the hypotheses in terms of operational variables, and measuring the mathematical relationships between sets of variables. This set of methods was developed over the last few hundred years by scientists studying the physical world, and was labelled “positivism” in the early 20th century, as outlined by Whitehead and Russell (1910/1962) in *Principia Mathematica*.

However, the logical rigour of quantitative research begins with the statement of hypotheses, and ends with the evaluation of the hypotheses based on the data collected. This is only the central part of the scientific process: it is preceded by the selection and generation of hypotheses, and often followed by an attempted generalization to a wider situation. To that extent, quantitative research is positivist only in its core process, as noted by Gephart (1988).

How would a quantitative approach be manifested in the present case? In positivist thinking, the most rigorous possible approach would be to set up a formal experiment, using the methods developed by R A Fisher (Box, 1978). Light, Singer and Willett (1990) typify this position by stating that “to establish a causal link you must conduct an experiment.... Of the three research designs we discuss [descriptive, relational, and experimental], only experimental inquiries allow you to determine whether a treatment causes an outcome to change” (cited by Maxwell 2004, pp243-244).

As a thought experiment, I designed a positivist approach to the development of the Process:

<table>
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<tr>
<th>This design would use the “gold standard” (Campbell and Boruch, 1975) RCT method: the random controlled trial, or formal experiment. One set of cases (using the Process) would comprise the experimental group. To avoid any expectancy effect (Draper, 2004) the control group should receive some kind of placebo treatment – which might be some standard method of scenario planning. To maximize measurement sensitivity, cases would be matched pairs (as similar as possible within each pair) and within each pair, randomly allocated to the two conditions.</th>
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<tr>
<td>The minimum sample size for a quantitative study is generally regarded as being around 100: barely enough to detect a difference of around 5%, at a 95% level of confidence – without allowing any breakdowns of the sample. That sample size would apply to both the experimental and the control groups, producing a minimum sample of 200 cases. This means not 200 individuals, but 200 studies using the Process.</td>
</tr>
</tbody>
</table>
To guard against experimenter effects, there would have to be at least two experimenters, dividing their work at random between the experimental and the control groups.

The main hypotheses would be that the Process (in some specified ways) improved the performance of a social entity that underwent the Process. These specified ways would be measured using a combination of performance data and surveys of those involved. The experiment would be preceded by a preliminary survey, which would be used to develop a set of factors from the questionnaire. The factor analysis data would be used to refine the main instruments: two matching questionnaires, known from the pre-test to produce the same results. Each instrument would probably include around 100 variables, producing perhaps 3 or 4 near-orthogonal factors.

Before the intervention, the instrument would be applied to measure baseline data among those to be involved. Because the intervention could not be assumed to have immediate effect, there would have to be a time lag to allow for any implementation.

Since social change is slow, and that the Process is designed for looking at least some years into the future, it would be at least three years before the success (in that positivist sense) of SNM could be evaluated: the length of the evaluation period, plus probably several more years waiting for comparative statistics to be compiled and published. And as I found in my case studies, negotiating co-operation, finding a suitable time, and preparation of a set of scenario workshops can be a lengthy process: in some cases more than a year; it would take longer still to coordinate hundreds of organizations. Thus the time lag could well be 6 years.

After that period, the second instrument would be applied. Two matched instruments would be used, to avoid any problems of respondent memory of the initial questions. The difference in scores between the "before" and "after" measures, after taking into account the effect of the two control groups, would estimate the effectiveness of the Process.

That, then, is the quantitative methodology: the most "standard" method. However, for many reasons it was not feasible in this situation:

1. The scale and cost would be enormous: hundreds of cases – each involving the equivalent of several months’ full-time work with an organization whose future was to be studied.

2. There is no accepted standard scenario method that could be used for the control group. To design such a method would be to create an artificial standard – so the comparison would be between two broadly similar methods. Thus it would be advisable to include a second control group, in a “do nothing” condition – increasing the sample size and cost by 50%.
3. It would be difficult to find hundreds of organizations willing to co-operate with the study, particularly as only a third of them would be receiving the treatment hypothesized to be better.

4. The above description covers only a single study – but it is highly likely that results could be inconclusive, and that a further study would be required to clarify them... and probably several more studies, all on the same scale.

5. The rigid procedures necessary for successful accomplishment of such a large-scale study would make it impossible to introduce minor improvements to the method, except after each round of studies.

6. Because of the long time delay, particularly after multiple rounds, it is likely that social change would have superseded some of the earlier findings by the time the study was completed.

7. Bearing in mind Scriven's (1967) distinction between summative and formative evaluation, there is one further problem: that the entire exercise is misconceived. The above description is of a study designed to answer the summative question "Is this new method better than the method used in the control groups?" However, in methodological development, a more appropriate question is "How can this method next be improved?"

Thus the positivist approach was simply not feasible for developing the Process. Having considered and rejected the positivist model, I next considered a qualitative approach.

(b) Implications of a qualitative approach

The qualitative approach, which until recent years has not been generally regarded as "scientific," tends to be used mostly in the social sciences, while the positivist approach is dominant in the physical and natural sciences. In contrast with the quantitative approach (in which "variables" are tightly defined, do not overlap, and can readily be measured) the qualitative approach deals with concepts which are often not clearly defined, or for which there exist a range of interpretations. As the analytical tool used by qualitative researchers is words rather than numbers, verbally oriented research techniques are normally employed — though not always; for example, content analysis, essentially a quantitative technique, has been widely used by qualitative researchers.

Qualitative research has been more concerned with identifying and distinguishing concepts, rather than measuring them. When a variable can be precisely defined, it can be measured and if its occurrence is frequent enough, it can be usefully studied using quantitative methods.
However, in the social sciences, where many factors may simultaneously apply and overlap, the selection of relevant variables is a much more subjective assessment than in the case of the physical sciences. The difference arises because the social sciences have to deal with human language, while the physical sciences are confined to observation and physical measurement. If objects such as the moon employed publicists, to whom all questions had to be referred, physical scientists would have a much more difficult task, because of the human characteristic of reflexivity (Steier, 1991). What if one H in H2SO4 lied when asked about its local molecule, because it perceived sulphur dioxide as undesirable? And what if the moon gave an evasive reply, when asked “Where were you on the night of the 28th?”

Though it is possible to observe and measure human behaviour at the individual level without involving the subjects of the research, and even to formulate law-like generalizations about the behaviour of individuals en masse (such as the use of Dirichlet models in consumer behaviour: cf. Goodhardt et al, 1984), the value of observational measurement becomes more problematic as the scale of observed behaviour grows. Behavioural patterns may be established, but without knowledge of the purposes of those involved, prediction is fragile. I thus incline to support the view (frequently expressed by hermeneutic philosophers) that social science requires a different research approach from the traditional sciences — but on empirical rather than a priori grounds.

Some evidence for this is that 100 years’ research in psychology and related areas using the positivist approach has failed to produce a general theory that can be used to successfully predict human behaviour (cf. the review of forecasting in chapter 2), in the same way that (say) in the 17th century Newton developed laws to accurately predict the behaviour of objects in motion. As stated by Nagel:

In no area of social inquiry has a body of general laws been established, comparable with outstanding theories in the natural sciences in scope of explanatory power or in the capacity to yield precise and reliable prediction. (Nagel 1961, p447)

More than 40 years later, this statement is still true of the social sciences. The continuing lack of usable “laws” for predicting human behaviour can be viewed as a rebuke to positivism as the dominant tradition in social science. I am not suggesting that a qualitative approach would somehow uncover such laws; rather that general laws (in the sense of those of Newton) are not likely to yield useful predictions, because they would be so general, and because human decisions result from the interplay of many considerations. Thus the concept of “forces” (borrowed from Newton) may not be a useful analogy to apply to human futures.
(c) Choice of method

Eisner and Peshkin (1990, p11) discuss various perspectives on the state of research methodology. They distinguish four types of approach:

1. Those who regard conventional [i.e. positivist] and qualitative approaches to research as complementary. They argue that each approach is good for a particular class of problem. They cope with methodological pluralism by holding that it is the question that should drive the method, not vice versa.
2. Others hold that qualitative research is basically a soft and less trustworthy version of the real stuff. Their view is that qualitative research might be good for exploratory work...
3. Another group holds that it is conventional methods that are suspect. Methods based upon a deterministic causal model simply do not fit the arenas in which human action takes place.
4. Another group denies that there are any differences between qualitative and conventional research. Epistemological differences are, in their view, grossly exaggerated.

The position adopted for this thesis derives from the first of the above categories: that the nature of the problem determines the approach. Given the nature of the present Process, the third approach applies in this particular situation. For developing a futures studies methodology of this type, a positivist quantitative approach was untenable, and a qualitative approach was chosen.

Issue 4. Summative or formative?

Scriven (1967) makes a distinctive between summative and formative evaluation, which has come to be widely applied in the field of evaluation (particularly for educational programs) and is highly relevant for the present Process. Summative evaluation sums up the accomplishment of a program on its completion, while formative evaluation is a continuing process during development. Though Scriven’s original definition of formative evaluation was quite narrow: “outcome evaluation of an intermediate stage in the development of the teaching instrument” (Scriven, 1967, p51), more recent usage has extended Scriven’s definition. Chen (1996) separates Scriven’s summative/formative distinction into two dimensions: process vs. outcome, and improvement vs. assessment. In Chen’s terms the present study would be of process improvement. Flagg (1990, p5) defines formative evaluation as “any kind of feedback from target students or professional experts that is intended to improve the product during design, production, and initial implementation” – and later as “the art of making mistakes obvious, by hindsight” (Flagg, 1990, p63). Patton (2002, p220) notes some emerging variants of formative research, for developmental evaluation (Preskill and Torres, 1999) and continuous improvement (Mizuno, 1988), both of which are relevant in this case. Though formative research does not rule out the quantitative, its mainstay is qualitative data. Conversely, summative research frequently uses quantitative methods (Tessmer, 1993).
Thus a summative evaluation of a Process would answer the question “How good is this process?” — in comparison either to an absolute criterion, or to other comparable processes. In contrast, a formative evaluation would answer the question “How can this process be improved?” When a method is being newly developed the formative question is more relevant. Also, in the case of the current study (as demonstrated by the preceding design for a summative study using the hypothetico-deductive paradigm) a summative approach would simply not be feasible at this early stage of the development of the process. Similarly, Rowe and Wright, discussing research into the Delphi technique, state that:

We believe that recent research has been somewhat misdirected, with too much emphasis on Technique-Comparison studies at the expense of Process studies (Rowe et al. 1991, Rowe and Wright 1999). Studies of the former type tend to compare Delphi to other procedures to answer the questions “is Delphi (relatively) good or bad?” while studies of the latter type ask “why is Delphi good or bad?” (Rowe and Wright, 2001, p139)

In those terms, the present research was a Process study. Its purpose was not simply to determine whether the scenario network method was “good” or “bad” — particularly given the difficulty of developing testable criteria — but rather to detect weakness and strengths and to iteratively improve the method. Therefore, a formative approach was chosen.

**Issue 5. Hypothesis-based or evidence-based**

**Hypothesis-based.** Though a hypothesis-based approach is seen by many as synonymous with a positivist approach, this need not be so. Many scientific discoveries have been made not with a formal hypothesis, but with serendipity — a surprising finding, which has later led to the production of hypotheses and the measurement of their applicability. For example, in the case of the discovery of stainless steel in 1913, Harry Brearley (who was seeking a steel suitable for a gun-barrel, with resistance to erosion rather than corrosion) noticed that in a heap of metal scrap, the result of previous unsuccessful experiments, one piece had not rusted. There was no hypothesis: it was obvious to the naked eye (de Bono, 1974). Nor was there a need to observe a large sample: as a particular alloy will have invariant properties, a single case was sufficient, and generalizability was taken for granted.

Conversely, qualitative research can take a hypothesis-based approach: clearly stating initial hypotheses, and gathering evidence that serves to either confirm or disconfirm the hypotheses. Thorough research of this type often uses “judges” — not relying on one person’s (i.e. the investigator’s) view of the evidence, but combining the views of others who have less ego-investment in the successful confirmation of the hypotheses. The most rigorous qualitative content analysis is conducted in this way (Deacon et al, 1999).
The main use of the hypothesis-based approach in decision-making is when there exists a single relevant variable, the value of which can be precisely determined. But when does this apply? Some possible examples include evaluating the success of companies in terms of the aggregate value of their shares, and choosing as Olympic winners those fastest in their chosen competition. Even in those two arenas, however, the definition of variables is problematic. For example, the company could choose to maximize its market capitalization (as for public companies in the USA, following Milton Friedman, 1962), its return on capital invested, its profit level, its market share (as often in Japan), or some broader measure of success such as the Triple Bottom Line (Elkington, 1997) or Balanced Scorecard (Kaplan and Norton, 1996).

Even in the Olympic Games, the shortest-time rule excludes competitors with traces of certain substances (but not certain other substances) in their blood, and arguments have been raised concerning natural threshold levels for some substances. So what at first seems to be a simple measure, with one clear variable, is on closer examination more complex, with a large number of potential variables, many of which are complex social constructions. In these circumstances, there is no clear, single hypothesis, but many conflicting possibilities.

Evidence-based. For an evidence-based method, the model is the courtroom rather than the laboratory. Evidence is weighed up in all its detail, and a verdict arrived at. An implication of the thinking of Kuhn (1970) is that all science is consensus-based, and that consensus is largely based on generally-known evidence. Evidence of this type is usually in verbal form, but it need not be confined to that. For example, in a situation which requires a Yes/No decision based on a set of measures, there may be no agreed objective basis for the relative weighting of those measure, and to change the weightings in a preference matrix will change the decision – as with the examples in the previous paragraph.

In health and education, the use of “evidence-based medicine” and “evidence-based practice” has recently become popular, often using meta-analysis of findings of multiple studies. According to Pawson (2002a, 2002b) this can be either quantitative, or a narrative review, more theoretically based, using qualitative tables in the style of Miles and Huberman (1994). (Appendix 1 of this thesis, in reviewing scenarios for 2000, uses such a narrative evidence-based approach.)

Scriven’s (1974) “goal-free evaluation” is another example of an evidence-based approach. Unlike the classical evaluation method, which treats the objectives of a program as hypotheses
and tests the success of those objectives, Scriven’s method involves studying a program and asking “What have been the actual effects of this program?” Scriven maintains that it is not necessary for the investigator to know the intended effects during this research. Such an approach is close to grounded theory, the tools of which could be used to determine the actual effects. Logically, the more diffuse the likely effects of a program, the less likely it is that these will be captured by a hypothesis or a logic model, and the more likely that an approach such as goal-free evaluation will discover the existence of unintended consequences.

In the present case, the evidence-based approach was judged more appropriate, for two main reasons: (a) testable hypotheses could not be formed at the outset of the development process, and (b) evaluation of the process came through a wide variety of sources, both formal and informal, and an evidence-based approach was more suitable for integrating this information and deciding how to modify the nascent Process.

**Issue 6. A single case study, or multiple cases?**

The above sequence of decisions (empirical, mainly primary research, qualitative, formative, and evidence-based), combined with the relatively large scale of the Process, clearly required using the case study method. Also, because the Process is one that involves whole social entities, it would have been almost impossible to carry out this project without using case studies. It is now well established that the case study method produces knowledge of high quality, as documented by writers including Bennett and George (1997), Brown and Gerhardt (2002), Eisenhardt (1989), Guba and Lincoln (1992), Kvale (1996), McGuire (1998), Pozzebon, Freitas and Jenkins (1998), Stake (1983, 1995), Walsham (1995), and Yin (1994). The question here is whether the method should be developed in a single case study (as when Cooperrider (1986) developed Appreciative Inquiry), or a number of cases. For several reasons, the multiple-case approach was more appropriate in this situation:

**Reason 1.** Using only a single case study, by providing no basis for comparisons, would make it dangerous to produce any generalizations. Instead of being able to say “this method works in a variety of situations” the claim could only be “this method worked in one particular situation” – but only if it had worked in that situation (Kennedy, 1979; Donmoyer, 1990; Becker, 1990; Marianne Lewis, 1998).

**Reason 2.** A multiple case study allows for more speedy recovery if one case fails to be completed or for some reason is unusable.
Reason 3. One of the objectives of the Process was that it should be feasible for smaller entities, and should not (unlike the scenario planning of Shell Oil) take a year or more. But by working with a single case, one of two problems would arise: either the fieldwork would almost inevitably become highly detailed, involving multiple interviews and meetings – or else, if restricted to the planned set of four main workshops, a single case would be too perfunctory for doctoral fieldwork: it would not provide enough data to illuminate an entire thesis.

Issue 7. Sequential or simultaneous development

On close examination, this issue turned out to contain two sub-issues:

(a) Given that multiple cases were to be used, whether each case should be studied sequentially, or all cases should be studied at once.

(b) Whether the entire Process should be developed as a whole, or separate components of it should be developed sequentially.

Concerning point (a) it was simply not feasible to conduct all cases simultaneously. Even if this had been possible, it would not have been as useful as sequential development of cases.

Pope, Ziebland, and Mays, in the context of qualitative health research, articulate this well:

In much qualitative research the analytical process begins during the data collection phase as the data already gathered are analysed and fed into, or shape, the ongoing data collection.... It allows the researcher to check and interpret the data she/he is collecting continually and to develop tentative conclusions based on the data already collected, or hypotheses for subsequent investigation in further data collection. Compared with quantitative methods, this has the advantage of allowing the researcher to go back and refine questions and to pursue emerging avenues of inquiry in further depth. Crucially, it also enables the researcher to look for deviant or negative cases; that is, examples of talk or events that run counter to the emerging propositions or hypotheses, in order to refine them. This type of continuous analysis is almost inevitable in qualitative research; because the researcher is “in the field” collecting the data, it is impossible not to start thinking about what is being heard and seen” (Pope, Ziebland, and Mays, 2000:114).

As the process of iteration is itself highly valuable, allowing as it does the continuous comparison of each case with each previous case, sequential development was used for the cases.

Concerning point (b) above, when it comes to the development of elements of the process, each method has advantages and disadvantages. The advantage of sequential development is that the effect of each component can be separately assessed. The disadvantage is a potentially severe problem with sequential development: the possibility of interactions between components. It is possible that two components, each of which worked separately, might not work when combined. A further disadvantage of sequential development of components is that
there can be so many variables that it might take hundreds of cases to resolve these issues — as has occurred with the study of response rates in surveys (as noted by Dillman, 1978). Thus the components were developed simultaneously, with two exceptions. One exception was the pilot study, which was conducted purely to assess the feasibility of the envisaged Process, and was thus incomplete. The other exception was the final case study, which developed one component in detail. The rest of that study was delayed due to funding issues. It is not due to recommence until after this thesis is completed.

To summarize the outcome of this seventh issue: cases were studied sequentially, but (with two exceptions) all components of each case were studied simultaneously.

**Issue 8. Which qualitative approaches?**

The final question for setting up the research was which particular qualitative approaches to use — expressed in the plural, because qualitative approaches overlap a great deal: it is all but impossible to use a single qualitative approach. To some extent, the choice of qualitative approaches had effectively been decided by choosing the sequence of decisions summarized in Figure 6.1 above.

Qualitative research offers an enormous array of potential approaches. As noted by Patton (2002, pp131-134) different writers on qualitative research have produced different epistemological categorizations of qualitative research. Crotty (1998) lists five “perspectives,” and Creswell (2003) names five “traditions” (different from Crotty’s five). Schwandt (2000) lists three “epistemological stances,” and Denzin and Lincoln (2000) offer seven “paradigms/theories.” Pepper (1957) distinguishes four “world hypotheses” which underlie the major philosophies and corresponding research paradigms. Patton (2002) lists several more such categorizations, then offers his own set of 16. These various groupings are not clear alternatives to one another, but overlap in various aspects, and address different issues: in the judgement of Miles and Huberman (1994, p5) these sets of paradigms are “basically incommensurate.” It is therefore not a question of choosing one or another, rather a matter of choosing (whether explicitly or implicitly) a configuration of qualitative approaches: a toolbox, rather than a tool.

One way of making sense of all these approaches is to sort them into a chronological sequence of choice decisions: ontological, epistemological, methodological (including praxiological), and analytical. Using that sequence, the following qualitative approaches were applied:
TABLE 6.3 QUALITATIVE APPROACHES USED IN THIS STUDY

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Approach</th>
<th>Key references</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Epistemological</td>
<td>Pragmatism</td>
<td>Dewey (1910/1991), Peirce (1931)</td>
</tr>
<tr>
<td></td>
<td>Action research</td>
<td>Lewin (1946), Reason &amp; Bradbury (2001a)</td>
</tr>
<tr>
<td></td>
<td>Analytic induction</td>
<td>Znaniecki (1934/1968), Robinson (1951)</td>
</tr>
</tbody>
</table>

These four categories are not mutually exclusive, and the boundaries between them are not widely agreed. For example, many writers classify constructionism as an epistemology rather than an ontology; and action research, since its original articulation by Lewin (1946), has developed two aspects: it is not only a methodology, but also an epistemology, as noted by Peters and Robinson (1984). Thus the following categorization is not as tidy as it might seem: it is simply a means of classifying the range of approaches used in this study.

**Ontological.** In terms of ontology, viewed in this context as the nature of reality, the focus is on human groups and events as systems, which form the central unit of inquiry for this project. Thus a constructionist viewpoint was taken. This is almost a requisite viewpoint for qualitative futures work, because a central focus of futures studies is to understand human meaning, and what is the future but a social construct? There are two streams of constructionism: the social constructionism of Gergen (1999) and the radical constructionism exemplified by von Glasersfeld (1995). The latter is sometimes referred to as constructivism, by writers such as Crotty (1998, p58). In this study, the social stream is most relevant: though our world is but a social construction, many aspects of it are widely shared. In terms of the hemispherical model developed in chapter 4, the social element of construction is most pronounced at the top layer (events), but lower layers of the hemisphere, less able to be shared, are less socially constructed.

**Epistemological.** The development of any method perhaps implies a pragmatic viewpoint, because of its focus on the practical effectiveness of the method. Such thinking is expressed in the pragmatism of Peirce (1900/1955) and Dewey. In an apposite quotation, the latter states:
There are two ways in which man moves towards the future: by blind trial-and-error, or by consciously planning his future on the basis of his past experience and his projected desires. The Experimentalist hopes to construct methods which mankind can use to control the controllable part of the present, and to make intelligent plans for conscious movement forward, step by step, into a partially foreseeable future. (Dewey, 1929/1960, p119)

The Experimentalist's (i.e. pragmatist's) hope could almost be a description of the Process being developed in this thesis. The pragmatists' position was that objective truth is not knowable, so propositions should be judged by the outcomes they produce. Action research thus implies a pragmatist epistemology.

A secondary epistemology relevant to this study is critical realism (Sayer, 1984). Despite its major differences from constructionism, Mir and Watson (2000, 2001) show how the two are compatible. Also, critical realism, as argued by Bell (2003) and van der Heijden (2000, p31) is almost inherent in futures studies. A related approach is the "realistic evaluation" of Pawson and Tilley (1997), which abjures the so-called "black box" methods used in formal experiments in favour of probing into the antecedents of any outcome. Rather than simply asking "Was the null hypothesis rejected, and the intervention thus found effective?" it probes: "In what specific ways did the intervention achieve its effects?" These ways are grouped using the mnemonic CMO: what Contexts, what Mechanisms, and what Outcomes? The practical application of the layered hemispherical model developed in chapter 4, section 4.7 was much influenced by the thinking of Pawson and Tilley.

The third relevant epistemology is critical theory. To drastically summarize a wide range of thinking, in so far as it applies to this study, the contribution of critical theory is a focus on the negotiability of knowledge: in particular the relations of knowledge to power, with the powerful circumscribing the knowledge of the relatively powerless. A purely constructionist approach, as Pawson and Tilley (1997, p20) point out, implies a negotiation between stakeholders of equal power. Because the Process involves social entities, which are clearly not of equal power, critical theory is useful in exposing assumptions and unrecognized worldviews. The contribution of critical theory to the Process includes the exploration of embedded systems (as explained in chapters 4 and 5) and the effect of various actors' conflicting goals on the futures of a human entity. Though Churchman (1971) is not viewed as a critical theorist in the Frankfurt School sense, his philosophy is relevant in this context, as is that of his intellectual descendants Ulrich (1994) and Midgley (2000).

Methodological. In terms of methodology, the criteria set out in chapter 3 effectively dictate the use of a participatory approach. Issue 5 above demonstrates the value of case studies in
the present context. Given the iterative nature of methodological development, action research was the only qualitative method that both explicitly uses iteration and can involve a high level of participation. Many writers, particularly on information systems and operational research, support the utility of action research in such a situation. For example, Baskerville and Wood-Harper argue that action research is the most suitable method for studying purposeful human activity:

We suggest that action research, as a research method in the study of human methods, is the most scientifically legitimate approach available. Indeed, where a specific new methodology is being studied, the action research method may be the only relevant research method presently available. (Baskerville and Wood-Harper, 1996, p240)

Eden (1995) concurs, stating that an action research approach is the most relevant for evaluations with complex goals. As no more appropriate method could be found, action research thus became a key element of this study. The following section (6.3) provides more detail on the specific action research approach selected.

**Analytical.** In terms of data analysis, the visual approach outlined in chapter 5 indicated the value of using cognitive mapping. The layered hemispherical model required the use of critical methods, to probe beneath the surface of participants' beliefs about the future. To enable better understanding by participants of the layered model, a variant of cognitive mapping was developed. This is not a method of analysis in the same sense that statistical methods are; rather, it facilitates qualitative analysis through critical questioning of initial perceptions. Though it is possible to derive numeric data from cognitive maps, this was not appropriate in the present study, because commensurability of concepts could not be established.

For formative evaluation of findings, analytical induction (Znaniecki, 1934/1968; Robinson, 1951) was judged to be the most appropriate method for this study, given the use of multiple case studies and the need to develop a workable Process. Though seldom used, analytic induction is acknowledged to be a rigorous method for establishing patterns in any form of qualitative data (Frankland and Bloor, 1999; Katz, 2001). It develops generalizability by attempting to re-form tentative propositions in such a way that they are able to cover all cases; similar to a non-participative equivalent of the consensus group process described above. When a proposition cannot be restated in such a way that it covers all cases, the minority of cases that it does not cover are separated from the population to which the proposition applies, and a different proposition may be developed for that sub-population.
6.3 Action research as a development method

Because action research was judged to be the most appropriate methodological approach to the development of the Process, this section considers it in detail, and determines which form of action research was most appropriate to use. Since its original articulation by Lewin (1946), action research has developed into a variety of related streams. Peters and Robinson (1984) surveyed 11 early writers on action research, including Lewin, Argyris, and Kemmis, and compiled a "consensual summary" of 18 characteristics of action research. On exploring commonality between the methodologically and the epistemologically focused writers, Peters and Robinson distinguished three shared groups of characteristics:

1. Involvement-in-change characteristics – i.e. they are problem focused and directed toward the improvement of some existing social practice;
2. Organic process characteristics – i.e. research consists of a series of systematic cyclical or iterative stages of fact finding, reflection and planning, strategic action, and evaluation;
3. The collaborative characteristic – i.e. research is carried on as a joint, cooperative endeavor among the participants. (Peters and Robinson, 1984, p121)

If these are the key characteristics of action research, an implication is that if any of the three is lacking, the process being used is not action research. For example, concerning the second characteristic, Dick points out (Williams, 2004) that after the concept of action research has been explained to managers, some claim to be doing action research already, but often this is a misconception, as the component of explicit reflection is lacking.

Some variety of action research seemed the most appropriate method to use, because the development of a method would clearly require an iterative approach, and because the development would entail working closely with staff in the target organizations. The questions addressed at this point were thus:

1. Which varieties of action research are most relevant for the Process?
2. If no single variety is fully applicable, can elements of several varieties be used in developing the Process – and is it defensible to combine elements in such a way?
3. Can the development of a research method qualify as action research?

6.3.1 Action research and futures studies: similarities and differences

Action research, as well as being an appropriate method for development of the Process, is well matched with futures studies. Ramos (2002) found eight intersections of futures studies and action research: in their focus on participation, social change, engagement in creation of knowledge, systems thinking, holistic complexity, visions of the future, commitment to democracy, and social innovation. I suggest adding a ninth: an ongoing probing of assump-
tions, and reinterpretation of the system under study. Ramos includes this under democratic commitments, but the former need not entail the latter: for example, developing a root definition using Soft Systems Methodology can be done solely by experts (Checkland, 1981).

Despite their similarities, futures studies and action research also have several clear differences. The first, which arises almost by definition, is that futures studies looks well into the future, while action research, being action-oriented, focuses on the present. The second difference is one of scale. Action research is internally focused: it generally involves working with a single organization. In contrast, futures projects, even when commissioned by one organization, look beyond the confines of that organization, considering social trends and other external forces. A third difference is that action research makes explicit use of iterative cycles. This is not a normal component of any futures studies method, except Delphi (though CLA may do so in practice, by sequentially considering a series of layers).

Despite those differences, both participative futures and action research clearly fall under the label of "transformational inquiry" (Hart and Bond, 1995). By combining the two approaches, both might be improved. Participative futures methods could be enhanced through the use of iterative cycles, while action research could be enhanced in two ways: firstly, by viewing the focal entity as one component of a larger world, at a particular moment in time; and secondly, by incorporating futures studies' central concept of alternative futures into the practice of action research. These similarities between futures studies and action research allowed some simplification of the task ahead: not only could the development of the Process be done using action research, but the use of the Process could also be regarded as a form of action research.

### 6.3.2 Forms of action research

Since Lewin (1946) first put forward his concept of action research, numerous variants have arisen. Peters and Robinson (1984) discuss 15 forms of action research, and the handbook of Reason and Bradbury (2001a) adds more still. Despite their differences, all of these methods are similar enough that they can still shelter under the broad umbrella of action research. Some major varieties of action research (and related methods) are listed below in approximate chronological order; these are key references rather than initial publications. The list is not exhaustive, as it excludes some offshoots not relevant to the development of a method.
TABLE 6.4 VARIETIES AND DERIVATIVES OF ACTION RESEARCH

<table>
<thead>
<tr>
<th>Variety</th>
<th>Major references</th>
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<tbody>
<tr>
<td>Participatory action research (PAR) — two varieties:</td>
<td></td>
</tr>
<tr>
<td>8. Critical action research (stemming from</td>
<td>Kemmis &amp; McTaggart (1988)</td>
</tr>
<tr>
<td>Habermas and critical theory)</td>
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</table>

None of the above approaches was designed with the development of a social inquiry method in mind. However, two methodologies explicitly use the concept of "double loops" – the action science of Argyris, and the soft systems methodology of Checkland. The relevance of this is that an inner loop can apply to the use of the method within a case, and an outer loop to the development of the method between cases – corresponding to the revision of development criteria for the consensus group technique, as described in section 6.2.1.3 above.

Checkland’s FMA model, derived from Soft Systems Methodology, was the most relevant model that could be found. However, Hindle et al (1995) on discussing the FMA model do not imply that the F (Framework: as covered in this chapter) would change, even though Soft Systems Methodology, of which FMA is a component, is a form of action research. The later LUMAS model (Checkland, 2000), effectively a more flexible version of FMA, though specifically not designed for generalization, does allow for revision of the initial framework. However it is not stated specifically enough to be useful in practice.

3. Though Critical System Heuristics shares many similarities with action research, Ulrich (1996, p9) points out a major difference: that action research avoids conflict, while CSH deals with it.
Having thus failed to find a "ready made" action research variety specifically suited for the development of a social inquiry method, the next step was to examine whether generic principles of action research might be usefully extended, to form yet another variety of action research more specifically usable for the development of a social inquiry process.

### 6.3.3 Elements of action research used in this project

On reviewing the literature of action research, four key elements, gathered from various forms of action research, were identified as essential for this project.

1. From PAR, in both its forms (Greenwood and Levin, 1998, Fals-Borda and Rahman, 1991): participatory development, in which all stakeholders in an entity are invited to consider its futures.


4. From critical system heuristics and its derivatives: the questioning of the boundaries and exclusions of the systems being studied, or "boundary judgements" (Churchman, 1971; Ulrich, 1994, 2000; Midgley, Munlo, and Brown, 1998).

A potential danger with combining components of various methods is the risk of adverse interactions: that elements which in their original context work well individually do not work well when combined. In the present case, this did not appear to be a danger, for two reasons:

- because the various approaches to action research already shared those key characteristics, to varying extents, and
- because no clear contradiction was evident between any pair of the four components; on the contrary, each taken out of its context would be less useful in isolation.

It was therefore decided to combine the above four elements for the purpose of developing the Process.

### 6.3.4 Is this action research at all?

To determine whether the selected method still amounted to action research, its elements were compared with Peters and Robinson’s (1984) three characteristics shared by the methodological and epistemological emphases in action research.
Characteristic 1. To what extent is it problem-focused and involved in change?

In three ways:
(a) participants come to know likely futures for their social entity, and can develop ways of achieving their shared goals, and also
(b) having learned the Process through their immersion in it, participants can apply it to other social entities that they belong to.
(c) For development of the Process: using the outcome of a case to improve the method in later cases.

Characteristic 2. To what extent does it possess organic process characteristics?

The method is designed to make explicit use of the iterative cycle of action research, on two levels. At the case level, there is an iterative cycle of multiple workshops, generally a week apart to allow time for reflection. At the level of development of the Process, there is a larger cycle, in which the unit is the case itself. After each major or minor cycle, there is an opportunity to change the Process; this is the key “organic” characteristic.

Characteristic 3. To what extent does it use participatory, democratic processes?

Participants would be considering the futures of their own entity, and would offer advice on the Process, but because of their lack of expertise in methodological development, they would not be able to participate fully in the development of the Process. In relation to the development of the Process, the form of participatory action research used here would resemble the less-participatory Northern form derived from Lewin (as in Greenwood and Levin, 1998), rather than the more-participatory Southern form (as in Fals-Borda and Rahman, 1991). In relation to the use of the Process after its development, the Southern form could more closely apply, provided that if experts or consultants were used, boundary critique (Ulrich, 1996; Midgley, 1998) was applied.

Given those instances of the defining criteria, the development of the Process appears to qualify as action research, though it did not exactly correspond with any of the 13 varieties listed in Table 6.4. The method used differed from generic action research practice in three respects: collection of detail, degree of involvement, and more explicit use of cycles:

Differences of detail: In most published reports of action research projects, the researcher has long and repeated contact with the social entity being studied. The typical process is almost ethnographic, often extending for a year or more. In this project, with less contact (no more than 15 occasions, over several months, for each case study), less detail was collected.
Differences of involvement: In the more participative forms of action research, participants are highly involved with the process, because they are researching their own social entity. In this project, that was true at the inner (case) level, with participants considering the possible futures of their own social entity. My own involvement at both levels was more that of an outsider, because my major purpose was to develop the Process.

Differences of cycling: A surprising discovery made while reviewing the literature of action research was the paucity of accounts of the explicit use of cycling; the only detailed reference found was Dick (2000). This might be due to the differences of detail and of involvement: because I was not a member of the entities I worked with, the occasions on which I worked with the social entities themselves became components of a cycle. In a more typical situation, when participants are highly involved with the organization being studied, they work so continuously with that organization that it becomes difficult to delineate specific cycles. A paper of mine to be published in Futures (List, in press 2005) covers this topic in more detail.

To establish whether the proposed method could be regarded as action research, I conferred with a highly experienced action researcher, Dr Selva Abraham (Abraham, 1994) and director of the Gibaran Institute of Action Research in Australia. After a long discussion, he formed the opinion that the method I was proposing in fact was action research – but, because of the limited decision opportunities available to participants, it did not fully qualify as participatory action research. Rather, it was a generic type of action research, in Lewin’s sense.

6.4 Review of this chapter

This chapter has outlined the methodology selected for this thesis. It began by looking for precedents in the development of a methodology of social inquiry. However, nothing found was detailed enough to be usable. The next step was thus to derive a set of criteria for the development of a process – specifically for exploring the future, but probably also usable for the development of other social inquiry methodologies. The third section of the chapter investigated a range of approaches, and settled on a form of action research.

The approaches chosen as most suitable for this research included a wide range of methodological components, drawn from a broad variety of social research methods. Though this pluralistic approach might be criticized as *bricolage* (Lévi-Strauss, 1966) or postmodern adho-

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4. Now renamed the Gibaran Business School; details at www.gibaran.edu.au
cism (Jencks and Silver, 1972), other writers strongly support the use of mixed methods. For example, Mingers and Gill (1997) edited a book on this concept of *multimethodology*, as they labelled it. Several contributors to that book (M. Jackson; Taket and White) argue that methodological pluralism is not only a valid approach, even when paradigms are being mixed, but a preferable one, due to its encouragement of multiple perspectives. Thus Jackson states “Pluralism can provide its greatest benefits only in the context of paradigm diversity” (in Mingers and Gill, 1997, p367). Mindful of such support, I strove to assemble a methodological framework that would address the central research issue as closely as possible. To recap, the methodological toolbox comprised:

(a) **Selection of development method**

1. Is empirical data needed? (Yes.)
2. Collect primary data, or use secondary? (Mainly primary, some secondary.)
3. Standard quantitative method (e.g. field experiment) feasible? (No.)
4. Use summative or formative approach? (Formative.)
5. Use hypothesis-based or evidence-based approach? (Evidence-based.)
6. Study single case, or multiple? (Multiple cases.)
7. Develop method sequentially or simultaneously? (Sequentially.)

(b) **Selection of a coherent set of qualitative approaches:**

Ontological basis: social constructionism.
Epistemological basis: pragmatic, with elements of critical realism and critical theory.
Methodological basis: an iterative approach, using multiple cases (in other words, action research), paying particular attention to the use of cycles and reflection, with a high level of participation during the central stages of each cycle.

Analytical bases:
8. For use within the process: cognitive mapping.

Having decided on a suitable form of action research, the next step was to design the research program in detail. This entailed two groups of decisions: on the sampling method, and the specific steps to be used in the Process. These are detailed in the next chapter.
Chapter 7: Fieldwork design

This chapter outlines the design of the research undertaken: the population, the sample design, and the data collection for evaluation. It provides enough detail that any other researcher, in possession of the appropriate skills, would be able to follow the same procedures, and to produce corresponding results.

7.1 Selection of cases

Cases for a study can be selected using a variety of approaches, ranging between the mathematically rigorous sample design used in survey research and the single-case purposive selection often used in action research, when one case is selected without considering others. The language of sample design, though positivist in orientation, is useful even with qualitative work, because of its distinction between populations, sampling units, and samples. The use of these concepts hinges around whether any generalization is expected. In the usual type of action research, one social entity is being studied: it is both the sample and the population, and no attempt at generalizability (as opposed to generalization) is being made. If generalizability is to be aimed for (as in this case) the more that sampling units differ from one another, the more care must be taken with sampling.

A further reason for taking special care with the sample design in this case was that analytic induction would be used to form conclusions. The original form of analytic induction, as used by Znaniecki (1934/1968) was criticized by later writers, including Robinson (1951), Hammersley (1981), Lieberson (1991), Bogdan and Biklen (1992), and Katz (2001), as leading to finding conditions that are sufficient but not necessary. This weakness can be countered by comprehensively sampling the population for which generalizations are desired.

When designing a sample to answer a research question, several choices need to be made.

1. The choice of population
2. The choice of sampling unit
3. The choice of sample size
4. The choice of sampling method
5. Selection of cases.
Usually, the sampling unit and the population must be chosen first, and together, because the population is composed of sampling units – which in social inquiry are often individuals, but can also be households, businesses, or any other social or textual entity. When a study involves social groups, there can be several units of study (individuals and groups) but when a group is selected first, that is the sampling unit. The population is the entire collection of units from which the sample can be drawn. The selection is made using a sampling frame, which is either a list of every population member, or a method of choosing members.

Just as the sampling unit and population must be selected simultaneously because of their interactions, so must be the sample size and the sampling method. In a quantitative study, the necessary sample size can be calculated from the minimum tolerable sampling error, based on estimates of the distribution of responses. In such cases, and for many qualitative studies, a sample size can be safely chosen in advance. But when developing a theory or a method (as in the present project), not enough is known to be able to calculate sampling error, so there is no basis on which to select a sample size in advance – apart from economic considerations. An alternative approach is to continually assess the data, and decide on that basis when to stop collecting data. This can be done using a Bayesian approach, but only when fieldwork is very tightly coordinated (e.g. an online survey), or carried out by a single person.

The purpose of a sampling method is generally to ensure representativeness, and thus generalizability. This can be interpreted in two ways: either that all members of the population are represented, or that all relevant concepts derived from that population are represented. For the former, random sampling (or some similar method, such as quota sampling) is used. For the latter, a variant of purposive sampling is normally used. There are many such variants: Patton (2002, pp230-242) lists fifteen of them.

Finally, having chosen a unit, a population, a sample size, and a sampling method, the cases can be selected. The following sections outline the choices made for this study, in the above sequence.

7.1.1 Deciding the sampling unit
Because the scope of the Process is restricted to human futures, and because one of the original criteria for the Process was that it should be participative, this implied that the sampling unit would be a social entity: a group of people with something in common. In terms of the holonic principle (chapter 4, section 4.5) this amounts to a social holon.
7.1.2 Defining the population

Statisticians refer to an "infinite population" as being effectively equivalent to a large population (Kish, 1987), but the population used in this study was truly infinite. As proof: no matter how detailed the definition of a potential set of futures that can be studied, it will always be possible to add more potential futures – though some of these futures will be so similar that differences between them will be (by definition) infinitesimal.

This infinitude of possibilities has a practical implication: that it is not possible to draw a random sample, because there exists no sampling frame against which the representativeness of the sample can be assessed. (This is another reason why a positivist approach was not feasible for developing the Process.)

A tentative solution to the problem of infinite population is that, though the size of the population may be infinite, most of the variance in that population can be captured by using a relatively small number of classes of variables. (To use a statistical parallel, this is almost invariably the case in factor analysis, because of intercorrelations between variables.) Thus it was possible to stratify the sample in terms of variables expected to be relevant to the success of the Process. Given the decision to maximize the variety of the cases, the solution adopted was to develop a sampling frame that is a taxonomy of potential cases.

I propose that most of the variance in any area of human futures can be bounded by four classes of variable: (1) the concern (divided into activity and concept, only one of which normally applies in a study), (2) the social group involved, (3) its location, and (4) the time horizon. This corresponds to the taxonomy of prediction outlined in chapter 3.¹ As it is not possible to prove this proposition, I have attempted to demonstrate it empirically, in section 7.1.3 below.

Each of these types of variable can be further subdivided, as shown in the following table, which is both a taxonomy and the basis of a sampling frame for this study. Each subdivision could be subdivided endlessly, but for this purpose there was no value in creating a taxonomy that was orders of magnitude larger than the envisaged sample of cases for this project.

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¹. This is the original sample design, as applied. Later it became evident that "situation" includes two separate components: place and context.
### TABLE 7.1 A FACETED TAXONOMY OF HUMAN FUTURES

<table>
<thead>
<tr>
<th>1. A concern (activity or concept)</th>
<th>1.1 An action or habit (e.g. smoking)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2 An occupation</td>
</tr>
<tr>
<td></td>
<td>1.3 An industry</td>
</tr>
<tr>
<td></td>
<td>1.4 The use of a product or artefact</td>
</tr>
<tr>
<td></td>
<td>1.5 The use of part of the natural world</td>
</tr>
<tr>
<td></td>
<td>1.6 An affect: emotion, value, or belief</td>
</tr>
<tr>
<td></td>
<td>1.7 The use of an abstract concept</td>
</tr>
</tbody>
</table>

| 2. A social entity                 | 2.1 An individual                    |
|                                   | 2.2 A family                         |
|                                   | 2.3 An informal social group         |
|                                   | 2.4 A demographic category           |
|                                   | 2.5 A business                        |
|                                   | 2.6 A non-profit organization        |
|                                   | 2.7 A government, or public sector agency |

| 3. A location                      | 3.1 A locality, suburb, or village   |
|                                   | 3.2 A town, city, or rural area      |
|                                   | 3.3 A state, province, county, etc.  |
|                                   | 3.4 A country                        |
|                                   | 3.5 A continent or group of countries |
|                                   | 3.6 The world                        |
|                                   | 3.7 A non-contiguous set of areas with a common property (e.g. “Chinese cities”) |

| 4. A time horizon                  | Range from [starting date] to [finishing date] |

Using the above taxonomy, any futures project can be described as studying "the futures of [specified activity or concept] among [specified social group] in [specified location] during [specified time range]." Where one of the first three elements is unstated, the assumption is that there is no limit unless this is implicit in the other criteria. Hence the default concern is all activities or concepts, the default social group is the entire population, and the default situation is the whole world. The time horizon is different: its default assumption is not “the whole of recorded history,” but from the present to a date in the future that is indefinite, but probably no more than several decades.²

For example, choosing a difficult and unlikely subject such as “undergrowth”, the focus of such a study might be bounded to “the future of the use of undergrowth [subject], on farms [activity = industry type], in England [geography = country], up to 2025 [chronology].” The social group was omitted from that statement, but it would obviously include people involved

---

² The above taxonomy turned out to be very similar to the CIDOC-CRM ontology used in classifying cultural heritage for museums (Doerr, Hunter, and Lagoze, 2002).
with farming in England. (This discussion has assumed that the subject is already chosen. In practice, as explained in the next chapter, the precise choice of subject becomes part of the inquiry itself.) After completing the above taxonomy, I realized that it did not apply only to futures work. By varying the time horizon, it could also apply to any social research program (setting the time horizon to the present) and any historical research (setting the time horizon to a range of years in the past). Splitting the situation into the geographical area and the context of the inquiry would further sharpen it.

7.1.3 **Empirical testing of the sampling frame**

To refine the above sampling frame, I attempted to locate a logically comprehensive list of possible topics, using fault-tree analysis, but found that it was not possible to divide the entire conceptual world in this binary fashion. Had that been possible, it would probably have been done already, and used widely — but the existence of classificatory ambiguity in well-established classification systems such as the Dewey system and the Library of Congress system, and the gradual acceptance of faceted classification (Ranganathan, 1967) suggests that it is perhaps not possible. I therefore developed the above taxonomy using empirical data, from two distinct sources: a dictionary, and previous research.

The first source was a systematic sample of 100 headwords (on pages 9, 18, 27... 900) from the *Oxford Illustrated Dictionary* (Coulson et al, 1962). This particular dictionary was selected because it covers a wider range of word types than most dictionaries, including organizations, place names, and other concepts that normally appear only in encyclopedias. On each selected page I located the first headword ("X") for which it would make sense to study the "future of X" (or of "the future of the human use of X"). For example, the first three entries were Adriatic Sea, alcohol, angelica; the last was undegrowth. In general, only nouns and verbs (as participles) could have their futures studied. For example, it makes no sense to study the future of ad interim, the first entry on page 9.

All 100 of the selected words fitted into at least one category in the above taxonomy. This provides some assurance that (practically, if not theoretically) the taxonomy is comprehensive. Two kinds of potential error exist in any classification: overlapping and omission — corresponding to the statistical Type I and Type II errors. As noted by Sneath and Sokal (1973), to minimize either type of error must fail to minimize the other. In this case, because it was more important to include false positives than to omit false negatives, the taxonomy is deliberately very broad.
The second source was 129 papers published between 1984 and 2004 in Futures, the longest-established journal of futures studies. These comprised all the papers whose abstracts included the phrase “future of X,” where X was anything specific. Because the purpose of this exercise was to unearth problems, no paper was excluded because it was “difficult” – unless its precise topic was unclear from the abstract. This proved more challenging than the dictionary-based classification, because of some complex multi-word concepts that did not fit the original classification of activity types. A particular problem was the proliferation of very abstract types of future, including the futures of transdisciplinarity, the self, political resistance, negotiating skills, global corporate responsibility, and Church-state relations. 53 of the 129 papers (41%) fell under this heading, and could not be accommodated by the dictionary-based taxonomy. The original facet of Activities was therefore replaced by the broader facet of Concerns, including both activities and concepts.

7.1.4  Deciding the sampling method

When the number of cases in a study is small (less than about 30, though there is no fixed number: it depends on the between-case variance) the Law of Large Numbers does not apply. One consequence is that random sampling cannot be relied on to produce a representative sample – even when the population is enumerable (Kish, 1987). Because of this inherent statistical problem, different methods of sampling have been developed for small-n case studies, generally involving purposive approaches to sampling. There are at least fifteen varieties of purposive sampling (Patton, 2002, pp230-242), of which the most relevant for this study were maximum variation sampling and theoretical sampling.

Theoretical sampling is used in grounded theory (Glaser and Strauss, 1967; Coyne, 1997), with each successive case chosen so as to try to disconfirm the findings from the previous case. In principle, this method would have been ideal for developing this Process. However, to use theoretical sampling assumes that enough is known about each member of the population that a likely disconfirming case can be identified in advance. While this may be true when the more public characteristics of a case are being studied (as is often the situation in grounded theory), such preliminary knowledge is not generally available when a method is being developed. The variables affecting successful use of the method with one case often can not be known in advance, and may be independent of externally identifiable characteristics of the case.

A further problem with theoretical sampling (in this instance) was the sheer amount of time it took to identify a suitable entity to study, then persuade it to co-operate, and finally arrange a time when its senior managers could meet together. The shortest time I achieved between
initial contact and beginning the fieldwork was four months. The longest was two years — and that did not include any time spent in identifying a suitable entity, before approaching it. The use of theoretical sampling would thus have extended the fieldwork inordinately.

Therefore, instead of theoretical sampling, I used a form of maximum variation sampling. The key difference between theoretical sampling and maximum-variation sampling is that theoretical sampling requires knowledge of the likely nature of each case before that case is selected: what characteristics that case may possess that are likely to disconfirm findings from a previous case. Maximum variation sampling is not sequential; it requires much less initial knowledge, and a form of stratification can be used to identify suitable cases that were initially unknown to the researchers.

A literature search using the Science Direct and Ebsco online databases revealed only 37 references to “maximum variation sampling” (including its less common synonyms, “maximum diversity” and “maximum heterogeneity” sampling), and most of those references simply reported using that method, without explaining it. The fullest methodological guide to this topic (apart from a brief paper of my own, currently under review) appears to be a single page in Michael Quinn Patton’s *Qualitative Research and Evaluation Methods* (Patton, 2002, p234).

The central principle of maximum variation sampling is to search for commonality among extremities. Cases are chosen, within a population that may not be enumerable, so that they are as different as possible from one another across any variables that are initially known. In the analysis, the researcher seeks principles that apply across all the cases; this sampling method is therefore well paired with analytic induction. The assumption is that, because these cases represent such a diverse group, any properties that they all have in common are also likely to be shared by other members of that population.

### 7.1.5 Deciding the sample size

Two factors impinge on the desired sample size: the information gained from each successive case, and the cost of adding another case. For the fullest development of the action research cycle, the number of iterations should be large. One would expect a law of diminishing returns to apply: that as each new case was added to the sample, fewer and fewer amendments would be needed for the process. A parallel was found in Landauer and Nielsen’s (1993) studies of software usability, as demonstrated by the formula

\[ P = N (1 - (1 - L)^p) \]

where
\( P \) = the number of problems found,
\( N \) = number of known problems
\( L \) = the probability of any given sample member finding any given problem
\( n \) = sample size

Graphing \( P/N \) against \( n \) produces a curve that tails off rapidly:

As the number of cases increases, the cumulative number of problems found grows more and more slowly. \( L \) of course is initially unknown; the above graph uses \( L=0.25 \), which seemed plausible both beforehand and in retrospect. (That is, the estimate was that each case study would uncover 25% of the problems — assuming of course that the number of problems would remain constant.) With \( L=0.25 \), six cases would uncover 82.2% of the problems.

Though Nielsen's graph was designed for software usability studies, the same principle applies to the present situation: developing a method. At some point, the expected gain from adding a new case will be less than the effort of researching that case (which is linear), and the sampling should therefore stop at that point. This aligns with Lincoln and Guba's recommendations on sample selection in naturalistic inquiry:

In purposeful sampling the size of the sample is determined by informational considerations. If the purpose is to maximize information, the sampling is terminated when no new information is
forthcoming from new sampled units; thus redundancy is the primary criterion. (Lincoln and Guba, 1985, p202)

By using sequential sampling (finishing one case before beginning the next) it is possible to detect the tailing-off of new information, and decide at which point to stop adding new cases.

Another factor impinging on sample size selection was the practical one of resources and time limits. Given the timetable laid down for a PhD thesis, and the amount of time involved in locating a suitable case, then working with the people, planning the workshops, developing the method, and reflection on the outcomes, it was clearly not going to be possible to work in detail on many case studies. (In fact, it turned out that my initial plan greatly underestimated the amount of time it would take to work with each case, mainly because of the many preparatory and follow-up meetings involved.)

After considering these factors, I decided to aim for a provisional sample of 6 cases. By choosing cases that were as widely varied as possible, I hoped to maximize the possibility of discovering problems with the nascent process. As Eisenhardt (1989) suggests, when developing a theory, the number of possible comparisons between sample members can be a more relevant measure than sample size as such – and the number of potential comparisons rises rapidly with sample size. With a sample of $n$, the number of possible paired comparisons is $n(n-1)/2$, which is 3 comparisons for a sample of 3 cases, 15 for a sample of 6, and 66 for a sample of 12.

7.1.6 Selection of the sample
The sampling taxonomy in Table 7.1 above is in terms of four facets: subject, social group, geographical area, and time horizon. In practice, any case chosen would include elements of all four: it would be a particular concern, for a particular social entity, in some situation, in some future period. However, the taxonomy was not detailed enough to enable selecting a sample that might uncover all suspected problems. Some variables related to the likely success of the Process were not specifically covered in the above taxonomy: particularly the size of the entity whose future was being studied. Thus the four facets of futures in the taxonomy were supplemented for the purposes of developing the method.

Some potential cases and classes of case were excluded, for various reasons:

1. Because of likely ethical problems, individuals and families were excluded. A further reason for excluding this category was that the workshop process being developed was not designed to apply to groups with very small memberships.
Because of linguistic problems, I chose only English-speaking cases (apart from the pilot case, which was part of a larger consulting project, using an Indonesian interpreter).

Owing to logistical and financial limitations, most of my cases were confined to South Australia, where I live.

Because this thesis was to focus on human futures, the physical future of geographic areas was excluded from the scope of study. For the same reason, I excluded the futures of animal species, natural habitats, geological futures, astronomical occurrences, and the like (though Soper, 1995, after Foucault, argues strongly that the natural environment can be treated as a human construct).

In terms of Table 7.1 (the taxonomy of possible futures) the goal was to include a range across each of the four types of variable: concerns, social entities, situations, and time ranges. Since many sampling variables can apply to a particular case, and there were more variables than cases, each case had to represent a number of variables. In addition to the above systematic grouping of social entities, some specific characteristics of social entities were particularly sought for inclusion in the sample, because they might reveal particular problems with the Process. Given a planned sample size of only 6, all of these would need to be additional characteristics of cases sampled to fulfil other criteria. I recognized from that outset that it would probably not be possible to include all of these criteria in the sample. The following table shows the number of sampled entities of each type; the desirable figure was at least 1 in each case.
A further consideration is that of Stake, who notes that, in case study research, "My choice would be to take that case from which we feel we can learn the most. That may mean taking the one that we can spend the most time with. Potential for learning is a different and sometimes superior criterion to representativeness" (Stake, 1995, p243). In the case of formative research (such as this) Stake’s criterion would appear to apply strongly. Though until near the end I had little choice of cases, I bore Stake’s consideration in mind when negotiating the terms and scope of each case study.

The following table lists the final sample selection case by case, showing which of the desired sampling characteristics were met by each case.
Table 7.3 Characteristics of Sampled Cases

<table>
<thead>
<tr>
<th>Characteristics of the entity</th>
<th>Case</th>
<th>RN</th>
<th>EM</th>
<th>Iraq</th>
<th>LS</th>
<th>CU</th>
<th>SC</th>
<th>Barossa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale of entity</td>
<td>medium</td>
<td>small</td>
<td>huge</td>
<td>small</td>
<td>medium</td>
<td>large</td>
<td>large</td>
<td></td>
</tr>
<tr>
<td>Facing major change?</td>
<td>yes</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous futures work?</td>
<td>yes</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly constrained by its</td>
<td>yes</td>
<td>not applicable</td>
<td>yes</td>
<td>not applicable</td>
<td>yes</td>
<td>to some extent</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>enveloping entity?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Many factors unknown?</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level of innovation?</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level of conflict?</td>
<td>yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content domain</td>
<td>Information</td>
<td>Technical</td>
<td>Governance</td>
<td>Governance</td>
<td>Financial</td>
<td>Social</td>
<td>Natural</td>
<td></td>
</tr>
<tr>
<td>- selected from FARTHINGS4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sector of entity</td>
<td>public</td>
<td>private</td>
<td>..</td>
<td>NGO</td>
<td>private</td>
<td>NGO</td>
<td>..</td>
<td></td>
</tr>
<tr>
<td>Situation</td>
<td>..</td>
<td>..</td>
<td>country</td>
<td>..</td>
<td>..</td>
<td>state</td>
<td>local</td>
<td></td>
</tr>
</tbody>
</table>

Characteristics of the study

<table>
<thead>
<tr>
<th>Concern (activity or concept)</th>
<th>2003 war</th>
<th>governance</th>
<th>landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>- if not the entity as a whole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Riau province</td>
<td>South Australia</td>
<td></td>
</tr>
<tr>
<td>- if not entire area of entity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time horizon (years)</td>
<td>~5</td>
<td>10</td>
<td>~5</td>
</tr>
<tr>
<td>Development method</td>
<td>work-shop</td>
<td>second-ary</td>
<td>work-shops</td>
</tr>
<tr>
<td>Language other than English?</td>
<td>yes</td>
<td>no</td>
<td>partly</td>
</tr>
<tr>
<td>Follow-up possible?</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

1. Officially not-for-profit, but behaves as if in the private sector (see Appendix 4).
2. Reported as existing (scenario planning by the US military) but unpublished.
3. No activity-based futures were used in this project.
4. See chapter 5, section 5.4.6
5. Followed up, but with a shorter than desirable delay after completion of the main study.

7.2 Fieldwork method

This section describes the fieldwork method used, covering issues of sequence of timing, data collection by cognitive mapping, the systematic use of iterative cycles, creating a suitable development environment, the fieldwork schedule within each case, the use of reflection in developing the Process, follow-up evaluation, and ethical issues in group work.

7.2.1 Deciding the sequence and timing of cases

In order to derive the maximum benefit from the action research cycle, it was desirable to finish the initial reflection on one case before beginning fieldwork with the next case. This was so that reflections arising from the previous case, and any deficiencies found with the Process,
could be addressed with the next case. As scenario networks are designed to be used over a period of at least several years, it would have been ideal to return to each case after that time, to review the outcome of the process with that case. However the exigencies of PhD completion meant that this cycle had to be accelerated for the later cases.

The original plan was to begin with cases that seemed relatively straightforward (e.g. private sector, fairly small, with few impinging stakeholders and little intrinsic conflict) and gradually work up to the other extreme. The most difficult expected was a large international voluntary organization, with many stakeholders and high conflict. Due to difficulties in finding social entities to co-operate in the process (as well as lack of initial knowledge about entities that agreed to co-operate) it was not possible to follow this sequence exactly, but deviations were not major. I had originally hoped to cover six cases in a year, but that was before I realized how much time would be spent on preliminary dealings with each entity. In the end, it took more than two years to cover the six cases (not including the pilot study).

7.2.2 Data collection by cognitive mapping

I used a method of data collection described by Laukkanen (1994). This is a method for producing a variant of cognitive maps, referred to by Laukkanen as “cause maps.” It is based on the “self-Q” technique of Bougon (1983) and elaborated by Bougon and others in Huff (1990). Eden and Ackermann (1998) describe a similar method. The latter method involves interviewing managers, often using two sessions. In the first interview the interviewer becomes familiar with the terminology used by the manager, while the second is devoted to creating a cognitive map of that manager’s understanding of the mechanisms of his or her work environment. Specifically, this involves a semi-structured interview, creating a set of statements of the type “A leads to B.” When all the As and Bs are connected, and the specific meaning of “leads to” (for that pair of concepts) is elicited, a cause map can be drawn.

Cognitive or causal mapping, as described by most writers on the topic, is an individual process, in which one researcher interviews one manager. Because this Process uses group workshops (to gain a wider range of perspectives) the method of elicitation had to be modified. Eden and Ackermann (1998) describe a method of strategy development, around which their proprietary software, Decision Explorer, is designed. This involves small-group workshops using walls to display data, in a similar way to this Process.

A practical difference in procedure from the Bougon/Laukkanen method in this project was that the participants wrote each concept on a small sticky note, then placed these notes on a
whiteboard or large sheet of paper, drawing arrows between the concepts, and moving the notes and arrows until those involved were satisfied with the set of relationships expressed. One advantage of the wall-based mapping process is that it gives participants a joint task to focus on. As noted by Doyle and Straus (1993), this tends to induce a spirit of co-operation among participants, temporarily reducing the conflict that often surfaces in a workshop situation.

7.2.3 The use of iterative cycles

In Lewin's original (1946) paper on action research, the action research cycle involved three stages: planning, action, and reflection. Some recent writers distinguish four stages, with the addition of Observation between action and reflection (Carr and Kemmis, 1986), while Susman and Evered (1978) describe a five-stage cycle. Though I found no explicit argument in favour of a four-stage cycle over the three-stage version, it seems logical that observation should precede reflection—though the findings of Bem (1972 and 2002) and the review by Ajzen (2001) imply the opposite. If observation is not simultaneous with reflection, it is probably simultaneous with action, because it is the action that is being observed. From a constructionist viewpoint, it can be argued, paradoxically, that some reflection must precede observation: people must know what to expect before they can see anything (as empirically demonstrated by Piaget, 1971). In that case, some element of reflection could be present even as the first cycle is being planned, comparing expectations with a mental model derived from past experience. But regardless of the number of stages distinguished in the cycle, chronologically there are three: (1) planning, (2) acting and simultaneous observation, (3) formal reflection on completion of the action. It can be argued that all three stages involve reflection: on what might happen, on what is happening, and on what did happen.

The iterative cycle, or spiral (implying a third dimension, of improvement), is one of the essential characteristics of action research, but few writers have focused on the process of cycling, and the transfer of knowledge between cycles. For example, several of the most widely referenced books on action research (Reason and Bradbury, 2001a; Greenwood and Levin, 1998; Argyris, Putnam, and Smith, 1985; Hart and Bond, 1995) devote no more than a page to this aspect. It is addressed by Dick (2000) and by Carr and Kemmis (1986), but not in detail. Kock (1997, 2004) provides detailed treatments of the action research cycle, using Susman and Evered's (1978) five-stage cycle of diagnosing, planning, action, evaluating, and

3. Only three of the 45 chapters of the handbook (those by Heron and Reason, Torbert, and Marshall) mention action research cycles as more than a passing reference.
specifying learning. However, Kock's positivist epistemology restricted the learning to a single-loop model, in Argyris' terms.

7.2.3.1 Iterative cycles in fields other than action research

It is not only action research that uses the principle of improvement through iteration:

- Most educational practice also involves repetition: understanding a phenomenon by repeating it in different ways. This practice is well supported by theory. Kolb's (1984) cycle of experiential learning, derived from the theories of Jung (1921/1971), has strong similarities to the action research cycle.

- Sancar and Onaran (2001) point out that the legal system, in its alternation between case judgements and legislation, uses a similar cycle to action research.

- Likewise, the quality management movement has introduced the concept of continuous improvement, particularly in manufacturing. Deming's (1994) P-D-S-A cycle (plan-do-study-act) is strikingly similar to the action research cycle. The kaizen method first used in Japanese manufacturing is a less formal application of cycles (Mizuno, 1988). Hatten et al (2000) compare quality management with action research, finding many similarities.

- Charrette (a participatory urban planning method) uses a 24-hour design cycle, as noted by Lennertz (1999, p2):

  Four days is required to accommodate three feedback loops, scheduled at least a day apart. Three loops are the minimum required to facilitate a change in participants' perceptions and positions. Only simple projects with little controversy should be attempted in four days. More complicated projects typically take seven days.

  This is a different type of charrette from that of Schuttler, as described by Glenn (1994).

- However, futures methods (apart from Delphi) do not make explicit use of cycles of learning.

From the extent of the above examples, it may be that most human learning occurs through such a cyclic process, as Kolb (1984) suggests. The potential contribution of action research is to make that process explicit, enabling a focus on improvement through systematic reflection (as applied by Langley et al, 1996).

7.2.3.2 Multiple loops

The theoretical weakness of the standard single-loop cycle (whether or not repeated) of action research, is, as Argyris and Schön (1978) point out, that it has no place for the original impetus of a project to be questioned - hence their concept of double-loop learning. An example of this is the development of the consensus group technique (as noted above) in which the feasibility of each successive approximation to a useful method was reviewed in the context of
unclear and changing demand from potential clients. In the language of causation, a double-loop approach is the equivalent of redefining causes as well as effects. In action research, this corresponds to a concept of cycles within cycles (chronologically), as noted by Dick (2000).

For the development of this Process, a double-loop method was used. The inner loop corresponds to the development of the scenario mapping methodology for a particular case. The participants in that case are involved only with this inner loop. In practical terms (as outlined below) the inner loop involves cycles within cycles: the outer cycle is the entire half-day workshop, while the inner cycle corresponds to each of the several tasks scheduled within that workshop.

The following diagram illustrates the linkage of the inner and outer cycles.

![Diagram](image)

**Figure 7.2** The concept of cycles within cycles within cycles

<table>
<thead>
<tr>
<th>Cycle type</th>
<th>Unit of repetition</th>
<th>Observer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer cycle</td>
<td>Each case</td>
<td>Developer of the method</td>
</tr>
<tr>
<td>Inner cycle, Level 1</td>
<td>Each workshop in each case</td>
<td>Developer and participants</td>
</tr>
<tr>
<td>Inner cycle, Level 2</td>
<td>Each task in each workshop</td>
<td>Developer and participants</td>
</tr>
<tr>
<td>Inner cycle, Level 3</td>
<td>Each component of each task</td>
<td>Developer and participants</td>
</tr>
</tbody>
</table>

An alternative notation for the development of a Process is a triangular cycle, which involves passing information between three elements: the conceptual framework underlying the Process, the Process being developed, and participants' reflections:

(i) Experience with developing the participative Process generates ideas that can improve that Process. These ideas can be used in a later workshop of the current case study, or the next case study.
(ii) The conceptual framework guides the development of the Process, which in turn refines the conceptual framework.

(iii) The conceptual framework generates reflections and ideas, which can be used to modify the framework.

This three-way process could be illustrated as follows. The figure can be read as six simple (subject-verb-object) sentences, with two beginning from each oval, one in each direction (with verbs as italicized above):

**Figure 7.3** THE TRIANGULAR CYCLE OF METHODOLOGICAL DEVELOPMENT

Figure 7.3 is similar to Ulrich’s (2000, p252) “eternal triangle” of facts (analogous to the development process), values (ideas for the process), and system (conceptual framework). Though Ulrich’s description does not mention cycling between the three, his Critical System Heuristics (Ulrich, 1994 and 1996) is effectively a form of action research, and in a personal communication Ulrich confirmed that “cycling between the three corners of my ‘eternal triangle’ is an essential part of its application.”

Checkland’s FMA model (Checkland, 1999; Hindle et al, 1995) is also similar. In FMA, F is the conceptual framework used, M is the methodology, used (corresponding to the Process), and A refers to “area of application” — equivalent to the case in Figure 7.2. Reflection is not explicitly included in the FMA model, but M is permitted to change in response to F and A.

For the development of a method, there is one such triangle for each case: the triangle can be envisaged as surrounding the case, which would be labelled at the centre of the triangle, with all the information being passed around the case. The successive case-based triangles can be

envisaged as superimposed on one another, with gradually changing reflections, and gradual improvement of the process and framework (as noted following each case study in chapter 8). The following figure is thus a more complete representation of the development of the Process.

![Figure 7.4 Development through repeated triangular cycles](image)

**Figure 7.4 Development through repeated triangular cycles**

Though the above triangular model was developed for this project, it is not specific to it, and could be applied to the development of any method of social inquiry.

### 7.2.3.3 Use of cycles in participative workshops

The Process took place through a series of workshops – generally, four half-day workshops for each entity. These share the concept of participation with Jungk’s “future workshops” (Jungk and Müllert, 1987), the “futures-oriented workshops” of Wood and Christakis (1984), and the large-group scenarios of Steil and Gibbons-Carr (2005) but differ in other ways.

The four-workshop format used the cyclical principle by having each workshop focus on a particular aspect of the entity that would determine its future, generally in this sequence:

- Workshop 1: What forces from the past will constrain your future?
- Workshop 2: What forces from your stakeholder groups will constrain your future?
- Workshop 3: What might you expect to encounter on the paths to your future?
- Workshop 4: How might all these forces affect one another?

Each half-day workshop consisted of around six short tasks (the Level 2 inner cycle listed in Table 7.4 above). These tasks varied for each workshop; a typical list of them is provided in Appendix 2.
The Level 3 inner cycle took place within each task, following this general pattern:

1. Brief plenary session: the facilitator explains guidelines for small groups in this cycle.
2. Small groups (3 or 4 participants) work on the task, often by writing concepts on small sticky notes and arranging them as an event tree.
3. After each small-group session, a spokesperson for each group reports back to the plenary session, and adds the group's findings to the steadily growing diagram on the wall. Because each group has worked at the same task, many similarities are noted. Reasons for any differences are discussed, often resulting in changed perceptions.

Each sequence of the above three tasks can be seen as a small action research cycle in itself, corresponding to Lewin's three-stage cycle: planning, action, and "fact-finding about the result of the action." The initial plenary session involves planning, the small-group work is the action, and the plenary reporting session is the fact-finding or reflection. It might be argued that this is not a true action research cycle, because the day's work sequence is pre-planned, and there is thus no chance for the concluding plenary to affect the next task. However, because I was keen to cultivate serendipitous improvements, and I was the facilitator (for most cases), I made an in-principle decision to facilitate quite loosely. This involved not insisting on keeping exactly to the timings and sequence laid down in each workshop's agenda, and being prepared to improvise when necessary, using a repertoire of what Andersen, Richardson, and Vennix (1997) refer to as scripts. Thus in the circumstances, it was true action research, though not at a high level of participation, because the decision to vary the following task was not the participants' but mine — though always in response to participants' activities. Participants were helpful, but (with several exceptions) not well-enough informed about the previous development of the Process or about futures methodology to make decisions during the flow of the workshop.

7.2.4 Creating a suitable environment for development

The partial-prediction axiom in chapter 4 states that the medium-term future of a social entity (despite many participants' preconceptions) is to some extent knowable, at least in broad terms. In graphical terms, the future is an area or envelope, rather than a point. The primary purpose of the Process is to help participants develop their capabilities for foresight, which can be envisaged as a weak force, easily overwhelmed by the pressures of daily life. It follows that the environment in which the foresight takes place is crucial: psychological "noise" must be minimized to allow the weak force to be perceptible. All aspects of the development environment should be conducive to foreseeing the envelope of futures that may occur.
The iteration involved in the inner loops is therefore an attempt to help participants view that envelope from different angles. This is similar to Morgan's (1997) images of organizations, and to Linstone's Multiple Perspectives approach. Linstone (1984) suggests applying three types of perspective that can be applied to any management problem: technical, organizational, and personal. Integrating data seen through each of the perspectives can reveal insight that is more than the sum of the parts, and help unrealized assumptions to surface. Likewise, the principle of this Process is that, since the future is difficult to perceive through the fog of time, the cyclical paradigm of action research can be used to enable multiple perspectives of the future.

7.2.5 Fieldwork schedule for each case

This section lists a generic schedule for the four main workshops in the Process (as described in principle in Chapter 5, with a detailed agenda in Appendix 2), preceded by some preliminary planning meetings, and followed (about a year later) by a follow-up meeting. Though no case followed this schedule exactly, departures from it were not significant.

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Time since previous</th>
<th>Purpose</th>
<th>Output</th>
<th>Evaluation method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary meeting/s to plan workshops</td>
<td>2 weeks</td>
<td>Introduction; consider the presents</td>
<td>Map stakeholders and influences</td>
<td>Critical reflection, comparing cases</td>
</tr>
<tr>
<td>1</td>
<td>1 week</td>
<td>Consider the pasts</td>
<td>Left-hand side of scenario map</td>
<td>Questionnaire and discussion at end</td>
</tr>
<tr>
<td>2</td>
<td>1 week</td>
<td>Consider possible futures</td>
<td>Right-hand side of scenario map</td>
<td>Discussion at end</td>
</tr>
<tr>
<td>3</td>
<td>1 week</td>
<td>Combine previous weeks' data, add attributional links</td>
<td>Annotated scenario map with layers</td>
<td>Questionnaire and discussion at end</td>
</tr>
<tr>
<td>4</td>
<td>1 year</td>
<td>Review of scenario map and flow-on effects</td>
<td>Revised scenario map</td>
<td>Entire meeting is evaluation</td>
</tr>
</tbody>
</table>
but this stage preceded planning – it was more observation. This involved exploring the possible process with insiders, learning about the organization, and what outcomes might be expected: characterized by Wadsworth (2001) as “compass work.”

The information collected at this stage included:

1. Stakeholder groups – and motivations of each.
2. Impinging systems – and forces exerted by each.
3. Key actors (decision makers, and possible future ones) and their interests.
4. Broad social trends which may impact indirectly through many sources.
5. The goals, values, baggage, worldviews, and other factors that may influence the organization’s actions (first pass).

After this initial information had been collected, the planning could begin. This involved deciding on the number and nature of participants, the particular participants, the venue, the dates, and the content of the meetings – as tailored to that specific entity. Creating a suitable environment is particularly important, both in terms of factors relating to shape, size, and arrangement of the workspace (Doyle and Straus, 1993) and the effects of the presence of other people (Green and Hart, 1999).

7.2.6 The use of reflection in developing the Process

An essential component of action research is the use of reflection. As noted by Dick, without systematic reflection, an intervention cannot accurately be described as action research (Williams, 2004). In the present study, with its twin substantive and developmental components, two forms of reflection were used:

(a) Reflections on the futures of the social entity currently being studied.
(b) Reflections on the development of the Process.

The former type of reflection was done mainly by participants (stakeholders in the social entity) while the latter type was done mainly by the researcher, as well as the assistants used in some of the case studies. To ensure that reflection occurred and could be productive, the following steps were taken to encourage reflection by participants:

1 Fifteen minutes was allocated at the end of each workshop, specifically for evaluation.
   Both written and spoken data were collected.
2 A questionnaire (incorporating the “critical incidents” elements recommended by Brookfield, 1995) was distributed, asking several relevant open-ended questions. Participants were asked to anonymously complete these and hand them up.

3 After filling in their questionnaires, participants were encouraged to discuss their experiences, and these were recorded on audio tape.

4 Workshops for each case were mostly held one week apart, this being judged an optimum time for reflection: long enough to allow follow-up reflection, but short enough to clearly remember the workshop.

5 Participants were encouraged to email the facilitator or the organizer for that entity with comments about the previous workshop.

6 Each workshop (after the first) began with the facilitator summarizing the previous workshop, and requesting further observations on it.

7 In the follow-up sessions with each case (approximately one year later) participants had another opportunity to reflect on the process. This was done by my distributing a summary report before the revisit, and asking them to read this and think about it. They then had the opportunity to reflect further before the follow-up session began.

The fact that these opportunities for reflection were provided to participants did not mean that they were all taken up. As the primary interest among participants would always be with their own entity, rather than the Process, the above variety of opportunities for reflection was set up in the hope that some of these opportunities would be used.

As for reflection by myself, as Process developer and as facilitator: when facilitating, I kept a diary, filling it in during quiet moments in each workshop, reflecting on the efficacy of the Process itself. Because effective reflection generally involves comparison against a framework (Checkland, 2000), each workshop was compared (using the criteria listed at the end of chapter 3) with (a) the plan for that case, (b) any previous workshops for the current case, and (c) the corresponding workshops for previous cases.

For the Legal Services case, in which I was an observer, and employed separate facilitators, they and I discussed the procedure after each session. This was also possible in the Barossa case, for which I brought along a cartoonist/observer (another PhD candidate) and conferred with the convenor, who had a doctorate in environmental studies and a strong interest in futures work.
Before the sessions with each entity, I recorded (a) my expectations, and (b) the methodological decisions needed: what could be tested by varying procedures from the previous case. After completing the work with each case, I re-evaluated the recently produced scenario map and its annotations, asking whether it was as clear as it could have been, and whether there was a better way to present the information. Sometimes this was done in conjunction with key members of the entity – if they had time, and were still interested. I then considered whether some changes should be made to the method for the next case, and if so, what changes were appropriate. This parallels Dewey’s (1910/1991) reflection sequence: the expected, the observed, differences between the two, reasons for the differences, and resolution.

7.2.7 Follow-up evaluation

The plan called for the final session with each organization to be an evaluation and review of the process. This would be about a year after the main study: long enough to evaluate the usefulness of the process, but not so long that the study would have been forgotten. The follow-up was planned as a single meeting with the group of participants at each entity studied (or as many participants as remained available). Before the follow-up meeting, prior participants would be recontacted, and asked to list the main events that have affected the organization in the time since the scenario mapping exercise.

At the actual meeting, with a planned duration of several hours, the scenario map from a year earlier would be reviewed. Four elements would be under review, corresponding to the levels of the Kirkpatrick model for evaluating training (Kirkpatrick, 1994):

1. participants’ satisfaction with the project
2. current situation on the scenario map
3. changes in the behaviour of participants
4. change in the entity, brought about by the Process.

As noted in chapter 9, the Kirkpatrick model was later modified to suit the evaluation of the development of a social inquiry process. At the same time, the fulfilment of the execution criteria developed in chapter 3 would be assessed, by myself and participants working together, with any disagreement being recorded.

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7.2.8 Ethical issues in group work

When humans are communicating, there is always a possibility that ethical difficulties can arise. As noted by Stufflebeam (1991, p258) on the development of evaluation standards, there are potential conflicts between ethical principles, so “evaluators need to recognize and deal as judiciously as they can with such conflicts.” The solution is not to refrain from all social inquiry, on the ground that harm may be possible, but to be aware of that possibility in the course of inquiry, and take all practicable steps to avoid harm to participants and their entities. In a workshop situation, harm is perhaps most likely when one participant has power over another (typically an employee/employer relationship), and the less powerful participant says something in the workshop that annoys the more powerful one. One suggested solution (by Murphy et al, 1998) is never to have employer and employee in the same room, but this could weaken the Process by narrowing the range of participant stakeholders. Also, it does not guard against a situation in which one of two peers present later becomes the other’s superior. As it is not possible to design a social process to avoid such eventualities, the best solution lies in the execution of the process, and in the facilitator’s sensitivity and situational awareness. As a member of the Australasian Evaluation Society, I follow that organization’s ethical principles (www.aes.asn.au). In consultancy work with groups, I also observe the code of ethics of the International Association of Facilitators (www.iaf-world.org) but could not fully do so in this study due to part of item 4: “We avoid using processes, methods, or tools with which we are insufficiently skilled.” However, the developmental nature of the Process was made very clear to all participants, both in writing and verbally. Also, because of my previous experience in facilitation, only some aspects of the Process were new; the group techniques were fairly standard.

7.3 Limitations and conclusion

Following the taxonomy of possible futures formed in chapter 3, this work is subject to limitations of place, language, and time. In terms of place, most of the fieldwork occurred in South Australia, and for that matter mostly in its capital city, Adelaide. However, a pilot study was done in Indonesia, and an international case was developed using secondary data. In terms of language, the research was done only in English – though the preliminary trial in Indonesia was bilingual, using both English and Indonesian. In terms of time, all the development occurred between 2001 and 2004, but mostly in 2003 and 2004.
7.3.1 **Representativeness of the sample**

There is also a possible limitation of representativeness. A potential source of difference between the sampled population and the final sample is the differential unwillingness of some types of group to participate in the study. As the development of the technique involved approximately one week's time for those involved, groups without a strong interest in the future were unlikely to take part in the study. For businesses, this involved an investment of about one week's salary for each staff member involved. For voluntary groups, it involved a decision by participants to give up time that they could have spent in other ways.

Within cases, this limitation was more obvious in some cases than in others, and is discussed under each case in the following chapter. A more serious problem is related to the representativeness of cases themselves. Social entities that were approached, but not (through their own choice – or delay) not included as a case, may have produced different results had they taken part in the study. Comparing the potential cases that resulted in case studies with those that did not, the clearest difference was that the former tended to be organizations facing imminent major change, while there was little evidence of this for the latter cases. Thus the tentative conclusion is that the sample used was biased toward organizations expecting major change in their circumstances. While this obviously made them more receptive to undertaking futures work, this would also apply to most other foresighting methods as well as SNM.

7.3.2 **Researcher effects**

In qualitative research, the “instrument” is the researcher; thus Guba and Lincoln (1992) refer to the “human instrument.” There is a strong argument that it was not valid for me (as a human instrument) to both develop and evaluate this Process. How can a reader of this thesis be sure that, even were I scrupulously impartial in administering the evaluation questionnaires, I did not subtly bias the participants’ reactions? (With a master’s degree in social psychology and 20 years’ experience in facilitation and moderation, this would not have been difficult to do deliberately – though that same background makes it clear that this could have changed responses to only a very limited extent.) Secondly, in the absence of experience of other methods of scenario development, might not a favourable evaluation by participants be a form of expectancy effect (Draper, 2004): the result of any futures studies exercise at all?

The safeguards against these effects were as follows.

1. The evaluation questionnaires completed by participants were anonymous.
2. Participants were asked to evaluate the method itself, rather than my facilitation of it, or their participation in it.
3. Evaluation was carried out at several stages during the workshops: immediately after each session, with a general review at the end of the final session main for each case, and the final evaluation approximately a year later.

4. Following the findings of Tannenbaum and Yukl (1992) on measuring the effectiveness of training, the focus was on the viability and potential usefulness of the Process, rather than on its being a pleasant experience for participants.

5. To reduce any chance of expectancy bias, during fieldwork I avoided forming detailed hypotheses (as distinct from reflections) about the Process. My working proposition was that it should be possible in some way to create a viable method within the four broad design parameters (participative, visually oriented, holonic, and scenario-based). Initially, even the issue of whether the approach should be quantitative or qualitative was left open.

Above all, because the research was formative rather than summative, my motivation was to improve the Process through successive iteration. The guiding objective was to improve the method to a point where it could be readily demonstrated to and used by others.

7.4 Review of this chapter

This chapter has covered the sample design and the fieldwork procedure used in the case studies. Though the sample selection method described in section 7.1 was faithfully followed, the "ideal" fieldwork method described in section 7.2 had to be varied somewhat to suit particular circumstances of each case. In summary, the sample selection involved:

- Creating a theoretical sampling frame using a faceted model.
- Maximum-variation sampling from an infinite population.
- The sampling unit was a social entity.
- A sample of six primary cases and one secondary case.

The fieldwork involved four half-day participative workshops, focusing in turn on

(a) the entity's past
(b) its present situation
(c) its future - from several sources
(d) its future - integrating those sources.

Approximately a year later, each case was followed up to determine the extent to which its future had been anticipated, and any after-effects of the case study.
Chapter 8: Case studies

8.1 Introduction

This chapter presents empirical evidence to add support to the overall argument that the method developed is valuable. To keep this chapter from being overly detailed, and to enable the progress of the Process to be more readily understood, minimal descriptive content has been included in this chapter. Fuller details of each case study are given in Appendix 4, which for each case adds the following data:

1. More detail on the entity under study
2. Sampling considerations: how that entity fulfilled the sample design
3. The procedures used (environment, participants, and activities)
4. A summary of the output from that case.

In other words, this chapter focuses on the development of the Process, while Appendix 4 describe each case study in more detail. The goal has been to make this chapter self-contained, for those wanting an overview of the development of SNM, by removing most of the case-specific data to Appendix 4.

Taking this chapter and Appendix 4 together, the combined structure for each case closely follows the standard sequence of action research, for each of the seven cases in turn. The reporting format for each case begins with background data, then discusses three elements in a sequence corresponding closely to Lewin's (1946) cycle of action research (planning, action, reflection). The following table shows the cycle, and the location of each element.
8.1.1 Preparation for fieldwork

For the thesis fieldwork, the original plan was to work with six organizations, of varying sizes and types, as outlined in chapter 7, section 7.1. The plan was, as far as possible, to begin with less complex organizations, resolve any initial problems with the method, and gradually to move on to more and more complex organizations.

Initial response was slow

Perhaps naively, I had expected that an offer of what amounted to free consultancy work would be eagerly accepted by organizations. I placed a description of my thesis work on a web page, optimized it to attain a high ranking on searches for “scenario planning Adelaide” (not difficult: there was no competition) and waited for inquiries to flow in. Nothing happened. I

1. For each case, I produced a separate report for the organization on whose behalf that study was done. As these reports were written in a consultancy rather than academic style, included some in-confidence business data, and averaged around 50 pages, the full findings are not included here.
then began contacting local organizations that I thought might feel a need to anticipate their futures. In a city with a population of over a million, and with an estimated 53,000 business entries in the 2001 telephone directory, I did not anticipate any problems finding cases. However, after approaching 11 different organizations during 2001-02, many through personal contacts (which should have helped to increase the probability of acceptance), I was unable to convince a single organization to agree to begin participation in the project. Though no contacted organization rejected my proposal, and most were favourably inclined, I encountered the following difficulties:

- Organizations were wary because the service was offered at no cost, and perhaps because it was a student project. One contact remarked that “admitting you’re doing a Ph.D is the kiss of death” – implying that a thesis project was seen as long, tedious, and too academic to be of value in a workplace.
- Often, the person I first contacted was enthusiastic, but failed to convince his or her superior (often outside South Australia) of the value of the work.
- The “musical chairs” effect, in which I approached person A, who was unable to make a decision and passed the question on to person B, who passed it on to person C, who referred it back to person A, who was now working in a different position – and so on.
- “We are about to make major changes, so this is not a good time.”
- “We are not planning any changes, so this is not a good time.”
- “We’re so busy dealing with the present that we have no time to think about the future.”
- “This is a very small organization and we can’t spare the management time.”
- “This sort of work is done by our head office” – in Sydney / Canberra / USA / France.
- The organization agreed in principle, but never managed to find time for the workshops.

In addition to the above reasons, I detected in some cases almost a fear of the future: people who did not want to look beyond the current financial year, perhaps because they did not like the future that they dimly perceived, or a form of defensiveness that occurs when mental models are challenged (as noted by Friedman and Lipshitz, 1991).

Partial cases
As well as the fully participating cases in the sample, this study was informed by a set of what might be called partial cases. These involved types of organization and situation in which the process of scenario-building could not be fully explored, for reasons of time, language difficulties, lack of preparedness of an organization to participate, or client confidentiality. These included a manufacturing management group, lifelong learning in the city of Marion, the residential construction industry in South Australia, and a project for a manufacturer of lawn
mowers, which included investigating the future of lawn-mowing in Australia. In each of these cases, some elements of the Process were used, but none used the full Process.

One such opportunity arose with Smartlink, the Australian National Institute for Manufacturing Management, for which I was evaluating its seminar program and managing its website (www.smartlink.net.au). Smartlink, with only three full-time staff, but a $1.3 million dollar budget, was an example of an "imaginary organization" (Hedberg et al, 1997). It fulfilled its goals by funding other organizations, using a complex value chain. Though Smartlink's director agreed in principle that I could use the organization as a case study, this did not proceed, as the organization was too small to enable any participative scenario-building. Nevertheless, some preliminary work helped in the initial development of the Process.

Despite these setbacks, seven cases were eventually located that did participate. The cases are summarized in the following table, which shows:

(1) The sequence of cases studied.
(2) A brief label, used to refer to the case.
(3) A description of the type of entity involved with the case.
(4) The number of main fieldwork sessions (not including any preliminary or follow-up meetings.) The figure for Iraq is zero because this case used secondary data.
(5) The status of the case: whether it included the full Process, or only parts of it.
(6) The number of participants involved; these were "official" participants, who turned up at least one workshop, but not necessarily all workshops. For case EM, this is the number of different people interviewed.

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
<th>Sessions</th>
<th>Status</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>A radio network in Indonesia</td>
<td>1</td>
<td>Partial</td>
<td>14 a</td>
</tr>
<tr>
<td>EM</td>
<td>An engineering manufacturer</td>
<td>11</td>
<td>Full</td>
<td>6</td>
</tr>
<tr>
<td>Iraq</td>
<td>The 2003 war in Iraq</td>
<td>0</td>
<td>Full</td>
<td>0</td>
</tr>
<tr>
<td>LS</td>
<td>An NGO providing legal services</td>
<td>4</td>
<td>Full</td>
<td>14</td>
</tr>
<tr>
<td>CU</td>
<td>A credit union</td>
<td>4</td>
<td>Full</td>
<td>17</td>
</tr>
<tr>
<td>SC</td>
<td>A service club</td>
<td>5</td>
<td>Full</td>
<td>20</td>
</tr>
<tr>
<td>Barossa</td>
<td>The Barossa Valley landscape</td>
<td>1</td>
<td>Partial</td>
<td>19</td>
</tr>
</tbody>
</table>

a. Officially there were 14, but at times up to 35 were present.
As noted in Chapter 7, each case was selected in order to highlight some potential problems with the Process being developed. Problems found with each case were reflected on; solutions were envisaged, and tested with the next appropriate case. The elements of the Process used therefore varied slightly from case to case, depending on the reflections from the previous case and the nature of the subsequent entity. The following table shows for each case whether the element was used in full, with time specifically assigned to it (shown as **), or covered as part of another session (shown as *), or not used at all with that case (shown as -).

**Table 8.3 Elements of Method Used with Each Case**

<table>
<thead>
<tr>
<th>Case...</th>
<th>RN</th>
<th>EM</th>
<th>Iraq</th>
<th>LS</th>
<th>CU</th>
<th>SC</th>
<th>Barossa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impinging systems</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>Leaf of goals</td>
<td>-</td>
<td>-</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Futures wheel</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Midcasting</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Backcasting</td>
<td>**</td>
<td>*</td>
<td>-</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Morphological scenario paths</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Hemispherical layered model</td>
<td>-</td>
<td>-</td>
<td>**</td>
<td>-</td>
<td>**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Envisioning preferred futures</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>*</td>
<td>-</td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

**8.1.2 Outline of each case report in this chapter**

The bulk of this chapter summarizes the seven case studies. For each, the following information is presented:

1. Background to the case study
2. Reflections on the findings
3. Implications for the next case.

As noted above, Appendix 4 adds the following data for each case:

1. A more detailed description of the entity under study
2. Sampling considerations: how that entity fulfilled the sample design
3. The procedures used (environment, participants, and activities)
4. A brief summary of the output from that case.

This additional information can be viewed as falling between subsections 1 (background) and 2 (reflections on the findings) for each case in this chapter.
8.2 Pilot case: a radio network in Indonesia (RN)

Appendix 4 contains details of this case: on the entity studied, sampling classification, procedures used (recruitment, environment, activities), and output.

8.2.1 Background
The first attempt at creating a scenario network map was done as part of consulting work that I was conducting in mid-2001. This work (not formally part of the thesis project) enabled me to conduct a preliminary feasibility study. This was part of a Swedish aid program, the aim of which was to strengthen democracy in Indonesia by introducing the concept of public service broadcasting to a government-owned radio network (RN). My role was to train groups of RN staff in audience research, using that term in a very broad sense, including research into likely future audiences. One of these courses was held at the RN office in Pekan Baru, the capital of Riau province. The course syllabus involved a situation analysis, which involved helping RN staff to explore possible futures for RN in Riau, and I used this opportunity to make a preliminary trial of the scenario network process.

8.2.2 Reflections
Six main reflections arose from this study.

Reflection 1. Problems identifying stakeholder groups
The method used to identify stakeholder groups was in terms of enveloping systems, subsystems, and linked systems. This was difficult to convey to participants, and took much longer than anticipated. A different approach thus seemed to be indicated.

Reflection 2. Success with midcasting and event trees
It was clear that the most successful technique with these participants was midcasting. Perhaps due to their journalistic training, the participants readily grasped the concept of the event tree: defining a major turning point (almost a snapshot scenario, in some cases) then outlining the probable preconditions and consequences.

Reflection 3. Lack of success with backcasting
The backcasting was not completed. Though that group engaged in much discussion, it ran out of time to record its findings. The paths discussed seemed highly specific, referring to particular government ministers and other influential people. The group appeared to treat this as a CPM-like planning exercise, establishing a sequence necessary to achieve the final purpose.
(e.g. shutting down RN) without considering the broader ramifications and likely reactions: in other words, if causal diagrams had been created, they would have been simple chains, without branching.

**Reflection 4. Lack of success with futures wheel**
The futures wheel exercise produced disappointing results. Though this is one of the simplest futures techniques, and thus one of the most readily grasped, this one displayed a marked lack of detail. It seemed more difficult for the participants to imagine the near future (growing from the present) than it did for them to imagine more distant possibilities. Because I was using an interpreter, and Indonesians are reluctant to voice criticism (particularly to an authority figure such as a trainer) it was difficult to know why the futures wheel had not worked. One reason may have been that participants did not grasp the concepts of multiple pasts and multiple presents. This was perhaps because the group was too homogeneous. Since most of them had worked together at RN for years, they shared a single past and a single present. They seemed to be confused about creating futures wheels that began in the past. This may have reflected another aspect of Indonesian culture, which places a very high value on solidarity and authority in social settings. Alternatively, it may have been that the instructions, relayed through the interpreter, were unclear. Also, I sensed that many of the participants were trying to forget their past work environment, as being not useful in the new régime: their interest was centred on the future. On reflection, I realized that instructions for creating futures wheels would need to be much more explicit for later cases.

**Reflection 5. Participants avoided unpleasant possibilities**
In this first exercise in the participative development of futures, it became clear that participants were not keen to explore the more unpleasant possibilities. They did explore the consequences of selling RN stations, but those unpleasant consequences served the purpose of convincing participants that such a sale was not a good idea. However, if the central government did decide to sell a network or two, the desires of existing staff might not be much of a deterrent. I suspected that the time that this unwillingness to consider potential bad news might be a more Indonesian trait, and that it might not exist (or at least might not be so strong) in Australia.

Despite those problems, the general approach proved viable. Though the scenario network map was incomplete, due to time pressure, this was not unexpected. In particular, this first trial of midcasting was clearly viable: it caught the imaginations of the participants, and they
engaged in it keenly. The impinging-systems analysis divided such systems into three groups: enveloping systems, subsystems, and linked systems.

**Reflection 6. Similarity of morphological approach to standard scenario planning**

I realized that, despite my criticism of the Critical Uncertainties scenario method in preceding chapters, that morphological hierarchies are topologically similar to that method. However, the Critical Uncertainties method begins by considering dimensions of uncertainty, while the morphological model is a faceted one, based on categories rather than dimensions. The nearest approximation that the Critical Uncertainties method could have made to Figure A4.1.2 in Appendix 4 would have been to use two dimensions (public/private and one/many entities), producing up to four scenarios:

1. Public ownership of one entity
2. Public ownership of many entities
3. Private ownership of one entity
4. Private ownership of many entities.

Using the participative approach, a small group would have fleshed out each of the four dimensional combinations into a scenario, producing a description of how RN would fit into each scenario. In contrast, the scenario network method involved creating 13 small scenarios instead of four large ones, focusing not on vivid description of the endpoints, but on creating paths between the present and each of the 13 states. The vividness would be realized through narrative sequence, rather than detailed descriptions.

As normally applied, though, the Critical Uncertainties method would not have produced the above four scenarios, but a more macro-scale set covering Indonesian society as a whole. Two key dimensions were obvious: whether or not Indonesia would continue along its path to democracy, and the level of economic growth. Crossing these dimensions would have produced four scenarios:

1. High democracy, high economic growth
2. High democracy, low economic growth
3. Low democracy, high economic growth
4. Low democracy, low economic growth.

The focus would have been how RN would cope in each of the four scenarios, but that method would not normally have covered the ways in which RN might contribute to the scenarios. Following the normal Critical Uncertainties procedure, the next step would have
been to canvass RN's possible reactions to each of those four scenarios. The Critical Uncertainties method is passive in that (in the form described by Schwartz, 1991) the entity cannot affect the scenario outcomes.

However, the same criticism can be applied to the morphological set used in this case. That set of possibilities for RN focused on its organizational structure: certainly relevant to the staff and managers of the organization, but of little relevance to the audience. Since the overall goal of this project (in which my course played only a small part) was to enhance democracy in Indonesia, it would be reasonable to create a morphological set addressing that objective. I realized this only after this casework was completed, so it was too late to make another attempt with the same participants. These reflections led eventually to the development of the Leaf of Goals, as described in section 5.3.4 in Chapter 5.

8.2.3 Issues carried forward to the next case

The main purpose of this pilot case, carried out on a very limited scale, was to determine whether the construction of scenario networks was feasible, and what problems might be faced. The conclusion was strongly affirmative, though clearly much developmental work was required, particularly with the practical development of the futures wheel and backcasting. Two clear lessons were learned, one relating to the listing of stakeholders, and the other on the number of participants in a workshop.

Need to develop a taxonomy of stakeholders

Participants had difficulty with the division of stakeholders into subsystems, enveloping systems, and (particularly) linked systems; it seemed likely that some were omitted. Thus one task for the next case was to create a taxonomy of linked systems, which might also be thought of as stakeholder groups.

Number of participants

The optimum number of participants was clearly fewer than the 30-odd sometimes reached in this case; probably a lot less, around 15 – though much would depend on the size, shape, and characteristics of the workshop environment.
8.3 Case 2: An engineering manufacturer (EM)

8.3.1 Background
This was the first substantive case in the study - though initially I was hesitant to include it. Because the entity was a small business, it would not be possible to use the workshops called for by the Process design. However, the sample design called for the inclusion of an innovative business, and this one certainly qualified. Also, there were no other suitable cases on the horizon at the time, my fieldwork was behind schedule, and the chairman of this company was very keen to engage in scenario work. The clinching reason for accepting this case was that my original intention had been to develop a futures method that would work well on a small scale, and it was likely that this business was far from alone in being unable to spare staff for two days of workshops. I therefore decided to go ahead, if only to find out to what extent the Process would succeed without participative workshops.

8.3.2 Reflections

Reflection 1. Use of interviews instead of workshops
I had not expected the first substantive case in this study to depart so radically from the designed Process (i.e. by not using workshops) but as indicated above, there were good reasons for both accepting this case and departing from the plan. In particular, the use of interviews (with numbers of respondents varying between one and four, with not all respondents always present together) permitted the extension of the Process to a entity too small to hold workshops.

Reflection 2. Two entities in one
Another unexpected development was that what was intended to be a study of a single entity soon became a study of two entities: the main business of EM, and the development of the electric motor. The potential futures of the two turned out to be so different that it made little sense to look at their futures as a single entity – particularly in view of the fact that one option being considered was to sell the bulk of EM but keep the electric motor business.

Reflection 3. Increasingly-structured interviews
Books on in-depth interviewing and the case study method (such as Kvale, 1996; Stake, 1995; Yin, 1994) generally distinguish three types of interview: structured, semi-structured, and unstructured. Structured interviewing uses a detailed questionnaire, which the interviewer is expected to follow verbatim. Semi-structured interviewing uses an interview guide rather than
a questionnaire: a list of topics to be covered, rather than specific questions, with a less rigid emphasis on the sequence of topics. In unstructured interviewing, the interviewer has a clearly-recognized single line of inquiry, and for which a questionnaire is not used at all.

Cutting across the above categories is cognitive interviewing, which focuses on the retrieval of data from memory (Fisher and Geiselman, 1992; Jabine et al, 1984, Willis, 2004). This lies between structured and semi-structured interviewing in its approach to questioning, with an emphasis on probing responses.

I began by using the semi-structured method, but even in the first interview found it too restrictive. Because I was asking the two senior managers in a company to describe the background and nature of their organization, it was impossible to stop them from talking. The first question from me (“Could you tell me where your business is heading?”), produced a torrent of words that lasted for two hours, and they still had not exhausted the topic. I returned the following week for what was essentially a continuation of the same interview. On listening to the tapes I had recorded in the first interview, I realized that in fact the managers had already answered many of the other questions I had planned to ask about in the first interview, as well as some of the issues I had been intending to ask about in later interviews.

With that realization, from that point onward I conducted what could be labelled an “increasingly-structured” set of interviews, drawing questions from each interview to ask about in more detail the following week. With the later cases, I followed this procedure deliberately. The first interview generally involved a single question from me: “Tell me about this organization, and how it came to be where it is today.” For the following session I would return with some specific questions designed to fill the gaps in the previous session’s responses, as well as some new general questions. I generally began the second set of sessions (focusing on the present) by asking respondents to enumerate the key actors and stakeholder groups that influenced and were influenced by the organization I was dealing with. Having established a broad list of stakeholders, I then asked for more detail about each. In some cases it was only after I had listened to the day’s tapes that I realized that some data had been omitted, and I needed to ask further questions at the following session. Gradually, as my respondents passed on the main data of interest to me, they became less voluble and I began to ask more and more specific questions. I made several attempts to create a more formal, generic questionnaire, but in each case this was overwhelmed by a flood of particularities: questions that I would not initially have known that it made sense to ask, and which varied with each organization I worked with.
A search for some reference to such a procedure in the qualitative research literature found the nearest (though not exact) equivalent to be the "recursive interviewing" described by Minichiello et al (1995). This may be because few published studies (outside the ethnographic area) seem to have interviewed the same respondents repeatedly. In the classical ethnographic literature involving repeated interviews with the same people (such as Evans-Pritchard, 1940; Lewis, 1967; Lynd and Lynd, 1929; Mead, 1928/1963; Whyte, 1955) the data collection methods appear not to have been formal interviews, and none of these researchers set out to develop a "method."

**Reflection 4. Extending midcasting through "weaving"**

Midcasting in its original version, as used in the RN pilot case, is a combination of two elements: (a) identifying potential surprises in the entity's near future, and (b) elaborating these using event trees: conceptually identical to the "problem trees" used in the ZOPP method (COMIT, 1998). In the EM case, I realized it was possible to indefinitely extend event trees, providing a continuous context — unlike problem trees, which end with a "root cause" (Mizuno, 1988). An event tree begins with a central situation or event — current or potential. This is transformed into a tree by asking (1) what other situations would lead to this? and (2) what other situations would flow from this? (The tree metaphor is that one begins with a trunk; question 1 provides the roots, and question 2 the branches.)

The "weaving" process discovered in this case involves extending a problem tree by asking additional questions (see Appendix 4) that result in each of its elements forming the centre of another event tree. This destroys the tree metaphor by making a root or branch of one tree the trunk of another, but creates a powerful method of generating scenario network. Thus backcasting was not used in this case: it was almost superfluous.

**8.3.3 Issues carried forward to the next case**

The main issue to be carried forward was the potential for further development of the "weaving" approach. Neither of the other two reflections on this case was expected to have a bearing on later cases, except that since only five further case studies were planned, and since the main focus of the process was the use of participative workshops, no further cases would be undertaken with entities too small for workshops to be used.
8.4 Case 3: The 2003 war in Iraq

8.4.1 Background

This case was developed as a scenario network in early 2003, in order to demonstrate the Process to organizations interested in using it. As the possibility of war in Iraq was a major news story at the time, everybody understood many of the underlying issues. Presenting a scenario map of this familiar issue thus seemed a useful way of illustrating the output of the Process. When the long-foreshadowed war began, I realized that this example could become a real case in my research, and would complement the primary research, adding two main contributions: (a) a study of the uses of power, given that the US military was perhaps the world's most powerful organization, and (b) the intentions of many of the actors involved were not clear, and stated intentions could not be relied on. Adding a secondary case study would fill some gaps in the sampling frame. Also, much documentation was becoming available, providing the secondary data required.

8.4.2 Reflections

Reflection on this scenario mapping exercise took place over two years, overlapping all the subsequent case studies. It proved highly productive in terms of developing the Process, revealing various new elements in the construction of scenario maps:

1. Establishing case boundaries and data selection.
2. Perceived motives of other actors as a factor in events.
3. The need to anticipate changes in actors.
4. Difficulties in deriving the lower three levels of the hemisphere.
5. The notion of emerging constructs.
6. The worth of constructing a full hemispherical model.

Reflection 1. Establishing case boundaries and data selection

Unlike all other cases in this study, the Iraq case (because it involved secondary data) did not have a central entity. Thus a central problem was defining the scope of the scenario map. A huge volume of writing was available on the war in Iraq, even before it began. Because there was some doubt about what was relevant, it seemed safer (bearing in mind the problems found with some scenarios for 2000, in Appendix 1) to risk defining the scope too broadly rather than too narrowly. The principle of “sweeping in” (developed by Churchman (1971), from the philosopher E A Singer) was thus adopted. However, if the definition becomes too broad, there is a risk of overlooking important data. Pragmatic solutions to this problem are
(1) defining the scope a little more broadly than was first envisaged, and (2) willingness to redefine the scope during the study.

**Reflection 2. Perceived motives of other actors as a factor in events**

With the cases previously studied, the motives of external actors were not dominant in determining the future of the entity. In the case of EM, motives could safely be assumed to be purely financial, while for RN, actors' motives were not explored in the workshop but were well known. In the Iraq case, motivations of the main actors were much less clear, and stated motives were sometimes not believed by other actors. Despite the USA's announced initial intentions of eliminating Iraq's Weapons of Mass Destruction without necessarily seeking régime change, the first of eight motives stated by the Secretary of State a few days after the invasion began was "to end the regime of Saddam Hussein..." (Rumsfeld, 2003). However, a public opinion survey in 20 countries (Pew Research Center, 2003) found that the commonest motive ascribed to the USA was that it could control Iraq's oil.

**Reflection 3. The need to anticipate changes in actors**

When dealing with national policy, as in this case, a country may have internal divisions and differing opinions, but such divisions are not always made known publicly, or at least do not emerge until after some time. It was not apparent initially that there were divisions in the US administration on conduct of the war. Later it became clear that the State Department (under the Secretary of State, Colin Powell) was much more cautious than the Pentagon (led by the Secretary of Defense, Donald Rumsfeld). Later still it became clear that even within the Pentagon there were divisions (Fallows, 2004; Bazerman and Watkins, 2004), with one group supporting much larger military ground forces than the other. As the next 18 months passed, and it became increasingly obvious that the Iraq adventure was not an unalloyed success, more voices of dissent arose from the US defence establishment (such as a report of the US Defense Science Board, 2004).

This splintering of actor groups suggested that key transitions between event holons could be better understood by (1) applying the Stakeholder Star, and listing actor groups with direct or indirect interests (in this case, Israel was an example of the latter), (2) considering potential new actors, (3) reviewing likely reactions of each actor group to the transition, and (4) the pressures that each group was able to bring to bear on each other group. A related suggestion is (5) to question the unthinking use of synecdoche and metonymy (prevalent among journalists): broad terms such as "the Pentagon" and "the US" should be defined as specifically as possible; nor should personalization, such as "Saddam," be taken for granted.
Reflection 4. Difficulties in deriving lower levels of the hemisphere

The original concept of the hemisphere of four levels, though envisaging each level as being derived from elements of the one above, did not include a detailed method for doing that. The original plan was akin to differentiation or the “method of differences” in the mathematical sense. In other words, level 2 (motives) would be derived from level 1 (events) by asking for each connected pair of events “How did event A influence event B?” It was expected that there would be fewer motives (in level 2) than events (in level 1), fewer values (in level 3) than motives, and fewer worldviews (in level 4) than values.

However, when this form of qualitative differentiation was tried – as for the first time with this case – there turned out to be more motives than events: the multi-cause axiom applied. The multi-effect axiom also applied: some motives influenced many events. Thus a relatively small number of motives could be derived. This involved decoupling the second level from the first. Figure 4.3 in chapter 4 was thus varied from this original (upper) shape to a revised (lower) shape, in which motives were represented by lines rather than boxes:

![Original vs Revised Diagram](image)

**Figure 8.1 RECONCEPTUALIZATION OF THE SECOND (MOTIVES) LEVEL**

In other words: each actor has a number of motives, and each of those motives may be applied to a number of events influenced by that actor. In practice, diagrams such as the lower part of the above figure were too complex to be readable; the solution seemed to lie in software, but no suitable software was found.

Reflection 5. The notion of emerging constructs

On comparing the Impinging Systems diagram created in early 2003 (Figure A4.3.1) with the situation at the end of 2004, the group “Iraq’s Islamic neighbours” stood out as an uninformed construct. The situation had become clearer, and the Sunni neighbours (such as Saudi Arabia) were now distinguished from Shia neighbours (such as Iran). Those who had followed news reports of the conflict in Iraq had become better informed about this inter-Islamic
distinction. By the end of 2004 the struggles in Iraq were clearly divided along ethnic and religious lines, with relative peace in the Kurdish north and the Shi'ite south, but much violence in the mainly-Sunni central region, including Baghdad. Over the same time, the construct “Weapons of Mass Destruction,” which had existed for decades but became widely used only in late 2002, began to fade in 2004, when no such weapons were found in Iraq.

Reflecting on these changes in language used, it became evident that a useful function of foresighting could be to anticipate a change in constructs used in discourse. This is comparable to the first stage of emerging issues analysis, as described by Molitor, 1993 (summarized by Lang, 1998). Molitor describes the first stage as “framing of the issues”, indicators for which are “leading ideas” and six related sources of issues. A leading idea is expressed in a sentence-like format, along the lines of “the idea that X might do Y”. But how do leading ideas originate: where do the constructs X and Y come from? The suggestion here is that constructs must emerge before issues about them can be generated. These are not necessarily “new to the world” constructs, but can be little-known constructs that become relevant at a certain point in history.

A literature search of futures databases revealed nothing on “emerging constructs analysis” or likely synonyms, including terms such as concepts and schemata. I contacted Sohail Inayatullah, one of the world’s leading experts in this area; he confirmed2 that this concept of “emerging constructs” was indeed new. Though such a method is clearly worth developing, it is beyond the scope of this thesis. It would be a separate social inquiry method, to be developed later, following the resolution of the empirical question on the extent to which (or circumstances in which) constructs precede issues. It would be informed by recent writings on issues framing, such as Luntz (2004) and Lakoff (2004).

**Reflection 6. The doubtful worth of constructing a full hemispherical model**

The construction of the second layer proved very time-consuming. In a workshop situation, the time taken would have been excessive; there was clearly a need to improve the process. The second layer comprised 95 distinct intentions, fuelled by 34 motives. Each of these motives was linked to one or more values in the third level. Creation of the third and fourth layers was straightforward enough, but not found helpful, perhaps due to the use of pre-existing taxonomies for the values and worldview layers.

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2. Personal communication, 23 February 2005.
8.4.3 Issues carried forward to the next case

The method of constructing the third and fourth layers of the hemisphere needed to be reconsidered, but these first needed to be tested in the designed situation of participative workshops. As the next case (legal services) was taking place while the layering method was being developed for the Iraq case, it was not until the subsequent case (the credit union) that the participative construction of layers could be attempted.

The idea of creating a method that might be called Emerging Constructs Analysis is certainly worth pursuing, but was put aside as a later task: developing one method was quite enough for this thesis.
8.5 Case 4: A community legal services group (LS)

8.5.1 Background

Like the RN project, this was another case of consultancy work, rather than pure research. LS was a non-government organization that provided legal services for indigenous people in South Australia. This was the first case that I had not sought out — in fact, I had not known of its existence. The Board of LS, faced with pressing problems, had asked a colleague of mine to organize a program of change management. However he had just been appointed to a position in a distant city, and was unable to oblige. Knowing of my thesis work, he suggested that I take over this project.

From LS’s point of view, the work had a clear objective: to help design a way of changing the governance structure, which would result in many of its board members effectively voting themselves out of a job. Though this project fitted well with the development of the Process this was consultancy work rather than pure research, so the client’s needs were foremost.

After an initial meeting with the senior management of LS, it seemed that this was a suitable case for the application of SNM. Following discussions, the management agreed that I could use SNM, making this case part of the development process. The managers warned me that the organization had a history of conflict between stakeholder groups, and in view of that record, there was a high probability that any participative process would fail due to disruption. However, a non-participative approach would probably fail due to non-acceptance by board members; it would be seen as a power play by managers.

8.5.2 Reflections

In terms of the consulting assignment (persuading the organization’s board of the need to revise the constitution and reform itself) this project was a clear success. The facilitators and myself received some glowing tributes, stating that we had succeeded in a task which had originally been thought all but impossible.

However, in terms of development of the Process, this case study was not much of a success at all. This was partly because, with the first workshop effectively wasted through interpersonal conflict, there was insufficient time to explore potential futures, nor was time available to extend the workshop series at the end — partly because I was due in Europe to work on another consulting project, and partly because of the tight time-frame for LS to change its constitution.
Nevertheless, this case study revealed four new elements and possibilities for improvement:

1. Realization that preliminary work was part of the Process
2. Reaffirmation of the relevance of the past in anticipating the future.
3. Realization that futures work could be effective with a short time horizon.
4. A new element was added to the Stakeholder Star

Reflection 1. Preliminary work also is part of the Process

Though this was the fourth case study, it was the first to use the workshop process as envisaged in the original plan for the Process. (The RN study was a partial pilot study, the EM study was all done through interviews, and the Iraq war study used secondary data.) Thus it was only with this case, after a protracted series of preparatory meetings (rather than the single meeting in the Process design) that I realized that one preparatory meeting would probably never be enough. There were too many people who needed an explanation of the Process before the practical planning could begin. In this case there were five preliminary small-group meetings (with between 2 and 10 people), as well as post-mortem meetings after each of the four workshops. In fact, more time was spent in these meetings (around 15 hours in total) than in the workshops (13 hours).

Reflection 2. Reaffirmation of the relevance of the past in anticipating the future

One comment on follow-up was that “you need to report that aboriginal people stated very specifically that the investigation of the past in workshops 1 and 2 was an irrelevant waste of time, because everybody knew it so well.” In fact, the past was investigated only in workshop 1. Several participants commented on reviewing the “prouds and sorries” timechart that most of the “prouds” were not recent, and related to the work of the staff, while most of the “sorries” were recent (in the last 3-5 years) and related to the board and the broader political agenda. This realization probably contributed to the determination of participants in later workshops to find a solution to the current problems of LS and rebuild its earlier values.

Reflection 3. Realization that futures work could be effective with a short time horizon

There was one aspect of this case which did not fit at all well with SNM, which was designed as a futures process, looking some years ahead. The intended timescale for LS was around three months, given that the government funding body was scheduled to invite tenders late in 2003, and that LS as it was currently constituted would not be eligible to bid for the tenders, and thus would receive no more funding. With the three-month time horizon, this at first seemed to be hardly futures work at all. But nor was it normal planning, because the intention was that the scenario map and other findings would be used to demonstrate to all involved the
necessity for board reform. On reflection, there was no component of SNM that required a minimum time horizon of several years; this had simply been my unexamined assumption.

Reflection 4. A new element was added to the Stakeholder Star

The original Stakeholder Star diagram, as shown in chapter 5 (section 5.3.1) had seven stakeholder groups (suppliers, customers, competitors, regulators, staff, neighbours, and media). This case, perhaps because LS was an NGO, found various stakeholders that did not fit any of the seven categories. One adjustment was made by broadening the “competitors” group into “peers”. LS had few competitors for its clients (who could generally not afford lawyers), but it exchanged information with counterparts in other states, and had several peer organizations locally — such as the medical services NGO at whose offices the workshops were held. Even on extending “competitors” to “peers,” some types of stakeholder did not fit the seven categories. The 7-pointed star diagram had the focal entity at its centre, indicating that it communicated with seven categories of actor — but the star could be extended outwards, to show communications between the primary actors and others with whom the focal entity communicated indirectly. An example of such indirect influence is the general public, in the role of media audiences. LS has no direct link to media audiences, but if a television program were to criticize LS in a way that made audiences react strongly, audience pressures might then result in the government might creating regulations that directly affected LS.

The following diagram represents one sector of the Stakeholder Star, with the focal entity of LS to the left and its regulators to the right. The heavier arrows indicate sources of funding-related power. Lines that are not arrows simply indicate a high level of communication.

![Figure 8.2 The Regulatory Sector of the Stakeholder Star for LS](image-url)
This case made it evident that as well as the outer indirect level (media audiences, in the above example) there could also be inner intermediaries. This applied to most of the seven actor groups. For example, labour unions (important for LS) did not fit any of the seven groups, but formed a conduit between the entity and its staff. Other intermediaries included industry associations (in their role of dealing with regulators) and welfare agencies, linking the entity to potential clients. Rather than double the number of stakeholder categories, the solution adopted was to regard each as being contactable either directly, or through such intermediaries.

As the purpose of the Stakeholder Star is to help avoid overlooking any important stakeholders, the prompt sheet for listing stakeholders was revised to this format:

**Table 8.4 Worksheet for Listing Stakeholders**

<table>
<thead>
<tr>
<th>Group</th>
<th>Direct</th>
<th>Intermediaries</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighbours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 8.5.3 Issues carried forward to the next case

The main contributions of this case to improvement of the process was the enlarged view of stakeholders: in particular, the impact that intermediary stakeholders could have. The recognition that much important work was going to take place in preliminary meetings did not have any practical implication, except to recognize that it was probably not going to be possible to set up workshops at short notice, following an agreement in principle. The distinction between internal and external scenarios, though a useful one in this case, was not seen to need any further general application, as it was already covered by the holonic principle: that all the internal scenarios could be regarded as components of a single holon, labelled something like “reform.”
8.6 Case 5: A credit union (CU)

8.6.1 Background
This entity was a bank-like organization, a large credit union (CU). Having reached its previous objectives in terms of corporate size, becoming one of Australia's largest credit unions, and having now reached a turning point, CU was interested in considering its possible futures. This was driven by the CEO, who had a history of trying new management techniques, as well as being a strong supporter of strategic planning. My liaison was mainly with the planning manager, who was also interested in my method. This was the only entity in this project that had previously engaged in futures work: it had participated in a scenario planning exercise done two years earlier (McAllum and Fowler, 2001) for an association of credit unions in Australia, informed by a US study by Randall, Schoemaker and Schuurmans (1999).

CU, after a sustained period of rapid growth, had grown more slowly in the past few years, and its board decided that this was a good time to take stock of its growth and to plan its way ahead. A major strategic planning review was scheduled for late November 2003, and this case study was to form an input for that review.

The scope of this exercise was to be "the future of retail financial services in South Australia and the Northern Territory over the next ten to fifteen years." The industry, retail financial services, was deliberately chosen to be broader than the credit union industry, because CU was moving into other aspects of retail financial services ("RFS"). The geographical scope, South Australian and the Northern Territory, was the main area in which the credit union operated (though, as I later discovered it also had recently established outposts in three other states). The timescale, "10 to 15 years" was deliberately non-specific: even if it were possible to anticipate events more than a few years ahead, it was not regarded as possible to accurately specify particular years.

A unique aspect of this case was that it was not feasible to organize one series of workshops at which all participants were present. Instead, two parallel sets of workshops were run, with different participants. Because some participants had to fly from interstate, two full-day workshops were undertaken, instead of the four half-day workshops normally used in SNM. Both sets of workshops were small, with only 11 people in the first, and 8 in the second.
8.6.2 Reflections

The CU case produced a wide range of reflections:

1. Two days was not enough.
2. Lack of overlap in the two studies.
3. The value of using common software.
4. Dividing a scenario map into holons was feasible.
5. The need to write full sentences in the statements, rather than cryptic phrases.
6. The need to produce separate written instructions for each breakout session.
7. More actor types should have participated.
8. Problems with the third ("values") layer of the hemisphere
9. Invisibility of the fourth ("worldview") layer of the hemisphere.

Reflection 1. Two days was not enough

By late in the second day, for each of the two studies, it was clear that there would be no time for producing the four layers. Even though in the second study I tried to accelerate the first half (focusing on the past and the present) this still did not produce enough time at the end – particularly as many participants wanted to leave early, to catch their flights home or check their offices at the end of the day.

Reflection 2. Lack of overlap in the two studies

This case was unique in having two parallel studies. It would be expected that scenario maps produced by both groups would be very similar, because:

- both groups had about the same numbers and types of participants
- both took place in the same environment and used the same procedures
- both had the same facilitator (myself)
- they took place only a week apart, with no significant events occurring in the interim.

As it turned out, there was surprisingly little overlap between the two sets of maps:

<table>
<thead>
<tr>
<th>Holon type</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Not shared: past or present</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Not shared: future</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>49</td>
</tr>
</tbody>
</table>
Thus 78 different holons were identified, of which only 8 were common to both studies. Even for the 30 holons that had already occurred, or were still occurring, there was little overlap: only two were mentioned by both groups. For the other 28 past or present holons (all of which were valid) only one set of participants mentioned them. The most plausible reason for this difference was that the groups were too small and too homogeneous. The holons were developed in small-group sessions, with only three groups in each case study, so in some ways the effective sample sizes were not 11 and 8, but 3 and 3. The lack of diversity within the breakout groups may have encouraged “groupthink” (Janis, 1972).

Reflection 3. The advisability of using common software

Up to this point, a wide variety of different software had been tried for drawing the scenario networks, including CMap Tools, Spidermap, and Inspiration. Though Decision Explorer might have been best of all, the budget excluded it, and its underlying model (being less flexible than the above software) did not quite fit with SNM. Inspiration, though limited in functionality, proved to be in many ways the most suitable, and was certainly quick and easy to use. However the large diagrams it produced could not be read by participants, none of whom in the previous cases had access to this software. Therefore in the CU studies I experimented with producing scenario maps using widely available office software. For the first CU study I devised a method of creating scenario maps using the spreadsheet Excel, to which almost all participants in almost all entities had access. This was an entirely different application of Excel from normal: diagrams, rather than the calculations customary in spreadsheets. The main limitation, compared with the graphics software tried previously, was that each worksheet had to use a regular grid, which sometimes made it difficult to squeeze enough elements onto a single page. On the other hand, the grid also made it easy to later insert new elements.

The second CU study used the presentation software Powerpoint – which, though it is mostly used to create small “slides,” also has the ability to produce poster-size presentations. However, transcription took much longer than with Excel, hyperlinking was less flexible, and the software crashed repeatedly with this unintended use. Spreadsheet software was clearly superior, and using it also enabled participants to modify scenario maps, without their having to acquire and learn to use separate software. Thus the use of spreadsheets helped empower participants to visualize their entity’s futures.

3. These software packages, along with several others of the same type, are discussed on my web page at www.audencedialogue.org/soft-visu.html; links are frequently updated.
Reflection 4. Dividing a scenario map into holons was feasible

Prior to the second CU study, large sheets of paper (from a 1-metre wide roll) had been used for the scenario maps. These turned out to be difficult to transcribe after removal from the wall, because of their sheer size, when entered into a computer in a small office. The first CU study created 37 main holons, from 267 minor holons (each of which could have been developed into a separate scenario). Not only was transcription a major problem, so was understanding the maps, because of the long arrows connecting the 267 elements. A similar problem in the case of consensus groups had been solved by using many small sheets of paper (one sheet per statement) instead of a few very large sheets. This was an adaptation of the cards used in various ways in Metaplan (Schnelle, 1979), VIPP (UNICEF, 1993) and ZOPP (COMIT, 1998), and the hexagons used in some futures work (Hodgson, 1992). With consensus groups, multiple sheets allow a more flexible display, being easily reordered and replaced.

Accordingly for the second CU study the display wall was tiled with small sheets. (Figure A4.5.1 in Appendix 4 is a photograph of this.) Each sheet represented a separate cluster — such as one event tree, in midcasting. To enable one cluster, with up to about 10 adhesive notes (each 7.6cm square) to fit onto a single sheet, A3 paper (30 by 42cm) was the most suitable size. For the few clusters with more elements than that, two adjoining A3 sheets could be used. Another advantage of multiple sheets was that colour coding could be used, reflecting the exercise in which the cluster had been generated.

Previously, arrows denoting influence had been drawn between separate elements of the scenario map — which made the map hard to read when several “causes” were identified as having long-delayed effects, resulting in overlapping arrows snaking for many metres. Using coloured knitting wool instead of arrows (in the LS case) made maps more legible when arrows were redrawn, but the result was still difficult to grasp. Using separate sheets for each holon enabled arrows to link entire holons rather than individual points. Each sheet could now be numbered before removal from the wall, and the numbers of those linked sheets recorded on both sending and receiving sheets. When the finished diagram was transferred to a computer file, the arrows could be replaced by hyperlinks between worksheets.

Though the second CU study created more data than the first (49 major holons, combining 430 minor ones), reducing the output to 49 sheets of A3 paper (rather than 267 separate items) simplified both transcription and interpretation. Comparing the two matched CU studies, no useful information was lost by coarsening the scale of links — now connecting event trees rather than individual elements.
Reflection 5. The need to write full sentences in the statements

Some of the statements were so short (one or two words) that their meaning was unclear, both to myself and to some others present. Though cryptic utterances save time and space, they can also serve as an in-group statement that discourages external dissection. For that reason, it is preferable to make statements into complete sentence. Three words is often enough: subject, verb, and object. Such a sentence, even when written even on small adhesive notes, can still be readable from the other side of the room – which is important for enabling viewing of the scenario map as a whole.

Reflection 6. The need for separate written instructions for each breakout session

Verbal instructions, though simple and brief, were sometimes misunderstood and/or forgotten within the breakout groups. Thus it seemed useful to create sheets with instructions for each session. Only a few sentences are needed, and even if the schedule were varied on the spot, it would be possible to write such instructions by hand and photocopy them.

Reflection 7. More actor types should have participated

This case made it clear that excluding some types of stakeholder limited the scope of imaginable futures. It was evident to me (though not apparently to most participants) that the scenario maps produced in these two exercises were largely from the point of view of management – not the customers, nor even the junior staff, let alone the competitors, the credit union sub-industry, and the South Australian retail financial services industry as a whole.

Reflection 8. Problems with the Values layer of the hemisphere

The subgroup that worked on the Layer 3 of the hemisphere had problems generating useful values from the motives in Layer 2. The Iraq case so far had been the only one for which a set of layers had been constructed; it had used the standard set of values based on Schwartz (1994), and that had not proved useful. Thus the CU participants were not given Schwartz's value list, but were left to develop specific values based on the specific motives. However, this revised approach was no more help in anticipating changes in actors' motives than when Schwartz's list of values was used.

The lowest layer therefore needed to be rethought. As "values" was only a convenient label for ideas that changed approximately once a decade, the principle of the layered hemisphere could be retained by either abandoning the third layer, or rethinking its central concept. A solution was found following the next case study, and is reported in section 8.7.2 below.
Reflection 9. Invisibility of the lowest layer of the hemisphere
When the CU participants tried to create a set of hemispherical layers, they used the top-level scenario map of events to create a second layer of motives, and from that created a third layer of values. They were unable to create a layer of worldviews. As this was the first case study in which participants created a set of layers, it seemed at first that the four-layer categorization was too detailed. On reflection, the reason for the lack of a fourth layer became obvious: with the restricted range of actors who took part in the case study, the fourth layer (worldviews, culture, and the like) was invisible to them – a vindication of the hemisphere theory. McLuhan's aphorism applies: “Fish don’t know water exists till beached” (McLuhan, 1970, p191).

8.6.3 Issues carried forward to the next case
Based on the above reflections, the key lessons from this case to be applied to the next case were...

- To continue with the grouping of scenario maps in holon-based units. The method of generating items on sticky notes and arranging these on large sheets of paper worked well, allowing changes without extensive redrawing.
- The vital importance of including a wide range of stakeholders.
- Half-day sessions are preferable to full-day sessions.
- The need to rethink the construction of the “values” layer of the hemisphere.
- Spreadsheet software proved most suitable for generating scenario maps – not because it could generate diagrams more easily than concept-mapping software, but because (a) it minimally served the purpose, and (b) almost everybody involved could access it – and thus had the power to modify the diagrams rather than only read them.

None of the above represents a radical change from previously. This indicated that the mechanics of the Process were now working well, perhaps needing little further development. The case studies could almost have stopped at this point, except that the sampling frame was incomplete; it was possible that one of the kinds of entity not so far studied might produce some new insights. But as the following case study demonstrates, the sense of sampling redundancy attained at the end of this case study was well and truly shattered by the next case.
8.7 Case 6: A group of service clubs (SC)

8.7.1 Background

SC is an international group of service clubs, with clubs grouped into “districts” averaging around 50 clubs each. In early 2004 I was approached by the governor-elect of a district covering the north of South Australia. She was concerned at the slow decline in membership of SC since the 1980s; she was hopeful that a scenario planning exercise would both reveal to participants the consequences of this decline continuing, and hopefully reveal some paths forward. As the governor of the adjoining district, covering the southern part of South Australia, was also very interested in this project, the case study became a joint exercise between the two districts. The fact that this was the first ever such joint project underscores the independence of the clubs and districts.

The full Process was used in this case, but a fifth workshop was added to explore visions of multiple futures.

8.7.2 Reflections

This case revealed the following new insights about the Process:

1. The practical use of multiple futures
2. Comparison table of scenario paths.
3. Problems of managing this type of group
4. Possibility of combining first two workshops
5. Regressing in the development of a methodology
6. The desire for normative futures.
7. Redefining the third layer of the hemisphere.

Reflection 1. The practical use of multiple futures

One of the key principles of futures studies is that of alternative futures: that as we cannot predict “the” future, we should prepare for a range of alternatives. The conceptual framework in chapter 4 above (first presented in 2001, before fieldwork began) proposed a variation of alternative futures: multiple futures. Whereas the concept of alternative futures can be expressed as “Our future could be this, or this, or this,” the concept of multiple futures is that “Our futures could be this, and this, and this.” However because of the nature of the case studies done until this point, and the restricted range of participants involved in each case study, no clear example of multiple futures was found.
In this case study, because SC is so decentralized, yet all clubs share a common purpose, the deliberate use of multiple futures became a clear solution to SC’s problem of declining membership. Using the Leaf of Goals, all clubs could still aim at their shared goals while exploring different paths towards them. If after a few years it becomes clear that one path is unproductive, a club on that path can learn from the experience of others to vary that path.

**Reflection 2. Comparison table of scenario paths**

A simple but informative method of comparing scenario paths, developed for this case but with much broader applicability, is to create a list of variables on which possible futures could differ, and to compare each scenario on those variables. This serves two purposes:

(a) enabling a clearer and more comprehensive comparison between scenario paths;

(b) helping to ensure that no major variables are omitted

In this case, 28 variables were identified. Though there is no certainty that they are comprehensive, the fact that they were based on the output from workshops and were reviewed several times offers some assurance that there are no major omissions. However, it is possible that the most relevant variables in 10 or 20 years’ time will turn out to be not on the list of 28 (even though they are probably known now) because they seemed too obvious. Thus it would be worthwhile to have an early workshop session in which all participants try to identify key variables on which aspects of the future might differ. This is similar to the Critical Uncertainties method, as described by Schwartz (1991), but in seeking exhaustiveness, it is more of a morphological approach.

**Reflection 3. Problems of managing this type of group**

This was a difficult group to manage. Participants had seldom met before on this cross-club basis, and had a lot in common. Naturally they wanted to discuss club-related issues, and some were more interested in those than in the SNM exercise. Breakout groups sometimes did not complete their allotted tasks, and there were several long interruptions. This reflection concerns avoiding such interruptions: whether it would have been desirable to exert much firmer facilitation to ensure that the timetable is adhered to – which in turn raises the question of which is primary: the process or the client’s needs. (The question could also be recast as an issue of long-term needs versus short-term needs, with attendant probabilities in each case.) There can be no generic solution; this must always be a matter of judgement, which must be made on the spot. No time is available to reconsider. In retrospect, in this case, a suitable option would have been to use one or more assistant facilitators (as in the LS case), to help participants come to grips with small-group tasks.
Reflection 4. Whether to combine the “past” and “present” workshops
Some participants commented on the slow pace of the first two workshops (on the entity’s past and present). As some of the detail gathered in those workshops was not later used, it seemed worthwhile to experiment with combining those two workshops, to enable more focus on futures. This had been done in the second workshop in the LS case study (as an ad hoc measure, following delays in the first workshop), and caused no apparent problems.

Reflection 5. Regressing in the development of a methodology
This element applies to the development process, rather than this specific case. With each previous case, some problems had been found, with solutions then proposed and applied to the subsequent case. As originally expected, the Process was gradually improved. Thus this case came as a surprise, particularly the failure to produce a coherent scenario network map. On reflection, this failure was due to three main components: the expectations of participants, the physical environment for the workshops, and the unusual lack of restrictions on possibilities for the organization. Having previously done five case studies, four of which (all but the CU case) were broadly successful, it came as a surprise that so late in the development, an unsuccessful study should emerge. This suggested that perhaps a much larger sample of cases was needed before redundancy (in the sense of Lincoln and Guba, 1985) could be reached. However, the lack of success was only from the developmental point of view. Many participants, judging from their evaluative comments, regarded the series of workshops as a clear success. The follow-up confirmed this view, in that some clubs (from which participants had come) were energetically undertaking the reforms developed in the workshops.

Reflection 6. Participants’ desire for normative futures
With this case study, I could no longer avoid acknowledging that it was not feasible to set aside participants’ desire for improvement. The position until this point had been that the Process was one of social inquiry (in Dewey’s sense), not a planning method. However, participants in most previous cases had initially expected that the Process would help them attain desired futures. I had told them at the beginning of each workshop that this was not designed to be a planning process, and that it should logically be followed by a planning exercise in which they considered the possible futures that this Process had revealed. They could then create a plan taking those possible futures into account. In the SC case, even though some clubs already had strategic plans, this demand was very strong indeed. This was clearly in opposition to the literature-derived Criterion E5 (chapter 3) that each scenario should be dealt with even-handedly, with no preference given to one or another. The ad hoc
approach of adding a fifth workshop to consider desired futures largely resolved this dilemma: after four previous even-handed workshops, likely futures had already been considered.

Reflection 7. Redefining the third layer of the hemisphere

In this case study it was not possible to create a layered hemisphere as envisaged in the design of the Process, because the event-level scenario map was not completed. Defining the third layer in terms of values had not worked well either in the Iraq case (when a list of Schwartz’s basic values was used) or the CU case (when participants ascribed specific values to actors). On reviewing the SC case and its participants’ desires for normative futures, a solution became evident: the third layer would be redefined as one of visions, hopes, wishes, and the like (but not expectations) – combined under the umbrella of Visions.

The revised relationship of layers is that events (layer 1) are driven by motives (layer 2), which are driven by visions (layer 3). Forced changes in each layer can impel changes in the adjacent layer/s. This solution was plausible, it met the criteria outlined above, and it had the additional advantage that visions are by their nature more observable than are values, and can thus can be more easily ascribed for stakeholders not participating in a study. To assess the feasibility of using visions instead of values, I reworked the third layer of the Iraq case, and found that, on balance, this produced a more tightly-linked chain of influences. The difference between this and standard corporate “visioning” is that the latter uses only self-centred visions: an organization’s vision for itself - but the visions in the third layer of the hemispherical model are those that each actor has for each other actor.

8.7.3 Issues carried forward to the next case

Three issues remained for further study:

- To investigate the feasibility of empirically gathering (without artificially creating) visions to create the third layer of the hemisphere.
- To discover whether planning for an avowedly normative approach in the final workshop would affect the even-handedness possible in earlier workshops.
- To experiment with combining the “past” and “present” workshops, so that even if normative futures were covered in the final workshop the total number of workshops could remain at four.

The final case study was able to address both of these issues to a large extent, even though (once again) some modifications to the Process were required.
8.8 Case 7: The Barossa Valley landscape

8.8.1 Background
Since the sample design included a case study in primary industry, I had originally sought a case in the wine industry, because it is so significant in South Australia, and it must also plan well ahead. My initial soundings were unsuccessful, but later I was approached by one of Australia’s largest wine companies, which was interested in carrying out some scenario planning. As it turned out, the company was not ready in time for its study to be included in this thesis, but its senior technical manager mentioned an associated project that would also require futures input: studying the future of the Barossa Valley from a point of view of sustainability of the landscape. This was not due to begin till 2005, and in any case was dependent on the success of an application for a large research grant. If that grant was won, the latter project would go ahead, and I would be involved with the scenario planning and/or other futures work. But in case the major grant was not secured, a contingency plan was to redesign the project on a smaller scale, and to seek funding from another source, for futures work only.

On behalf of the Barossa Winemakers Association, I accordingly made a grant application to the Grape and Wine Research and Development Corporation (an Australian commonwealth government agency) for a pilot workshop in which visions of the various stakeholders for the Barossa Valley’s future would be identified and compared. This proposal was successful. We were awarded a Regional Innovation and Technology Adoption grant, and a workshop was accordingly organized. The only parallel to this workshop in any earlier case was the additional fifth workshop for the service clubs. The method being explored here was intended to supplement, rather than replace, the other aspects of the Process.

A key uncertainty for the larger Barossa project was to what extent any desires for the future of the Barossa landscape were shared between different stakeholder groups: winemakers, other business owners, workers in the Barossa, residents, administrators, and visitors. To the extent that different groups held different hopes for the Valley, this could create difficulties for planning. But to the extent that a clear pre-existing vision was shared, planning could go ahead to fulfil that vision, so that Valley stakeholders could become “protagonists of their own future and sustainable development,” in the sense described (for developing countries) by Max-Neef (1991).
Since the SC case had suggested using visions (in the broadest sense) to replace values in Layer 3 of the hemisphere, and had also emphasized participants' strong desires for normative futures, this was a suitable opportunity to develop an envisioning process as part of the toolkit of components for the Process. A seminar paper I had produced following the SC case study reviewed envisioning processes, finding that so-called vision statements were in many cases so non-specific that the term "vision" could not accurately be applied to them. This, then, was an opportunity to find a way of developing visions that were more visible.

8.8.2 Reflections

Three main reflections flowed directly from this study: whether the Process elicited or generated visions, the possibility that the exercise created artificial agreement, and the representativeness of the participants.

Reflection 1. Eliciting vs generating visions

The specific intention of the workshop was to determine to what extent visions were shared among different stakeholder groups. To that extent, results were very clear, with no consistent disagreement revealed. However, simply by having people think about their visions of the Barossa for a full day, visions were not simply elicited, but further developed and reinforced. However there is a fine balance between eliciting and generating visions, and one danger of focusing too much on the latter is that a vision developed by participants can be taken as representing the entire population from which they were drawn.

Reflection 2. Perhaps the Process created an artificial level of agreement

On further reflection, this type of median-group workshop (20-odd participants) may not have been the ideal environment for eliciting visions. It may have been possible to elicit more vivid visions with a series of much smaller groups. This could have been done using a separate workshop with each main stakeholder group: residents, workers, winemakers, and officials. This would restrict the role-switching used advantageously in the present workshop, but perhaps it was that role-switching that helped contribute to the high level of agreement among participants. If so, because it was an artefact of the Process, it might not be reflected in the remainder of the population.

Reflection 3. Doubts about the representativeness of the participants

Some groups were not represented at this workshop, particularly ordinary residents and owners of businesses other than wineries. There were two reasons for this: a restricted range of people specifically invited, and the fact that the workshop took most of a working day,
which many potential participants would not have been able or willing to spare. In particular, the lack of young people was a concern. They are the ones who will have to live in the future Barossa landscape, and only a handful of the 20 participants were aged under 30.

8.8.3 Issues to carry forward to the next study

Though this was the final case study, the development of the Process cannot be regarded as quite complete; thus it makes sense to review issues to be carried forward to a later study. Two such issues arose from the Barossa case:

- To decide whether an exercise of this type (which could be fitted into one half-day session) should be included as a component in the standard Process, and if so, where in the sequence it should be.

- In any study of a geographic community, any half-day workshop is likely to exclude a wide range of those interested. A possible solution would be to use a method similar to the charrette (Lennertz, 1999). This method, which could be labelled “rolling groups,” involves using a place frequented by many pedestrians, and inviting a stream of them to inspect displays, add their contributions, and offer their comments. At the time of writing, this was being planned as a follow-up to the Barossa study, but too late to be included in this thesis. Another planned follow-up is to repeat most of the workshop in secondary schools, with students as participants.
8.9 Review of this chapter

At the conclusion of the scheduled fieldwork (the pilot case, and six main cases) a decision needed to be made on whether further cases should be added. Though the Process was clearly not developed to its fullest extent, it was by now evident (following the reversal in the SC case) that it was not possible to determine how many additional cases would be needed, and that there was no certainty that adding a few more cases would resolve all remaining issues. Also, after compiling Table 8.6 (below) it was clear that none of the remaining issues was crucial to the Process. As an original goal of the thesis had been to produce a well-informed handbook for the Process, and ample information was now available, it was therefore decided to adhere to the original plan and conclude the fieldwork at this point.

8.9.1 Issues still to be resolved

The remaining issues are as follows, with tentative solutions to be tested.

<table>
<thead>
<tr>
<th>Case</th>
<th>Issue</th>
<th>Tentative solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN radio network</td>
<td>none remaining</td>
<td></td>
</tr>
<tr>
<td>EM engineering manufacturer</td>
<td>none remaining</td>
<td></td>
</tr>
<tr>
<td>Iraq war</td>
<td>Develop a method for Emerging Constructs Analysis</td>
<td>Do this as a separate post-thesis project</td>
</tr>
<tr>
<td>LS legal services</td>
<td>none remaining</td>
<td></td>
</tr>
<tr>
<td>CU credit union</td>
<td>none remaining</td>
<td></td>
</tr>
<tr>
<td>SC service club</td>
<td>Slow pace of “Past” and “Present” workshops</td>
<td>Combine these two workshops in future</td>
</tr>
<tr>
<td></td>
<td>Inclusion of normative element in main Process</td>
<td>Address normative issues in the final workshop</td>
</tr>
<tr>
<td></td>
<td>Replace Values with Visions in 3rd layer of hemisphere</td>
<td>Try this approach in Barossa follow-up exercise</td>
</tr>
<tr>
<td>Barossa Valley</td>
<td>Include visioning in main Process?</td>
<td>Move away from fixed elements and sequence</td>
</tr>
<tr>
<td></td>
<td>Value of “rolling groups”</td>
<td>Try this approach in Barossa follow-up</td>
</tr>
</tbody>
</table>
For comparison, the following table shows the changes already made as a result of each case study.

### TABLE 8.7 CHANGES MADE TO THE ORIGINAL PROCESS

<table>
<thead>
<tr>
<th>Case</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN radio network</td>
<td>Use the Event Tree approach in midcasting.</td>
</tr>
<tr>
<td></td>
<td>Avoid too internally-focused a morphological hierarchy.</td>
</tr>
<tr>
<td>EM engineering manufacturer</td>
<td>+ Workshops can be replaced by multiple interviews, but more time is taken.</td>
</tr>
<tr>
<td></td>
<td>Use of star-shaped pattern for envisaging all stakeholders.</td>
</tr>
<tr>
<td></td>
<td>&quot;Weaving&quot; method for developing context around surprises.</td>
</tr>
<tr>
<td>Iraq war</td>
<td>Importance of defining case boundaries: if in doubt, broader rather than narrower.</td>
</tr>
<tr>
<td></td>
<td>Use open-ended rather than multiple-choice options for developing lower layers of the hemisphere.</td>
</tr>
<tr>
<td></td>
<td>Further development of the Leaf of Goals.</td>
</tr>
<tr>
<td>LS legal services</td>
<td>Likelihood of additional preliminary meetings and follow-up meetings.</td>
</tr>
<tr>
<td></td>
<td>Addition of intermediary stakeholders to the Stakeholder Star.</td>
</tr>
<tr>
<td></td>
<td>Use coloured string (or similar) instead of hand-written arrows for linking holons on scenario map.</td>
</tr>
<tr>
<td>CU credit union</td>
<td>For ease of transcription and interpretation, record each major holon on one sheet of paper, around A3 size.</td>
</tr>
<tr>
<td></td>
<td>Spreadsheets are the best software for producing scenario maps.</td>
</tr>
<tr>
<td></td>
<td>Rethink lower layers of hemisphere, since open-ended options did not produce more useful results than multiple-choice options.</td>
</tr>
<tr>
<td>SC service club</td>
<td>+ Application of multiple futures, as opposed to alternative futures.</td>
</tr>
<tr>
<td></td>
<td>+ Comparison table of scenario paths.</td>
</tr>
<tr>
<td></td>
<td>+ Use assistant facilitators if there are many participants.</td>
</tr>
<tr>
<td>Barossa Valley</td>
<td>Usefulness of comparing different actors' visions for one entity.</td>
</tr>
<tr>
<td></td>
<td>+ Add an optional component for establishing visions of the future.</td>
</tr>
<tr>
<td>Multiple cases</td>
<td>Optimum number of participants is 15 to 20: CU and EM had too few, RN and SC had too many; LS and Barossa numbers worked well.</td>
</tr>
</tbody>
</table>

+ Changes preceded by a + symbol can be regarded as optional additions to the Process, to be used when relevant.

### 8.9.2 Limitations of fieldwork

The major limitation emerging from the fieldwork was that redundancy (in the sense of Lincoln and Guba, 1985) was not fully achieved, and not all elements of the sample design were fulfilled. Though the fieldwork covered a wide range of organizations and types of future, and fulfilled the basics of the original sampling plan, a still larger sample could have been helpful in addressing some process-related issues.
Of the 26 above additional entity types listed in Table 7.2, in the previous chapter, 15 were fully achieved, and only two were not achieved at all: the future of a concept, and the future of an ad hoc or temporary organization. The former had been lined up ("the future of lifelong learning in the City of Marion"), but participants proved difficult to organize; however, it may still go ahead. As for the latter, it is obviously difficult to study the future of an organization that was not planned to have a future; it will be a matter of timing, seizing a brief window when an ad hoc group wonders whether to disband after all.

Five other types of future were achieved only partially or tangentially:

1. A cluster of businesses, such as small manufacturers.
2. A grassroots group, without a leadership hierarchy.
3. An industry association. I found one that was willing to co-operate, but the central body had only a handful of staff, and the industry (residential construction) turned out to be too fragmented to enable even small workshops to be scheduled.
4. A local government agency.
5. A primary industry.

Another desirable entity, not included in Table 7.2, would have been an English-speaking entity outside Australia. Though the pilot study was done in Indonesia, communication through an interpreter was difficult, and I was not satisfied that I had understood all the nuances.

However, the sample covered 6 of the 9 subject domains in the FARTHINGS categorization described in chapter 6. It also covered three types of social entity (public, private, and voluntary sectors), two types of location (small region and country), and time horizons ranging from 6 months to 20 years.
Chapter 9: Evaluation of cases against criteria

This chapter evaluates the empirical evidence collected in the seven case studies presented in chapter 8, by comparing the outcome from each case with the execution criteria developed in chapter 3. The first section of this chapter reframes the execution criteria set up in chapter 3, to create a context in which the success of the execution could be determined. This was done by revising Kirkpatrick's (1994) well known model of training evaluation to suit the evaluation of a social inquiry method. The 13 design criteria are grouped into three stages, labelled implementation, influence, and action. The chapter concludes by reviewing the evidence relating to the overall argument: that SNM is a viable process for anticipating futures, as well as discussing limitations in that evidence.

9.1 Classification of assessment criteria

9.1.1 Creating a model for effectiveness

Because the criteria found in chapter 3 covered such a wide range, it would increase the rigour of the evaluation by locating those criteria in a model clarifying their application to this Process. As some criteria did not fit well with the basic program logic model used to classify criteria in chapter 3 (Inputs → Activities → Outputs → Outcomes) a more relevant model was sought. The most suitable model found was Kirkpatrick's four-level sequential model of training evaluation, which has been widely applied to the evaluation of employee training (Kirkpatrick, 1994; Salas and Cannon-Bowers, 2001; Arthur et al, 2003). Kirkpatrick posits that, for training to be fully successful, the following sequence must occur:

1. Trainees must be satisfied with their training.
2. Trainees must absorb that training – learning and acquiring skills.
3. Their on-the-job behaviour must change in accordance with the training.
4. That changed behaviour must increase the effectiveness of the employing organization.

Though reviews by Baldwin and Ford (1988) and Arthur et al (2003) have not supported Kirkpatrick's hypothesis that each stage is a prerequisite for the next, the four stages (as Arthur et al note) remain useful as a conceptual ladder. However, Kirkpatrick's model was designed for evaluating training outcomes, not for social inquiry methods. Accordingly, it was modified in three ways:
Modification 1. Inserting a preliminary level: Implementation. This stage, analogous to the Activities stage in program logic modelling (Funnell, 1997) was added because it cannot be assumed that what is planned to occur will actually do so. Kirkpatrick implicitly assumed that training would be delivered as scheduled. However, successful implementation is not a guaranteed outcome, particularly when a wide range of actors is involved.

Modification 2. Broadening the second level. The Kirkpatrick model has been criticized for not taking into account all potential effects of training. Kirkhart (2000) offers a more comprehensive model of evaluation effects, reconceptualizing “use” as “influence.” In extending the model from training to social inquiry, the second (“learning”) level was therefore replaced by the broader concept of influence: not only “How much did they learn from the course?” but “In what ways did the Process influence them?” Participant satisfaction, as one form of influence, was included under this second level.

Modification 3. Amalgamating the highest two levels. With the Kirkpatrick model (as with any sequential evaluation model) the later the stage, the more difficult it becomes to evaluate the effectiveness of the intervention. This is due to several factors: the time delay involved, the multiplicity of other forces that can affect outcomes, the difficulty of measuring these, and the decreased sample (one organization, instead of many trainees). Applying Occam’s Razor, what cannot be separated is thus combined. Further, Kirkpatrick’s model was produced for the benefit of the employers of trainees, but in other social situations, the fulfilment of the entity’s needs is not the only consideration. It cannot be assumed that the entity’s goals are more important than its members’ goals. Though it would be tempting to describe the highest criterion as “action resulting from the Process,” such action may be deferred for years if no suitable situation arises. The final criterion group in this study was thus broadly labelled as application.

The modified version differs from Kirkpatrick’s model in that achievement of a lower level is not necessarily a prerequisite of a higher level. (For example, even if a planned Process is cancelled, participants in its planning may gain knowledge that they can use in later work.) The following table summarizes the revised model.
TABLE 9.1 AN EFFECTIVENESS MODEL FOR PARTICIPATIVE FUTURES WORK

<table>
<thead>
<tr>
<th>Effectiveness level</th>
<th>Description of effectiveness label</th>
<th>Kirkpatrick equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Implementation</td>
<td>none</td>
</tr>
<tr>
<td>B</td>
<td>Influence</td>
<td>1, 2</td>
</tr>
<tr>
<td>C</td>
<td>Application</td>
<td>3, 4</td>
</tr>
</tbody>
</table>

Though this effectiveness model is applied here to participative futures work, the same model could be used to evaluate the development of almost any social inquiry method or OD (organizational development) intervention.

9.1.2 Classification of criteria on effectiveness model

The following tables list each of the execution criteria established in chapter 3 (using the same numbering as Table 3.4 in chapter 3), along with sources of evidence for their fulfilment. Table 9.2 lists the criteria that were best assessed during the casework, mainly at the completion of the scheduled workshops. Table 9.3 lists the remaining criteria, which could not be properly assessed until the follow-up, a year or so later.

TABLE 9.2 EXECUTION CRITERIA ASSESSED DURING CASEWORK

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Source</th>
<th>Supporting indicators</th>
<th>Contrary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. The purpose of the futures work is made explicit to all involved.</td>
<td>Agenda (etc), facilitator's notes, feedback from participants</td>
<td>Agenda (etc) statues purpose, facilitator’s notes record mentioning the purpose, and participants say purpose was clear.</td>
<td>Participants disagree with agenda or facilitator’s notes.</td>
</tr>
<tr>
<td>E2. Participants’ initial assumptions are challenged, focus broadened, and their perceptions reframed.</td>
<td>Feedback from participants</td>
<td>Participants report that their initial assumptions were challenged, focus broadened, and perceptions reframed.</td>
<td>Such reactions not reported by participants.</td>
</tr>
<tr>
<td>E5. Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient.</td>
<td>Facilitator’s notes and feedback from participants</td>
<td>Participants and facilitator do not detect that any possibility was favoured.</td>
<td>Participants and facilitator feel that some possibilities were not fully considered.</td>
</tr>
</tbody>
</table>
As the project progressed, it became clear that many criteria that were originally designed to be assessed during initial fieldwork could not be fully evaluated until the follow-up stage, a year or so later. For example, sometimes it was not until well into the fieldwork for a case that it became evident that the scope of the study should be broadened. Therefore all the above criteria were reassessed at the follow-up stage, supplemented by criteria in the following table, which were assessable only at the follow-up stage.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Source</th>
<th>Supporting indicators</th>
<th>Contrary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE1. Workshop participants include all major stakeholder groups, covering all likely impinging systems.</td>
<td>Attendance data, stakeholder map</td>
<td>Number and balance of main stakeholder groups included: compare attendance role breakdown with stakeholder map.</td>
<td>Some stakeholder groups mentioned in discussions are not represented at workshops.</td>
</tr>
<tr>
<td>DE3. Anticipations are expressed specifically enough that they can be tracked and confirmed.</td>
<td>Content analysis of output</td>
<td>Clear indicators for knowing whether a possible outcome occurs.</td>
<td>No clear indicators derived.</td>
</tr>
<tr>
<td><strong>Effectiveness level B: Influence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E4. Participants are satisfied with Process, feeling the activity was worthwhile.</td>
<td>1. Attendance data 2. Evaluation questionnaires</td>
<td>1. Participants keep turning up. 2. High satisfaction shown in evaluation questionnaires.</td>
<td>1. Many participants drop out. 2. Low satisfaction shown in evaluation questionnaires.</td>
</tr>
<tr>
<td>DE2. Participants gain more detailed perceptions of future possibilities. The Process creates “future memory” to help prepare for later action.</td>
<td>Feedback from participants</td>
<td>Participants say that futures were described in enough detail to enable them to know whether they were occurring.</td>
<td>Participants do not make such a statement.</td>
</tr>
<tr>
<td>E3. The boundaries of uncertainty and plausibility are clarified.</td>
<td>Feedback from participants</td>
<td>Participants report that they are now better aware of the more and less certain aspects of the future. Some futures that initially seemed inevitable now seem less so, and vice versa.</td>
<td>Such awareness not reported.</td>
</tr>
<tr>
<td>E7. Participants feel empowered and stimulated to act.</td>
<td>1. Feedback from participants 2. Record of meeting</td>
<td>1. Participants report that they feel empowered and stimulated to act. 2. Follow-up plans are discussed at last meeting.</td>
<td>1. Participants do not report such feelings. 2. No follow-up plans discussed.</td>
</tr>
<tr>
<td><strong>Effectiveness level C: Application</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E6. The output is directly usable by the entity.</td>
<td>Feedback from participants and entity managers</td>
<td>Report that at least some aspects of the output are directly applicable.</td>
<td>No such report.</td>
</tr>
</tbody>
</table>
TABLE 9.3 EXECUTION CRITERIA ASSESSED ON FOLLOW-UP

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Source</th>
<th>Supporting indicators</th>
<th>Contrary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness level C: Application</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E8. As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, and more adaptable to change.</td>
<td>Feedback from participants and entity managers*</td>
<td>Majority agreement, and details provided, e.g. evidence of extended time horizons.</td>
<td>No majority agreement, or unable to specify any details.</td>
</tr>
<tr>
<td>E9. The broad situation is successfully anticipated.</td>
<td>Ask participants: “Where are you now, on the scenario map?”</td>
<td>Success if the current position can be found on the original map.</td>
<td>Current position does not exist on the scenario map.</td>
</tr>
<tr>
<td>E10. The Process results in action for change: in the entity, or in participants' behaviour.</td>
<td>Ask participants and entity managers*</td>
<td>Reports of some improvement due to the Process.</td>
<td>No reports of any improvement due to the Process.</td>
</tr>
</tbody>
</table>

* Entity managers are people who at the time of follow-up were in a position to report on its outcome; they need not have participated in the original study.

Criteria in the Supporting Indicators and Contrary Indicators columns above are presented as binary variables, in order to keep the tables concise and clear. In practice, because this is a formative study, these items were not treated as if the only possible answers were Yes and No, but as topics for more detailed exploration, in the next three sections (9.2 to 9.4), which cover the fulfilment of the execution criteria at each level in turn, for each case. Because the Iraq case involved secondary research, and had no formal participants, many of the criteria are not relevant for that case. Occasional notes prefaced by “Transition” mark points of reflection in the action research cycles.

The following discussion and evaluation of each criterion is inevitably interpretive and subjective. Though it may have added some (spurious) sense of accuracy to have quantified the evaluation data, and compiled tables of numbers, such activity would be likely to have produced incomplete findings. It has fallen to me, as developer of the SNM Process, to formatively evaluate the process. Though charges of self-interest and bias might be levelled, I have taken much care (as the following sections might reveal) to review the findings dispassionately. Following the evaluation using each criterion, analytic induction (as noted in chapter 6, the end of section 6.2) was used to revise the criterion when necessary. These revised criteria, to emphasize their tentativeness, are expressed in the past tense, not implying any claim that they apply beyond the bounds of this study. That may be true, but further testing would be required.
The following table lists the 13 criteria in the original sequence, and shows where each is covered. Note that criteria beginning with E are applied at this execution level only, while criteria beginning with DE were applied at both the design level (evaluated in chapter 5) and the execution level.

**TABLE 9.4 LOCATION OF EVALUATION OF EACH CRITERION**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. The purpose of the futures work is made explicit to all involved.</td>
<td>9.2.1</td>
<td>276</td>
</tr>
<tr>
<td>E2. Participants’ initial assumptions are challenged, focus broadened, and their perceptions reframed.</td>
<td>9.2.2</td>
<td>278</td>
</tr>
<tr>
<td>E3. The boundaries of uncertainty and plausibility are clarified.</td>
<td>9.3.1</td>
<td>289</td>
</tr>
<tr>
<td>E4. Participants are satisfied with Process, feeling the activity was worthwhile.</td>
<td>9.3.2</td>
<td>282</td>
</tr>
<tr>
<td>E5. Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient.</td>
<td>9.2.3</td>
<td>280</td>
</tr>
<tr>
<td>E6. The output is directly usable by the entity.</td>
<td>9.4.1</td>
<td>298</td>
</tr>
<tr>
<td>E7. Participants feel empowered and stimulated to act.</td>
<td>9.3.3</td>
<td>294</td>
</tr>
<tr>
<td>E8. As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, and more adaptable to change.</td>
<td>9.4.2</td>
<td>300</td>
</tr>
<tr>
<td>E9. The broad situation is successfully anticipated.</td>
<td>9.4.3</td>
<td>302</td>
</tr>
<tr>
<td>E10. The Process results in action for change: in the entity, or in participants’ behaviour.</td>
<td>9.4.4</td>
<td>305</td>
</tr>
<tr>
<td>DE1. Workshop participants include all major stakeholder groups, covering all likely impinging systems.</td>
<td>9.2.4</td>
<td>283</td>
</tr>
<tr>
<td>DE2. The Process creates “future memory” to help prepare for later action, and participants gain more detailed perceptions of future possibilities and desired futures.</td>
<td>9.3.4</td>
<td>296</td>
</tr>
<tr>
<td>DE3. Anticipations are expressed specifically enough that they can be tracked and confirmed.</td>
<td>9.2.5</td>
<td>287</td>
</tr>
</tbody>
</table>

**9.1.3 The follow-up procedure**

Approximately one year after the completion of the first set of workshops, a follow-up workshop was held. The agenda for this session, which typically lasted for one to two hours, involved working through the above criteria. Specifically it covered the following issues:

1. **Review of scenario map.** The key question is “Is there a box on this year-old map which shows accurately where your organization is now?” To the extent to which the year-old map represents current reality (and new views of the preceding year) the mapping exercise has been successful. A further stage is to review the map to reflect the current position, asking:
   - Are there any aspects of the map that need to be removed?
Are there any new aspects to be added? If so, could these have been anticipated last year? And in how much detail? Who could have anticipated them, last year?

2. Review of the Process. Following the review of the map was a review of the SNM Process, considering each element separately:
   - the participants
   - the processes used to elicit the map
   - the facilitation
   - a comparison between this and other planning techniques used by the entity.

This involved asking (and explaining) the questions listed in Tables 9.2 and 9.3 above.

3. Consequences. The final component of the follow-up workshop is an investigation of the consequences that may have resulted from it, whether directly or indirectly.

In practice, it turned out to be not possible to organize full workshops for follow-up. Participants were less willing to meet for this purpose than they had been to study their own entity’s future. Some had changed industries, retired, moved interstate, or were otherwise not available. Therefore the follow-up sessions were conducted by interviewing key informants, supplemented by email contact with other participants.

9.2 Execution criteria assessed at implementation level

This section covers five execution criteria, the fulfilment of which was explored during and at the end of the casework. These criteria were all at the level of implementation: verifying whether things that were supposed to happen actually did so.

E1. The purpose of the futures work was made explicit to all involved.
E2. Participants’ initial assumptions are challenged, focus broadened, and their perceptions reframed.
E5. Each possibility is dealt with even-handedly, not neglecting any that seem awkward or inconvenient.
DE1. Workshop participants include all major stakeholder groups, covering all likely impinging systems.
DE3. Anticipations are expressed specifically enough that they can be tracked and confirmed.
### 9.2.1 Criterion E1: Was the purpose of the futures work made explicit?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>The purpose of the futures work is made explicit to all involved.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Agenda (etc), facilitator's notes, feedback from participants.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Documents state purpose, and participants acknowledge that purpose was clear.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Documents do not state purpose; participants are unclear about it.</td>
</tr>
</tbody>
</table>

This issue, seemingly obvious and trivial, must be regarded as important, because it occurred so often in the literature review in chapter 3. On follow-up, for most cases, an unexpected answer was offered to me: “Yes, very clear: to provide information for your thesis.” As this was an artefact of the Process, it was ignored for the purpose of evaluating this criterion.

**Radio network**: Yes, in the introduction to the course. Participants were informed that this was an exploratory study, and were given the option not to attend, but all chosen for the course did so - as did some applicants who were not chosen.

**Engineering manufacturer**: Because this case study used repeated interviews rather than workshops, and because this was the first case study, the purpose of the work was discussed frequently in the interviews. On follow-up, it was agreed that the purpose was always clear.

**Iraq**: Not applicable, because this was secondary research.

**Legal service**: All participants were sent an agenda, setting out the purpose of the project, but some apparently did not receive it in time for the first workshop. The facilitation was done by others, who were not as familiar as I was with the SNM process, and their introduction tended to downplay the futures aspect. As far as LS was concerned, this was consultancy for change management, and its primary purpose was to change the LS constitution. Some participants at the initial workshop were unsure about its purpose, having been asked at very short notice, and not having seen the agenda. One man repeatedly asked “Why are we here?” Others later suggested that his question was rhetorical: he was a former CEO of LS, who was not happy with what he apparently perceived as its recent decline. Following the difficulties with the SC case, in which some participants persisted in expecting the workshops to conclude with an action plan, this follow-up question was modified to be “Was the purpose of the workshops made clear - that it would result in a set of possibilities, not an action plan?” In response, one participant pointed out that “action plans imply there is an effective and
empowered and capable planner” — and thus would be controlled by the board and management, not by this diverse group of stakeholders.

Credit union: The purpose was made clear both by myself in agendas distributed to all participants at the first workshop, and in an invitation letter sent to participants by the CEO of the credit union. There was no suggestion during workshops that anybody was unclear about the purpose — though it seemed that for some senior managers the main purpose was “Here’s another new management tool: let’s try it out.”

Service club: I tried to state clearly at the beginning of the first workshop that the purpose of this project was to draw out possible futures, not to create any sort of action plan — though that could be a useful follow-up activity. Despite that statement (reinforced in the original agenda distributed to participants, and to a lesser degree at most other workshops), some participants in the fourth workshop wanted to end with an action plan. For these people, evidently the purpose of the activity had not been stated clearly or often enough. One participant later pointed out that there is a distinction between making a process clear (which she considered to have been accomplished) and that clarity “sinking in” to participants, particularly those who wanted urgent action.

Barossa: The purpose of the work was stated in the detailed agenda sent out to participants in advance. There was no suggestion during the workshop or from later feedback that the purpose was unclear, though as one participant commented “A good effort was made, but I was not certain what the outcome would be as it as a new ‘process’.” Because of its specificity (to discover to what extent different stakeholder groups agreed on their visions for the future Barossa landscape) this purpose was easily communicated.

Analytic induction
The statement “The purpose of the futures work is made explicit to all involved” implies that there is a single purpose, and that it is fixed. Examining the statement in the light of the Leaf of Goals suggests that there will always be multiple purposes — and some of these may change during the workshops. One constant purpose was my own goal to develop SNM; though this was made clear to all participants, it is not an inherent part of the final process.

As with all communication, the sender of information (in this case, myself and/or the organizing committees) may have been quite clear about the purpose of the intervention. This was communicated to participants through their acceptance forms and the introduction to the first
workshop in each series – but that does not necessarily mean they all understood (let alone accepted) that purpose: in particular, the statement that the scenarios were not designed to result in specific action plans. Thus the statement derived from analytic induction is that

E1a: For each entity involved, the purpose of the futures work was made explicit to all participants – but some were not satisfied with that purpose, and wanted to finish with an action plan.

9.2.2 Criterion E2: Were assumptions challenged, focus broadened, and perceptions reframed?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>Participants' initial assumptions about their entity's future are challenged, their focus broadened, and their perceptions reframed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants report that the workshops caused them to re-examine their initial assumptions, broaden their focus as to the nature of the study, and reframe their perceptions in that broader light.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Such reactions not reported by participants.</td>
</tr>
</tbody>
</table>

Ideally, initial assumptions about the entity's future would have been measured, and on follow-up compared with later assumptions. However, because assumptions are often unconscious and thus not directly accessible, these issues were posed following the fieldwork. This question turned out to be difficult for participants to answer. Many had trouble understanding it, and most others had very little to say, apart from a simple "yes" or "no."

Radio network: This criterion had not been formulated at that pilot stage, and due to the inability to follow up this case, its fulfilment could not be assessed with feedback from participants.

Engineering manufacturer: EM managers initially reacted negatively to some of the potential surprises raised in the Process, noting that some surprises were obvious, and others would never happen. They were thus resisting challenges to their assumptions, focus, and perceptions. However, on follow-up two years later, the attitudes had changed. The CEO noted that "The advantage of your process was raising new questions." Explaining further, he added "If
we did our normal [management discussion] we would have come up with 80% of what you came up with but because you came up with another 20% it made us ask questions of that 100% again." When he later mentioned some of the decisions EM had taken using the SNM report (selling one of its businesses, and moving its factory), it became clear that with a change for the worse in its situation, EM managers had begun to take the result of the Process more seriously. Thus this criterion was, in the end, fulfilled.

**Iraq:** This criterion is not applicable, as there were no participants. However the development of the method in this case certainly challenged my own assumptions and perceptions.

**Legal service:** Responses tended to be fairly negative, or equivocal; the most plausible interpretation was that participants did not want their assumptions to be challenged, but simply wanted to preserve the status quo – despite the workshop findings that the last few years had not been a good period in the history of LS. However, it is likely that the negative reaction on this item occurred because this criterion was not (on reflection) actively pursued during the workshops.

**Credit union:** There was little evidence of this during the workshops, except some moments in the plenary discussion - as for example when some financiers realized that it would not be difficult to implement Islamic banking, though they had never considered this before.

**Service club:** During the workshops, there was no doubt about this. On follow-up, this was confirmed; thus when asked this question directly, one district governor replied, “I think yes, yes - absolutely yes to both of them.”

**Barossa:** With only a single workshop, this criterion was not expected to be achieved strongly, and this was borne out by follow-up comments such as “Not particularly, as I have always had a reasonably clear picture of the way I feel about the Barossa.” With some answering No and others Yes without qualification, it may have been that the direct question had different meanings to different people.

**Analytic induction**

The evidence collected does not in general support achievement of this criterion, which turned out much too general to be useful. On reflection, the varying responses from different cases related to differences in the work done. In the LS case, participants were not expecting to have their assumptions challenged, focus broadened, and perceptions reframed: their focus
was on enabling LS to survive with its founding values as intact as possible; their focus was
conservation rather than change. At the other extreme, the SC case (which matched LS in
terms of participants’ desire to regain the organization’s former strength), this criterion was a
major purpose of the exercise, as far as the two district governors were concerned. Though
the workshop tasks in the two case studies were near-identical, the difference in emphasis
must have been subtly evident from the workshops. This was because in the SC case, the
participants themselves held the power, and had to be convinced of the need for change. In
the LS case, the commonwealth government held the power, and the participants wanted to
find the easiest acceptable change. In the EM case, the criterion was supported, but only a
year or so later, after a change in the company’s fortunes. Bearing this in mind, the analytic
induction statement would be

E2a: Participants’ initial assumptions can be challenged, their focus broadened, and their
perceptions reframed – provided that they are ready for this, either initially or through
changed circumstances.

9.2.3 Criterion E5: Were all possibilities explored with equal attention?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Facilitator’s notes and feedback from participants.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants and facilitator do not detect that any possibility was favoured.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Participants and facilitator feel that some possibilities were not fully considered.</td>
</tr>
</tbody>
</table>

For this criterion to be fulfilled, each possible future must be considered even-handedly; it is
vital not to neglect any paths that may seem awkward or inconvenient. Approximately the
same amount of attention must be devoted to each scenario path. The word “attention” is
used here rather than “effort” or “detail” because in some cases, paths can be so final (such as
a path to the entity’s non-existence) that they need little further exploration, either because
there is only one possible outcome, or because there are so many potential outcomes that
almost anything is possible.

Radio network: Due to pressure of time, only one set of paths was chosen by participants for
further analysis. This was related to the future ownership of the RN organization. The two
attractions of this topic were that (a) as most participants were journalists or ex-journalists, this “big-picture” topic was of professional interest, and (b) that it had a fairly direct bearing on their future as employees of the organization. However, as there was no attempt to avoid the awkward or inconvenient, this criterion can be regarded as partly fulfilled.

**Engineering manufacturer:** Generally this occurred, because I was leading the discussions, and kept returning to paths I had not fully understood. There was one exception, which I did not realize till later. One key question had been unanswered: “What happens if the chairman dies or is incapacitated?” I once brought up this topic in an interview with him, but as he seemed to be embarrassed, I did not pursue it, intending to return to it in a later interview (but not doing so). As neither his son nor the CEO evinced much interest in the metal-processing industry, the company’s focus may not long survive the chairman’s death or retirement.

**Iraq:** Paths were explored equally until the war began. Other paths then became irrelevant, and were not explored further. This project was different from all others, because of the rapid pace of change during the study.

**Legal service:** By the facilitators: yes. By leading participants: definitely not. The senior staff of LS were actively supporting scenario 5, and as a fallback alternative, scenario 2. However, more time was spent discussing the negative implications of some of the other paths: the preferred paths represented a continuation of the *status quo ante*, so there was less to discuss in that regard.

**Credit union:** For myself as facilitator: yes. However, the staff discussed the more expansionist outcomes with more interest than outcomes that would have reduced the size or scope of the organization. Therefore, the latter paths were not explored fully in the small-group work. This applied to both exercises with CU.

**Service club:** Of the four scenario paths covered in the final session, three gathered approximately equal attention, but the “Stability” (*status quo*) path had trouble gaining any supporters at all, and was considered only perfunctorily. The discussion for each path occupied the following times, and received the following number of preferences in the dotmocracy voting.
TABLE 9.5 RELATIONSHIP BETWEEN DISCUSSION TIME AND PATH PREFERENCE

<table>
<thead>
<tr>
<th>Path</th>
<th>Minutes</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path 1 (stability)</td>
<td>5.6</td>
<td>3</td>
</tr>
<tr>
<td>Path 2 (adaptation)</td>
<td>11.3</td>
<td>11</td>
</tr>
<tr>
<td>Path 2.75</td>
<td>11.2</td>
<td>28</td>
</tr>
<tr>
<td>Path 3 (transformation)</td>
<td>14.0</td>
<td>48</td>
</tr>
<tr>
<td>Total</td>
<td>41.1</td>
<td>90*</td>
</tr>
</tbody>
</table>

* Each of the 15 participants was given 6 voting dots.

This demonstrates a clear relationship between interest level (as evidenced in the number of votes) and discussion time. This telling comparison could be applied only in this instance, because other cases and other workshops did not devote blocks of time to each path in turn. However, one district governor considered that the paths had been presented even-handedly, and the fact that participants chose to spend more time discussing some paths than others was their own preference, not a deficiency of the Process.

**Barossa**: Not applicable. This study, because it only compared visions, did not develop scenario paths. (That is planned for the forthcoming follow-up workshops.) In the follow-up, several participants commented on the incompleteness of the coverage, particularly in relation to sustainability.

**Analytic induction**

Evaluating this criterion made it clear that even if the facilitator intends paths to be covered equally, participants may not co-operate, particularly in the small-group work. A solution to this problem is that used with the service club: to assign a small group to develop one path. Even if other participants turn out to be uninterested (as in Table 9.5 above), each path will have been considered in detail by one group.

A potential objection to this criterion is that because paths are holonic, they can be subdivided endlessly, and it is thus impossible to address each path even-handedly. In practice, this was not an issue, because of the number of constraints on the scenario paths: in the sense of Waddington (1977), the paths appeared to be *threads*.

The statement derived from analytic induction was that

**E5a**: Facilitators attempted to ensure that each possibility was explored with equal attention, not neglecting any that seem awkward or inconvenient. However many participants had
a clear preference for one particular path, and focused much more on that than on the other paths.

9.2.4 Criterion DE1: Were all stakeholder groups included?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>All major stakeholder groups, covering all likely impinging systems, are represented by participants at the workshops.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Compare attendance data with stakeholder map.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Number and balance of main stakeholder groups included: compare attendance role breakdown with stakeholder map.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Some stakeholder groups mentioned in discussions are not represented at workshops.</td>
</tr>
</tbody>
</table>

The purpose of this criterion was to ensure that the scope of the study was broad enough. This was to be achieved indirectly, by including representatives of stakeholder groups that covered all likely impinging systems. Their presence, it was expected, would ensure that their voices were heard.

**Radio network:** Though the participants made a very comprehensive list of systems, they did not consider potential new systems. (As they could not have been expected to think of that, I should have pointed out the possibility.) Also, though other radio networks were listed in the situation assessment, they were not included on the diagram of impinging systems in Figure A4.1.1. This decision was made by the participants, but I am not certain that it was wise.

**Engineering manufacturer:** Mostly, because the scope was defined as the future of EM and everything that might affect it. However, the fact that a scope is declared does not mean it is thoroughly investigated. In particular, the denials of EM managers that they had competitors appeared to me to be almost a psychological defence mechanism; it was as if the more strongly they denied the existence of competitors, the fewer competitors there might be. When the chairman told me about a contract that EM lost to an Italian company, his reaction was that this was not really a competitor, because it was a foreign company and this had happened only once. I suspect the study would have been more useful to EM if the scope had been industry-wide – though reaching an agreed definition of the industry would have been problematic.
Iraq: It was difficult to know this at the time, during which more and more systems became involved, and new information was revealed (e.g. differences of opinion within the US military). Even now, more than two years after war preparations began, it is still unclear whether the scope was broad enough – that is, broad enough for a purpose which may still change. On the other hand, this case showed that there could be dangers in making the scope too wide: reducing focus on the key important aspects. Perhaps such tension is resolvable only in hindsight.

Legal service: The major funding conduit for LS was a commonwealth government agency, and therefore any change in that agency could have a major effect on LS. The study initially tried to involve the agency’s staff, but they withdrew after several meetings because they perceived a conflict of interest (or perhaps, as some LS staff suspected, the agency’s local staff were ordered to withdraw by their head office). The study therefore did not take into account any possible changes in that agency, apart from the change already flagged by the commonwealth government: that the legal aid contract which in previous years had gone automatically to LS would in future be contestable. By not looking at the future of that agency (regardless of co-operation by its staff) we overlooked an important source of change. I realized this only several months after completing the work with LS, when the government announced that the agency would be abolished, and services to indigenous people would be handled through “mainstream” government agencies.

Transition: The above realization came too late to affect the planning for the CU case. However, because (unlike the LS project) the time pressure of the LS study did not apply to the CU case, I was more able to negotiate a broad scope for the CU study.

Credit union: While the case covered retail financial institutions comprehensively, and even possible changes in these (such as the possible growth of international banks in Australia) it did not look outside the area of finance, to examine the other needs that members of CU might have expected it to fulfil.

Service club: The original scope of the study covered competitors to SC, and several of those were represented at the workshops. In retrospect, however, we did not cast the net widely enough. The workshops were held on Saturday mornings, and it was only when one workshop was scheduled early due to a major football game that afternoon that I realized that even attending a football match was a competitor to SC – in terms of time available.
Having experienced the overlooking of competitors in the EM and SC cases, this should have been an obvious point to monitor in the Barossa case.

**Barossa**: The Barossa study was organized for a somewhat different purpose than the others, and impinging systems did not need to be identified in advance, except generically.

To enable the following table to be absorbed more readily, symbols have been used to show the degree of inclusion: ** = fully included, * = partly included, . = not included, - = not applicable. The Iraq case is excluded; it did not use workshops.

**Table 9.6: Stakeholder Groups Included in Workshops for Each Case**

<table>
<thead>
<tr>
<th>Case...</th>
<th>RN</th>
<th>EM</th>
<th>LS</th>
<th>CU</th>
<th>SC</th>
<th>Barossa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Staff</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>Customers, audiences, beneficiaries</td>
<td>*</td>
<td>a</td>
<td>.</td>
<td>.</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>Suppliers, sponsors</td>
<td>.</td>
<td>.</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>-</td>
</tr>
<tr>
<td>Competitors, peers</td>
<td>.</td>
<td>.</td>
<td>*</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Regulators</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>-</td>
<td>**</td>
</tr>
<tr>
<td>Media, communication channels</td>
<td>= peers</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

- Other relevant groups included

<table>
<thead>
<tr>
<th>Totals:</th>
<th>Visitors</th>
<th>Owners</th>
<th>Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups applicable</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Groups included (fully or partly)</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Groups not included</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

* Only during the associated co-discovery conference.

To summarize the above table: of a total of 42 types of stakeholder group that could have been included in the six primary case studies, only 23 were included: little more than half. Of those included, many were not fully represented. Note that as the cases progressed, more groups were included - due to emphasizing this need much more strongly in initial stages.

**Which stakeholder groups were not represented at the workshops?**

**Radio Network**: Only three of the radio network’s six relevant groups were not represented. The workshop included only staff of RN in Riau, and few at a junior level. This was part of a training course, and it was not possible to include stakeholders from the other impinging systems. However, the co-discovery conference carried out during the same course, including the same participants and about 20 RN listeners, informed the participants about the preferences of the RN audience.
Engineering manufacturer: Most stakeholder groups were not represented. Almost the only participants were staff members of the engineering manufacturer. With the company's agreement, I interviewed a product development specialist, with whom I had worked previously, and was related by marriage to the CEO. He provided useful information from an independent viewpoint, focusing on the new electric motor.

Iraq: Because there were no workshops, this question does not fully apply. However, despite an attempt to include data from countries neighbouring Iraq by accessing their English-language newspapers and news services online, far less information was available in English from those sources than from English-speaking countries or European sources. To that (unknown) extent, the Arabic-speaking and Islamic worlds were under-represented.

Legal service: As noted above, one serious omission was the staff of the commonwealth funding agency. However, that agency's board members were not subject to the same restrictions as the staff, and several did attend the workshops. Another omission was clients of LS, though since most were teenage offenders with little education, they probably would not have been able to provide useful information on the specific issue of governance.

Credit union: Two clear omissions were the credit union's customers and its more junior staff. Participants were mostly senior manages of the CU, with a few managers of other related financial institutions.

Service club: Participants were selected based on their level of interest in the future of that service club. The fact that they would be giving up four successive Saturday mornings for this project would certainly have served to discourage all but the keenest. In the final workshop, when participants voted on their preferred vision, very few votes were for the status quo – but as several participants remarked, in their opinions most ordinary club members would have supported that option. More specifically, the two SC districts for which the study was done included 106 clubs, but the participants who were SC members came from only 12 clubs.

Barossa: There were two main omissions: (a) ordinary residents, and (b) owners of businesses other than wineries. ("Ordinary residents" means people who were neither government officials nor winery owners.) In demographic terms, young people (under 30) were greatly under-represented, and wealthy people were over-represented.
Analytic induction

In none of the six primary case studies were all major stakeholder groups included as participants in the research. In aggregate, little more than half the distinct categories were included. The only cases to include more than half the actor groups were the legal service organization, the service club, and the Barossa Valley group: the least competitively oriented of the primary case studies. In each of these latter cases, the need to include all groups was very strongly emphasized. Thus the statement derived from analytic induction was:

**DE1a:** Workshop participants included all major stakeholder groups only when very strong steps were taken to include them, and when no direct competitors were involved.

A possible solution, for highly competitive industries, is to study the future of the whole industry in that area, not the future of the particular business.

### 9.2.5 Criterion DE3: Were the anticipations trackable and confirmable?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>Anticipations are expressed specifically enough that their progress can be tracked and their occurrence or non-occurrence confirmed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Content analysis of output.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Clear indicators for knowing whether a possible outcome occurs.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>No clear indicators derived.</td>
</tr>
</tbody>
</table>

**Radio network:** Yes, all of those reported above were highly specific and clear. There would be no doubt that any of these had occurred. On follow-up, three years later, the anticipations were still relevant, though I was told (by staff of a different Indonesian radio network, with whom I was working on another project) that no change had occurred in the situation of RN, except for a slow erosion of its budget and loss of some well-known presenters to private networks.

**Engineering manufacturer:** On follow-up two years later, all the anticipations were reported by EM to be very clear, and some had already occurred - notably, a sustained rise in the value of the Australian dollar against the US dollar.

**Iraq:** Yes, but perhaps because they were so general. For example, in the scenario map created before the war, one holon was “Iraq becomes a troublesome US colony.” This became the
case in May 2003, and has remained so until the present. A more foresightful anticipation might have further divided this holon, perhaps related to the de facto division of Iraq into three fairly self-contained regions, with most of the violence confined to the central region.

**Legal service:** Yes: the five scenario paths were so distinct that there would be no problem a year later deciding which future/s the organization was in. This was clearly confirmed on follow-up.

**Credit union:** Yes, very clearly, in most of the scenarios. Examples include *Flight from cities*, *Credit union franchising*, *CU becomes biggest RFS west of Great Dividing Range*, *Establishment of Asian Economic Community*, *Millions of private banks via the Net*, *Rise in Islamic banking*, and *CU demutualized*. None of these has occurred, except (to a small extent) the first. A few scenarios were less trackable, such as *Growth of micro-businesses* (massive growth was meant, but no threshold was discussed), and *Varying economies of scale* (it could take years to recognize this was occurring).

**Service club:** Many of the 28 indicators set out for each of the four main paths were quite specific, so their achievement would be readily confirmable. For example, the first of the 28 was membership criteria; for the four paths, these criteria were set out as:

*Continuation* Criteria as at present, perhaps relaxed slightly – loosen meaning of “leader in their profession” to include “potential leader”

*Adaptation:* Corporate membership becomes widespread, with focus on Triple Bottom Line, Balanced Scorecard, Natural Step, etc.

*Model 2.75:* Anyone interested in furthering SC’s goals would be admitted to membership.

*Transformation:* Many different classes of membership, to accommodate anybody interested in furthering SC’s goals.

Confirmation of these changes would be a simple matter of examining the rules of each club, grouping clubs according to which of the four paths they had chosen.

**Barossa:** Since this study’s focus was on landscape values, images (both photographic and narrative) were the main outputs; for examples, see figures A4.7.2 and A4.7.3 in Appendix 4. Landscapes in these images could be regarded as scenarios, and outcomes tracked, by comparing later images of the same landscapes and comparing these with the environmental values articulated in the Barossa workshop. As one participant commented, anticipations “would need to be expressed more specifically if you were to evaluate whether they were achieved.
But the selection of photos gave a useful expression of what aspects of the future could mean."

**Analytic induction**

This criterion was confirmed in all cases, with no change in its wording from analytic induction.

### 9.3 Execution criteria assessed at influence level

This section includes four execution criteria at the level of influence, implying changes in the outlooks of participants. The last (DE2) was also a design criterion, and was assessed on that basis in chapter 5.

- **E3.** The boundaries of uncertainty and plausibility are clarified.
- **E4.** Participants are satisfied with Process, feeling the activity was worthwhile.
- **E7.** Participants feel empowered and stimulated to act.
- **DE2.** The Process creates "future memory" to help prepare for later action, and participants gain more detailed perceptions of future possibilities and desired futures.

#### 9.3.1 Criterion E3: Were the boundaries of uncertainty clarified?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>The boundaries of uncertainty and plausibility are clarified. Perceptions of extreme plausibility and implausibility have converged somewhat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants report that, following discussions in the workshops, they are now more aware which aspects of the relevant future are more certain and which are less certain. Some futures that initially seemed implausible now seem more likely, and the seemingly inevitable now seems less likely.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Such awareness is not reported.</td>
</tr>
</tbody>
</table>

**Radio network:** This criterion had not been fully developed at that pilot stage, so was not an objective for the pilot case study. For RN, it cannot be claimed that this initial version of the Process was successful in this regard; if anything, participants seemed to come away from the workshops more confused than before about what they viewed as certain and uncertain. However, in terms of plausibility convergence, the Process was successful to some extent, particularly the discussion about Singapore buying part of Riau. None had heard of this idea,
and nearly all were highly skeptical at first, but they soon realized its plausibility, even though they did not like the idea of the consequential loss of their radio station at Tanjung Pinang.

**Engineering manufacturer:** This criterion was a primary focus during the main series of interviews, but as with the previous criterion, EM managers initially seemed to dismiss the concept of uncertainty, regarding future possibilities as either highly likely or highly unlikely. However, on follow-up I found that (as the study had foreshadowed), a major client, following a change of management, had decided to put out to tender the work that EM had been doing for many years. EM's managers had regarded this possibility as likely. The CEO commended "No, I think there was a degree of cockiness in there." In that sense, the issue was a boundary of uncertainty that had been explored, though not at first accepted as such.

**Iraq:** Not applicable, because there were no participants.

**Legal service:** This criterion was addressed in detail, in all workshops but the first. One of the main thrusts of this case study was to anticipate the commonwealth government's demands in relation to LS and its counterparts in other states, and much discussion was devoted to clarification of uncertainties. Because this was primarily consultancy work, with a clear objective, this case study focused more on such issues than did any other. On follow-up, a senior manager commented "Yes, it did that, it had the desired effect of legitimating change that was required and a direction that was satisfactory" - which was not quite relevant. The follow-up discussions provided no evidence that plausibility convergence had occurred. As with other organizations studied, participants had difficulty understanding this concept when asked about it as a direct question.

**Credit union:** One interviewee commented "No, but I don't think that's related to the methodology" - and later - "They are comfortable with not wanting to know what they don't know because they don't think it's important." However, I overheard several of the breakout groups discussing such issues intensively, with arguments over issues such as the likelihood of Islamic banking being offered in Australia. Going back to the original workshop data, some indirect evidence of uncertainty clarification was found: for example, executives who initially dismissed the concept of CU introducing Islamic banking ("We'd never do that") in a later session acknowledged that it would not be difficult to implement and may even have some advantages over the crdit foncier principle used by Australian lending institutions.
Service club: A representative comment on follow-up was that "Yes, I think people were clearer. I think a lot of it was thought-provoking and for each participant to hear what each other had to say, I think we achieved that – and we also found more uncertainty." This must have referred mainly to the earlier workshops; during the construction of the four broad scenario paths, no time was spent actively exploring uncertainty. Plausibility convergence applied to the extent that "that some futures that initially seemed implausible now seem more so” – but the opposite did not apply. In particular, the possibility of the “Transformation model” which had seemed very implausible at first, now seemed within reach, and as discussed under criterion E10 below, implementation was under way.

Barossa: No, because this was only a partial case study. Its emphasis was on teasing out visions of the future rather than exploring the boundaries of certainty. Only in the last session (on sectoral preferences) was this issue touched on, and then only in passing.

Analytic induction
In general, this criterion was not fulfilled. In fact, it was only for the two organizations with a clear need (EM and its uncertainties about the future of manufacturing in Australia, and LS and its uncertainties about how it would have to change to be eligible for commonwealth funding) that the issue was explored in detail. Reviewing the possible reasons for the failure of this criterion, the comments from a district governor in the SC case were relevant: that some participants did not want to clarify boundaries of uncertainty, preferring a pleasant fuzz to unpleasant knowledge. Reflecting on this comment, I realized that the standard design of SNM did not explicitly cover this issue. Though there was nothing to prevent such exploration in breakout groups, SNM, by avoiding the issue of probabilities, sidestepped this issue. Thus it was only in the two cases of specific need (EM and LS) that the issue was explored in detail. The other part of this criterion concerned plausibility convergence. It turned out to be not possible to assess whether perceptions of extreme plausibility and implausibility had converged – largely because most participants had difficulty understanding this concept, even after it was explained several times.

Thus the analytic induction statement from this criterion is

E3a: Because the SNM process was not designed to include explicit discovery of certainties and uncertainties, the boundaries of uncertainty and plausibility were generally not clarified.
9.3.2 Criterion E4: Did participants find the activity worthwhile?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>Participants are satisfied with Process, feeling the activity was worthwhile.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Attendance data, evaluation questionnaires.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants keep turning up. Positive spontaneous comments in evaluation questionnaires.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Many participants drop out. Negative comments in evaluation questionnaires.</td>
</tr>
</tbody>
</table>

**Radio network:** Because this was only one session in a two-week series in media research, there was no specific session evaluation (though ratings of the entire series were high, averaging 8.3 on a 10-point scale). Also because there was only one session, continuing attendance data was not relevant. However, in the evaluation for the course itself, some participants mentioned this session as one of the highlights of the whole course.

**Engineering manufacturer:** During the initial round of interviews, most participants seemed to be satisfied, but some (the middle managers) seemed to consider it a mild waste of their time. They tolerated the first few interviews, but did not encourage an extended discussion. The exception—who made up for the rest—was the chairman, who was highly interested in the futures of EM, and despite the demands on management time, encouraged me to return for a final total of 11 interviews (though only five were originally scheduled). However, in a follow-up interview, the CEO (who had initially been very skeptical about the value of the process) thought aloud: "Would we want to do it [the Process] again? Do I want to? No. Should I? Probably yes."

**Iraq:** Not applicable, because there were no participants as such, only a handful of people who offered occasional advice.

**Legal service:** A typical comment on follow-up was "Mostly, but the re-examination of the past was redundant, as T—said." In fact, it was not only T—(a former Board chair) who made that comment, but several others as well. In retrospect, I and the facilitators probably misjudged the mood of the group; it seemed that in this first-ever study of LS's future they had hoped to set past problems behind them, and not rake over old problems yet again. Beginning with the past may have been partly responsible for the comparative failure of the
first workshop. Apart from that problem, the answer to this criterion was a clear Yes, simply because most kept turning up to the later workshops.

**Credit union:** In open-ended comments made following the workshops, the most common comments were "useful", "interesting", "enjoyable," and "looking forward" (to the next workshop, or later outcomes). The 36 comments (some respondents made more than one) included no negative adjectives. The follow-up interview revealed that nobody had complained that the two days were a waste of their time. On the other hand, as pointed out by one participant, "Nobody's said anything like 'Gee whiz, we found the Holy Grail.' " Also, several participants failed to turn up for the second half-day session in one set of workshops, giving pressure of work as a reason.

**Service club:** Yes, because everybody continued to turn up, even though the workshops were held on Saturday mornings. The (anonymous) evaluation questionnaires included no negative comments, nor were any regrets expressed.

**Barossa:** The organizer of the workshop sent an email questionnaire to participants a few days after the workshop, asking them to rate its relevance, effectiveness, efficiency, and usefulness (not further explained) on a scale ranging from 0 to 10. Though only 4 of the 19 participants responded, the mean scores were 9.5, 8.0, 85, and 9.2 respectively; an overall average of 8.8. With 10-point satisfaction scales tending to average around 7.0 (Anderson and Fornell, 2000), this is a high figure. In the standard open-ended evaluation questionnaire, no comments were made that indicated dissatisfaction, except one related to the long duration of the workshop – though a related comment was "Whilst it was a long day, the photos and workshop atmosphere were rewarding."

**Analytic induction**

Criterion E4 received a mildly positive response on the whole, and nearly all participants kept turning up to workshops. Thus the original wording of this criterion can be confirmed.
9.3.3 **Criterion E7: Did participants feel empowered to act?**

<table>
<thead>
<tr>
<th>Full wording</th>
<th>As a result of the process, participants feel empowered and stimulated to act to carry the work forward.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants. Record of meeting.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants report feeling empowered and stimulated. Follow-up plans are discussed at final meeting.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Participants do not report feeling empowered and stimulated. No follow-up plans discussed.</td>
</tr>
</tbody>
</table>

This criterion applies when the participants’ completion of a futures study imparts to them a sense of empowerment.

**Radio network:** Judging from comments at the end of the two-week course: mainly not. Participants felt that the issues were too abstract and remote from their daily life, and they did not believe that they could influence RN on policy issues. This may almost always be the case when relatively junior staff deal with large-scale issues, particularly those on which they are not well informed.

**Engineering manufacturer:** As EM was a small private company, and the respondents in the interviews included EM’s directors and top managers, they were already empowered, and knew it. The process can thus hardly have added any sense of empowerment. As for the other point, “stimulation,” this was designed for use with the scenario workshops, but as this case used interviews rather than workshops, it does not apply to EM. However, on follow-up, the study was reported as one of the factors behind the decision to continue the development of EM’s revolutionary electric motor. The CEO had severe doubts about this in the original 2003 study, but in mid-2005 had accepted that despite the development costs (around 5% of EM’s annual turnover) the electric motor was essential to EM’s long-term future.

**Iraq:** Not applicable; no stakeholders were involved, so there were no participants in a position to act on the findings.

**Legal service:** Clearly yes, because they *did* act, without delay. Follow-up plans were discussed at the final meeting, Scenario 2 (changing the board structure and the constitution) was implemented, and a new constitution formed for LS. Despite a number of sequential steps being involved, this was completed three months after the final workshop.
Credit union: In general, no. The climate in the workshops was not one of impending action – in contrast with several other cases, which were seeking change. Some follow-up plans were discussed at the final meeting: the formation of a small working group to further develop some of the issues raised. However, this was set aside due to pressure of other work. On follow-up a year later, the strategic planning manager answered this question with a clear "No," but added “– but I don’t think we’ve finished the process.” Despite these few positive indications, it was clear that this question could not be answered positively for participants as a whole.

Service club: For a minority, this was clearly the case; for example “Tony R— took it [a report on the Process at SC] to a workshop in Queensland because he was so excited by it.” (Follow-up interview with one outgoing district governor, 9 months later.) However for most participants, no evidence of feelings of empowerment could be found, and in some cases the contrary applied. The same interviewee reported of one group of participants from a very conservative club, “I think the scenario planning made them feel threatened. The notion of trying something radically different was threatening to them and they were trying to hang on. They were in denial.”

Barossa: Results were mixed. On follow-up 9 months later, positive answers included “Yes – it reinforced the importance of assessing and prioritising landscapes in the region so that the most valuable and sensitive can be better protected. Another participant commented “No, but this is a big ask.” Still another replied “It made me more aware of the actions that are necessary” – which reflected the opinions expressed in the discussion at the end of the workshop. In brief, there was no unanimity in this case, partly because the single workshop was not intended to be complete in itself.

Analytic induction
The most comprehensive statement that can be made on this criterion is:

E7a: As a direct result of the process, a few participants felt empowered and stimulated to act to carry it forward – but those few felt highly empowered and stimulated.
9.3.4 Criterion DE2: Did participants gain clearer perceptions of possible and desired futures?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>Participants gain more detailed perceptions of future possibilities and desired futures. The Process creates “future memory” to help prepare for later action.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants: after workshops, and on follow-up.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Participants say that futures were described in enough detail to enable them to know whether they were occurring.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Participants do not make such a statement.</td>
</tr>
</tbody>
</table>

To the extent that this criterion was met, the Process would have captured users’ imaginations, with evocative narrative, and they would have remembered the scenario paths on follow-up.

**Radio network:** This aspect was not covered in the course evaluation, nor specifically mentioned in the open-ended responses. It was difficult to find out from participants informally, because most spoke little or no English, and I spoke even less Bahasa Indonesia.

**Engineering manufacturer:** This criterion was partly supported. On follow-up, a manager mentioned that “by going through your process, it asked questions that we previously hadn't considered.” However, because the event chains from the midcasting were not detailed or vivid enough, the Process did not address, on an operational level, how EM management could perceive the early warnings from the 11 surprise situations. On follow-up the directors had formed a much clearer perception of EM’s future: “ideally, we’d transfer to being an R & D centre” - instead of, as at present, a manufacturer. As with other criteria for EM, the fulfilment of DE2 was delayed, being much more evident on follow-up in 2005 than during the original study in 2003.

For the electric motor: the Process clearly captured the imaginations of the chairman and the CEO, given the time and effort they spent disagreeing and finding fault with the “surprises” in the midcasting. The Process thus perhaps aided in forming clearer perceptions of possible futures for the motor.
Iraq: This would apply only to myself, as developer of the scenario network. Result: perceptions were only a little clearer, because the holons were not detailed enough. The holon *Iraq becomes a troublesome US colony* could have been explored in much more detail.

Legal service: On follow-up, the main organizer in LS answered an unqualified “Yes” to this question, as the thrust of the workshops had been toward making such perceptions clear. For the Board to renew its structure (abolishing the positions of most of the members) such perceptions were essential. As LS would have probably ceased to be funded if the restructuring had not occurred it was essential for all participants to foresee the consequences of the range of likely futures.

Credit union: One participant commented “Unless you have a strong dream it won’t happen; [you must] believe that something long-term can actually be planned for.” It was pointed out to me that the nature of the Australian finance industry is such that major changes cluster in a short period, followed by long periods of no change – for example, the sale of all the state governments’ insurance agencies in a few years around 1990. Thus the normal situation in that industry is “punctuated equilibrium” (Eldredge and Gould, 1976), with the industry at the time of the study (and since) in a situation of no substantial change. As such, participants felt no sense of urgency, answering this question with responses such as “Not really” – because, as a senior manager commented, “They were not particularly interested in doing so.”

Service club: Until the fourth workshop this criterion would clearly not have been satisfied, but in the final (fifth) workshop, the pieces seem to have come together for most participants. Evidence of this was the small number of participants (only 3 out of 20) who opted for a version of the status quo for SC, while all the others participated in creating vivid narratives about their imaginary visits to a SC club in 2025. Of all the case studies, this was the most successful in meeting this criterion.

Barossa: Though the key purpose of this workshop was to explore visions of the future for the Barossa Valley, the issue of creating “future memory” was hardly relevant, because no scenario network has yet been created at the time of writing (the project is still incomplete, with funding being sought). As one participant commented, nine months later, “Think a follow up workshop dedicated to this may be useful.” This criterion is thus, in the circumstances, not applicable.
Analytic induction

Though it may seem obvious that the creation of a scenario map would itself be evidence of clearer perceptions of possible and desired futures, there was little evidence—particularly on follow-up—that this had been achieved. It was not that the negative applied, or that no perceptions were clarified, but that the effect was very weak. Since the only successful applications of this criterion were for LS and SC, the following statement is formed from those two cases, discarding data from the other five.

DE2a: When participants felt a clear threat to the future of an entity they valued, the Process created “future memory” to help prepare for later action, and participants gained more detailed perceptions of future possibilities and desired futures.

9.4 Execution criteria assessed at the application level

This section covers the last four execution criteria, which were assessed mainly during the follow-up phase. All of these criteria are satisfied when some appropriate action is able to be taken as a direct result of the Process. The guiding principle is “readiness for action” rather than simply “action taken” because a suitable situation may not yet have arisen, or other factors may have intervened.

E6. The output is directly usable by the entity.

E8. As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, and more adaptable to change.

E9. The broad situation was anticipated.

E10. The Process results in action for change: in the entity, or in participants’ behaviour.

9.4.1 Criterion E6: Was the output directly usable by the entity?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>The output is directly usable by the entity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants and entity managers.</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Report that at least some aspects of the output are directly applicable.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>No such report.</td>
</tr>
</tbody>
</table>

This criterion applies at the conclusion of the casework, and applies when participants who were members of the entity agree that they can make direct use of the output of the futures
work. The relevant word is “usable” rather than “used” because other circumstances may have prevented the output being used. Such circumstances were explored in the follow-up sessions.

**Radio network:** No, because it was cast at a level beyond the entity’s direct control – to do with ownership of RN and the like; only the Indonesian government would have been able to use the output.

**Engineering manufacturer:** In one specific sense, the output was highly usable: the reason for EM requesting a report from me was to show it to their bank, to help in getting a loan. (However, after seeing the report, according to the CEO, “the bank did a big yawn” – so though the report was used, it did not in the end prove useful for that purpose.) Looking more broadly, the report was useful because it was used: in other words, criterion E10 (action for change, discussed in section 9.4.4 below) subsumed criterion E6. If E10 applies, E6 will also apply, which it did in the case of EM.

**Iraq:** Not applicable; because no entity commissioned the work, no effort was expended to make the output usable by any specific party. Also, the real entities involved (such as the US military) would have access to far more detailed views.

**Legal service:** The information was highly usable, largely because the workshops had been designed for that purpose. Its usability was confirmed by its actual use: within a few months, LS had succeeded in changing its constitution, as a direct result of the workshops, as noted in the discussion of criterion E10, below.

**Credit union:** The output was clearly usable, though it had not yet actually been used. On follow-up, one senior manager commented “I wouldn’t mind going back through all those little tools to see if we can make use of some of that” – though this was a reference as much to the methodology as to the findings. A related comment was “When the new staff member turns up, I’ve got this on the list to fire up.”

**Service club:** At participant level, this criterion could hardly have been more successful. All of the 9 participants who filled in questionnaires at the final session (many did not, leaving early because the session had run over time) said they would be making changes. These ranged from specific changes to meetings (“less ritual, more discussion time, more stimulating speaker topics”) to the systemic (“motivate them to undertake change on a gradual basis...this may take many guises, but encouraging ‘ownership’ in change”). On follow-up, at club level,
this was true for some clubs: those that were ready for change. A report was circulated to all clubs, “but not all presidents have been through it because of the centenary celebrations.” Note that in this case there was no real entity, but a loose confederation of clubs. For most clubs, their only involvement had been receiving the report on the workshops.

**Barossa:** Not applicable, because (a) the output of this preliminary session was not designed to be directly usable, and (b) since the entity was the physical environment of the Barossa Valley, the only participants who could have used the findings were the few government officials involved in regional planning.

**Analytic induction**

Taking account of the lack of usability in the case of RN, the criterion can be reworded thus:

**E6a:** The output was directly usable by the entity, when cast at a level that the entity could use.

### 9.4.2 **Criterion E8: Did the entity become more future-oriented?**

<table>
<thead>
<tr>
<th>Full wording</th>
<th>As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, and more adaptable to change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Feedback from participants and entity managers (the latter need not have been present at the workshops).</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Majority agreement, and details provided, e.g. evidence of extended time horizons.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>No majority agreement, or unable to specify any details.</td>
</tr>
</tbody>
</table>

This criterion relates to the entity as a whole rather than individual participants. It can almost be taken for granted that the latter would become more future-oriented, after spending several days thinking about the future – but for the entity itself to become more future-oriented would involve some observable change. The wording is not intended to imply that the Process itself is solely responsible for change; the multiple-cause axiom (chapter 4) always applies.

**Radio network:** Due to follow-up not being possible, this was not able to be established - but probably not. The Process was too rushed; it comprised only one day in a two-week audience research course that mostly encouraged convergent thinking and analytical skills. However,
this criterion was not expected to apply to this pilot study: it would have been far too much to
expect.

**Engineering manufacturer:** Clear evidence was found for this criterion had been achieved. In particular, the company's planning horizon, which in the initial interviews had been stated as one year, was now much extended. The CEO, in his follow-up interview, stated “Yes, now I'm looking three to five years ahead... I'm probably more focused on the future than I was back then.” He attributed this change partly to the Process, and partly to events as they had turned out for EM in the two years between the case study and the follow-up. He did not mention the obvious fact that in 2003 his attentions had been focused on operational issues: specifically, “bedding down” the large contract for making engine parts for lawnmowers.

**Iraq:** Not applicable, because the entity was the conflict, not a social group, and no stakeholders were participants in this study.

**Legal service:** Yes, on the whole. The first workshop, covering the past of LS, showed that after a high point in its founding years in the 1970s, almost nothing had changed at LS, despite high staff turnover. Following these thesis workshops, the management re-contacted me, asking me to facilitate some further workshops, comparing the (unchanged) statement of objects in the new constitution with the activities that LS was currently undertaking, with a view to changing emphasis from criminal cases to family and civil law, to a new focus on crime prevention rather than simply representation. This was clear evidence of a change of orientation towards the future. However, in the follow-up, one senior manager provided an alternative view: “No, it is still strategic in the extreme – people are not open, they are strategic” – as if participants were more future-oriented as long as it served their purposes at the time, but later became less future-oriented.

**Credit union:** The general response on follow-up was “no” – but the organization was already future-oriented to an above-average level, as evidenced by its prior involvement in a joint credit union scenario study several years previously. One participant's comment was that the lack of change had been partly due to the selection of participants for the workshops: “I'd do some sort of psych filter on the senior decision makers first [to select participants] then adapt it down to a five year thing, then they'd get some value out of it.”

**Service club:** Yes, at district level, and for clubs that were already more future-oriented – for example, those that already had strategic plans. Thus the process increased the difference
between clubs, with the previously more future-oriented becoming more so, and the less future-oriented not changing. But these were the immediate results (7 months later). The longer-term result expected by one district governor was that the more conservative clubs would eventually be led to reform by the more progressive clubs.

**Barossa**: Though this entity is not an organization, some of the participants became more future-oriented in their own organizations. Several participants came from a local government authority, which soon afterwards appointed a Sustainable Futures Officer, who re-used some of the visual materials in her work, and (at the time of writing) is planning to continue the futures work of which this Barossa case was the first stage. Another of the participants was from a government planning agency, which followed up the image comparison session in the workshop with a large-scale online survey in which respondents assessed the landscape values of photographs of the Barossa. On those two grounds, this criterion must be regarded as having been accomplished in this case study.

**Analytic induction**

Drawing together the above findings, the conclusion was weakly positive – with the proviso (bearing in mind the CU experience) that:

**E8a**: The entity became more future-oriented as a result of the Process, more accepting of divergent thinking, and more prepared to adapt to change – provided that participants were in a position to enable this to happen.

### 9.4.3 Criterion E9: Was the broad situation anticipated?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>The broad situation was successfully anticipated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Ask participants: “Where are you now, on the scenario map?”</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Success if the current position can be found on the original map.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>Current position does not exist on the scenario map.</td>
</tr>
</tbody>
</table>

This criterion means that the broad situation of the entity at the time of follow-up is clearly locatable as a holon on the event-level scenario map that was produced in the original workshops.
Radio network: The broad situation in 2003 was correctly anticipated (RN was still a single entity, wholly owned by the government) but this knowledge was not particularly useful. The morphological hierarchy created for this study did not cover a slow decline in central government funding, with consequent loss of capabilities – though in retrospect this was entirely predictable from international comparisons (an equivalent situation in Australia is a major reason for the existence of this thesis, as noted in chapter 4, section 4.4.2).

Engineering manufacturer: On follow-up, the morphological futures wheel for EM as a company (Table A4.2.2 in Appendix 4) partly covered the situation. Scenario path 7 (“drop an existing industry”) had been used, with the sale of EM’s electroplating plant. Path 1 (“consolidate recent expansion”) was almost complete, with the introduction of some lean manufacturing approaches. However, what that futures wheel did not cover (due to what might be called a “morphological blindness” related to the selection of variables) was the decline in the market for lawnmowers and the consequent loss of business for EM in manufacturing engine parts. EM’s turnover had fallen from $A12 million in 2003 to less than $A9 million in 2005. That broad situation had certainly not been anticipated, because the futures wheel had been focused on activities rather than outcomes.

For the electric motor, situation 2B1 in Figure A4.2.1 of Appendix 4 applied, two years later: the development was continuing, on a larger scale, still internally funded. Turning from the morphological division to a broader assessment of the electric motor, the situation had been accurately anticipated: further technical development, investigations of possible markets (though no manufacturing agreements had yet ensued), and further work on IP protection, with at least six patent application in train.

However, as the CEO noted, the Process “was interesting for what it told us [but] it was [also] interesting for what it didn’t tell us [for example] the Chinese syndrome.” By that, he meant the huge growth of the Chinese economy, which had resulted in greatly increased prices for EM’s raw materials, such as brass and copper. The 11 midcast surprises did not include either a large increase in raw material prices (though they did include a likely consequence: “Engineering plastics replace many of the small metal parts that EM produces”). Nor did they include any mention of Chinese manufacturing replacing Australian - though again, one midcast possibility was “Sustained 30% increase in value of Australian dollar.” For both of these examples, the situation was thus indirectly anticipated. had the midcast surprises been incorporated in the scenario map, as was done for later cases, the possibility of the “Chinese syndrome” would have been much more obvious.
Iraq: This criterion was achieved very explicitly: "Iraq becomes a troublesome US colony." But as noted in section 9.2.4 above, perhaps a more focused situation could have been anticipated, with more detail on in what exact ways Iraq would become troublesome.

Legal service: Criterion E9 succeeded on the initial terms of engagement, because this was a very short-term anticipation. However shortly after the constitution was changed, major changes occurred in the regulatory environment of LS. The federal agency that had funded it was abolished, and its functions transferred to the Attorney-General’s Department, in line with the federal government’s “mainstreaming” of indigenous services. In hindsight, warning signs had been present for at least a year. I was unaware of these, but the staff of LS, in follow-up interviews, mentioned that they had been aware that some large change was impending. In practice, the main difference this made to the outcome for LS was that its tender process was delayed considerably.

Credit union: The general position was seen as unchanged since the workshops 18 months earlier. However, this was so broad that a major upheaval would be been required for the general position to change.

Service club: Not fully applicable, because this study was completed only six months before the completion of this thesis, and nothing had yet changed. However, in a follow-up interview, one district governor remarked “Yes, we are on the way from model 1 to model 3” (where model 1 was the stability path, and model 3 was the transformative path, described in table 9.5 above and chapter 8, section 8.7).

Barossa: Insufficient time had elapsed: this was a 20-year vision, with fieldwork carried out only nine months before completion of this thesis. In that time, there was no clear change in the environment of the Barossa Valley.

Analytic induction
Given the limitations and caveats discussed above, the broad situation was successfully anticipated – at least, for the interim. Thus the wording of this criterion does not need to change.
9.4.4 Criterion E10: Did the Process result in action for change?

<table>
<thead>
<tr>
<th>Full wording</th>
<th>The Process results in action for change: in the entity, or in participants’ behaviour.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Ask participants and entity managers (the latter need not have been at workshops).</td>
</tr>
<tr>
<td>Supporting evidence</td>
<td>Reports of some improvement due to the Process.</td>
</tr>
<tr>
<td>Contrary evidence</td>
<td>No reports of any improvement due to the Process.</td>
</tr>
</tbody>
</table>

Note the wording: “action for change” rather than simply “change.” The intended distinction is that for external reasons, unrelated to the Process, action for change may not produce change. (A duck paddling upstream on a fast-flowing river is undertaking action for change, even if she does not move relative to the riverbank.)

**Radio network:** The pilot use of the Process in this case was part of a larger program, involving training broadcasters in more democratic approaches to political information – such as talk-back radio programs. This did occur, but it cannot be said that it was a direct result of the Process. Whether there was any differential effect between Riau (where the Process was tested) and other provincial offices involved in the same program cannot be assessed, but there is no reason to believe that less than one day in a two-week program would have made a measurable difference. Nor, as a pilot study of feasibility, was it expected to achieve that.

**Engineering manufacturer:** As the CEO commented in a follow-up interview (after a long pause), “I guess the answer is yes... I guess we got out what we put in, it’s just you gave it back to us.” Expanding on that, he commented “We pulled out [your report] 12 months after, and looked at what we’d seen, what we’d expected and ... from this, it told us to get out of [EM’s old factory], to get out of the electroplating business. That’s what we had to do anyway. We went through that process. It was very unpleasant...” In fact that report did not “tell” EM to get out of its old factory and sell the electroplating business, though these possibilities were discussed. So for EM, this criterion could be rephrased as “the Process resulted in action for change a year later, based on participants’ interpretation of the report.”

**Iraq:** No, but in the absence of stakeholder involvement, the study could not have had any measurable effect.
Legal service: This criterion was fulfilled very strongly. The SNM experience was mentioned as the main impetus for the success of the new constitution. Confirming this, a note from the Senior Counsel of LS, sent to several others and myself, and dated 2 December 2003, stated:

I write to inform you that the AGM of [LS] held in Adelaide on 28th November 2003 approved constitutional amendments that substantially adopted 'scenario 2' as determined by the [LS] change workshops. Our thanks go specifically to Dennis List and David, and also to Bobby and James for their work in facilitating Dennis's participation and assistance.

(David was the main facilitator; Bobby and James were intermediaries, through whom LS found me.) Though the reason for the organization commissioning the workshops was that it foresaw the need for change, senior management expressed pessimistic views about the possibility of the workshops leading to constitutional change. In that context the Process was unexpectedly successful – though the change of constitution would also have had other precipitating factors.

Credit union: On follow-up, the credit union had not carried out any action for change as a direct or indirect result of the Process. Nor had it changed in any other substantial way in the intervening year. However, as no clear direction for change emerged in the workshops, it can be argued that this criterion should be extended: to note that one indicator of success is that the entity takes no action for change, when no clear benefit emerges from the workshops.

Service club: Yes, very clearly. A follow-up interview with a district governor six months later revealed that substantial work had been put into place in several clubs, moving them towards the "Transformation model." Also, new partnerships had been formed with several educational bodies as a direct result of the workshops. SC has long sponsored young people on international exchange visits, and this move to closer relationships with educational organizations was seen as a way of increasing awareness of SC among young people.

Barossa: The follow-up came only nine months after the case study, and the focus was on landscapes, which change very slowly. However one of the local councils had appointed a new Sustainable Futures Officer, who at the time of writing is engaged in a program of visiting schools and repeating the image-selection process with school students. Several follow-up comments also indicated action:

- "It reinforced the sense of urgency and need for the Landscape Assessment project that we were discussing in government circles. And a commitment was made to do this work."
• "A wine industry impact study is being reviewed, landscape assessment project commenced, and regional planning group established."

Thus, even though this was only the first workshop of a planned series, five actions resulted from it - though, as always (following the multiple-cause axiom in chapter 4) this workshop cannot have been the sole impetus.

**Analytic induction**

The relevant question here was: in what circumstances did action for change arise as a direct result of the Process? Setting aside the radio network (for which no information was available) and the Iraq case (for which there was no Process), clear action for change had arisen in each other case. However it was not possible to separate causes from effects. All five entities recognized a need for change: one reason why they agreed to participate. What the Process perhaps achieved was to guide that change, by illuminating the possible consequences of various choices. Thus a revised criterion would be that the Process resulted in better-considered action for change – which of course immediately raises the question of how we can be certain that the action was indeed better considered. This issue could be resolved only in retrospect, by statements such as "if we hadn't done those scenario workshops and had gone ahead with the action we had first planned, we'd be facing disaster now." However the circumstances in which such statements could be made with clear knowledge might not be at all frequent.

The legal service and service club cases were highly successful in terms of this criterion – but a supporting reason in those two cases was a pre-existing impetus for change. The scenario workshops helped in providing direction to that change. But oddly, both cases resembled the above-mentioned duck, in that the end result of the change would be that each organization would be able to continue as previously. A perceived need for change in inputs was intended to result in no change in outputs: the resumption of the previous status quo. (The same applied in the Barossa case.) These findings can be expressed in terms of the Leaf of Goals: that the actions made for change in the (horizontal) centre of the leaf allowed long-term objectives to remain attainable.

Given the above considerations, the statement re-formed through analytic induction is:

**E10a:** The Process resulted in action for change in the entity, if that entity was already prepared for change. In particular, the process resulted in change in behaviour when participants were both impressed by their experience in the Process and when they perceived an achievable path to a desired change.
9.5 Overview and comparison of findings

The following table summarizes the achievement of execution criteria for each case. Notations are: ** = yes, fully achieved; * = partly achieved; - = not achieved; .. = not applicable, or information not available. Italicized letters (a and b) refer to footnotes below the table.

| TABLE 9.7 CRITERIA ASSESSED DURING CASEWORK | \n|---------------------------------------------|
| Effectiveness level A: implementation       |
| E1. The purpose of the futures work is made explicit to all involved. | * | ** | .. | * | * | * | * |
| E2. Participants' initial assumptions are challenged, focus broadened, and their perceptions reframed. | ** | .. | * | * | * | * |
| E5. Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient. | ** | ** | * | - | * | * | * |
| DE1. Workshop participants include all major stakeholder groups, covering all likely impinging systems. | - | * | .. | - | * | ** | * |
| DE3. Anticipations are expressed specifically enough that they can be tracked and confirmed. | ** | ** | ** | ** | ** | ** | * |
| Summary of level A: occurrence (% of potential) | 70 | 80 | 75 | 30 | 70 | 90 | 70 |
| Effectiveness level B: influence            |
| E3. The boundaries of uncertainty are explored and clarified. | * | - | * | .. | - |
| E4. Participants are satisfied with the Process, finding the activity worthwhile. | ** | ** | .. | * | * | * | ** |
| E7 Participants feel empowered and stimulated to act. | - | .. | a | - | * | * |
| DE2. Process creates "future memory": participants gain more detailed perceptions of future possibilities and desired futures. | - | .. | a | - | * | .. |
| Summary of level B: influence (% of potential) | 50 | 50 | .. | 75 | 12 | 62 | 75 |
| Effectiveness level C: application          |
| E6. The output is directly usable by the entity. | - | ** | a | ** | * | .. |
| E8. As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, and more adaptable to change. | - | ** | - | - | ** | ** |
| E9. The broad situation is successfully anticipated. | ** | * | * | * | ** | .. | b | .. | b |
| E10 The Process results in action for change: in the entity, or in participants' behaviour. | .. | ** | a | * | ** | ** |
| Summary of level C: application (% of potential) | 50 | 87 | 50 | 62 | 50 | 83 | 100 |

*a. Almost impossible to have occurred: the relevant entities were not involved with the Process.
*b. E9: For these cases, follow-up occurred too soon for broad anticipation to be relevant.

Entries in the above table are conservative: two stars were awarded only when the evaluation yielded an unequivocally positive answer. By averaging the number of stars across the relevant cells in each column, an index of success can be obtained for each criterion. For each effectiveness level, an average percentage is shown — intended only as a crude summary enabling patterns to become more readily visible; precise measurement is not implied.
TABLE 9.8 OVERALL SUCCESS OF PROCESS BY EXECUTION CRITERIA AND LEVEL

<table>
<thead>
<tr>
<th>Criterion (original wording)</th>
<th>Average stars (range: 0 to 2)</th>
<th>Relevant cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness level A: implementation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1. The purpose of the futures work is made explicit to all involved.</td>
<td>1.5</td>
<td>6</td>
</tr>
<tr>
<td>E2. Participants' initial assumptions are challenged, focus broadened, and perceptions reframed.</td>
<td>1.2</td>
<td>6</td>
</tr>
<tr>
<td>E5. Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient.</td>
<td>1.4</td>
<td>7</td>
</tr>
<tr>
<td>DE1. Workshop participants include all major stakeholder groups, covering all likely impinging systems.</td>
<td>0.8</td>
<td>6</td>
</tr>
<tr>
<td>DE3. Anticipations are expressed specifically enough that they can be tracked and confirmed.</td>
<td>1.9</td>
<td>7</td>
</tr>
<tr>
<td><strong>Average for level A</strong></td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td><strong>Effectiveness level B: influence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E3. The boundaries of uncertainty and plausibility are explored</td>
<td>0.6</td>
<td>5</td>
</tr>
<tr>
<td>E4. Participants are satisfied with the Process, finding the activity worthwhile.</td>
<td>1.8</td>
<td>6</td>
</tr>
<tr>
<td>E7. Participants feel empowered and stimulated to act.</td>
<td>0.7</td>
<td>6</td>
</tr>
<tr>
<td>DE2. Process creates “future memory”; participants gain more detailed perceptions of future possibilities and desired futures.</td>
<td>1.0</td>
<td>4</td>
</tr>
<tr>
<td><strong>Average for level B</strong></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td><strong>Effectiveness level C: application</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E6. The output is directly usable by the entity.</td>
<td>1.4</td>
<td>5</td>
</tr>
<tr>
<td>E8. As a result of the Process, the entity becomes more future-oriented, more open to divergent thinking, more adaptable to change.</td>
<td>1.2</td>
<td>5</td>
</tr>
<tr>
<td>E9. The broad situation is successfully anticipated.</td>
<td>1.4</td>
<td>5</td>
</tr>
<tr>
<td>E10. The Process results in action for change: in the entity, or in participants' behaviour.</td>
<td>1.6</td>
<td>5</td>
</tr>
<tr>
<td><strong>Average for level C</strong></td>
<td>1.4</td>
<td></td>
</tr>
</tbody>
</table>

Bearing in mind that the above averages are not highly meaningful, they are still useful for making comparisons between criteria, effectiveness levels, and cases. Table 9.8 suggests that the weakness of SNM is at the Influence level, for which the only criterion to be satisfied to some degree for all cases was participant satisfaction (E4). There was no clear evidence that the other three criteria at this level were consistently supported. At Implementation level, the Process performed better; had it not been for the weakness in stakeholder representation (with the problem largely overcome in the last two cases, as noted in section 9.2.4 above), it would have been better still. At Application level, the Process also did fairly well, with the weak point here being E8: the entity becoming more future-oriented. However, as one participant noted, this is a “big ask” – expecting an organization to become more future-oriented simply as a result of four half-day workshops was not a realistic expectation.
Looking toward an improved version of the Process, the next table examines the outcomes of the analytic inductions.

### TABLE 9.9 CRITERIA BEFORE AND AFTER MODIFICATION THROUGH ANALYTIC INDUCTION

<table>
<thead>
<tr>
<th>Effectiveness level A: implementation</th>
<th>Effectiveness level B: influence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E1</strong> The purpose of the futures work is made explicit to all involved.</td>
<td><strong>E3</strong> The boundaries of uncertainty and plausibility are clarified.</td>
</tr>
<tr>
<td>Revised wording: For each entity involved, the purpose of the futures work was made clear to all participants – but some were not satisfied with that purpose, and wanted to finish with an action plan.</td>
<td>Because the SNM process was not designed to include exploration of certainties and uncertainties, the boundaries of uncertainty were normally not explored and clarified.</td>
</tr>
<tr>
<td><strong>E2</strong> Participants' initial assumptions are challenged, focus broadened, and perceptions reframed.</td>
<td><strong>E4</strong> Participants are satisfied with the Process, finding the activity worthwhile.</td>
</tr>
<tr>
<td>Revised wording: Participants' initial assumptions can be challenged, their focus broadened, and their perceptions reframed – provided that they are ready for this, either initially or through changed circumstances.</td>
<td>No change in wording needed.</td>
</tr>
<tr>
<td><strong>E5</strong> Each possibility is explored with equal attention, not neglecting any that seem awkward or inconvenient.</td>
<td><strong>E7</strong> As a result of the Process, participants feel empowered and stimulated to act to carry it forward.</td>
</tr>
<tr>
<td>Revised wording: Facilitators attempted to ensure that each possibility was explored with equal attention, not neglecting any that seem awkward or inconvenient. However many participants had a clear preference for one particular path, and focused much more on that than on the other paths.</td>
<td>As a result of the Process, a few participants felt empowered and stimulated to act to carry it forward – but those few felt highly empowered and stimulated.</td>
</tr>
<tr>
<td><strong>DE1</strong> Workshop participants include all major stakeholder groups, covering all likely impinging systems.</td>
<td><strong>DE2</strong> Process creates “future memory”; participants gain more detailed perceptions of future possibilities and desired futures.</td>
</tr>
<tr>
<td>Revised wording: Workshop participants included all major stakeholder groups only when very strong steps were taken to include them, and when no direct competitors were involved.</td>
<td>When participants felt a clear threat to the future of an entity they valued, the Process created “future memory” to help prepare for later action, and participants gained more detailed perceptions of future possibilities and desired futures.</td>
</tr>
<tr>
<td><strong>DE3</strong> Anticipations are expressed specifically enough that they can be tracked and confirmed.</td>
<td>No change in wording needed.</td>
</tr>
</tbody>
</table>
Of the five criteria at implementation level, only one (DE3: anticipations expressed clearly enough to be trackable and confirmable) remained unchanged. The other four were all qualified, applying only in certain situations, or to certain types of participants. Among the four criteria assessed at influence level, one remained unchanged, and two were qualified by applying only among certain participants, or only in certain conditions. The other (E3: “The boundaries of uncertainty and plausibility are clarified”) was not supported at all, largely due to a design fault in the Process. Of the four criteria at application level, one remained unchanged, and the other three were qualified in some way, operating only in particular situations. In summary, of the 13 criteria set up to evaluate the Process, three were confirmed without change, one was not confirmed at all, and the other nine were qualified, applying only in particular situations.

Two observations for the further development of the Process flow from the above discussion:

Criterion DE2 (creating “future memory”), as noted above, is probably an unrealistic expectation for a Process involving only four half-day workshops. If this criterion is to be taken seriously by an organization, a Process such as this may begin it, but only as part of a systematic program of cultivating foresight and futures thinking. This would be an interesting and useful program to develop, but it is outside the scope of this thesis.

Criterion E3: “The boundaries of uncertainty and plausibility are clarified.” Given the importance of this criterion, as established in chapter 3, rather than simply give up on it, further
work could be done. This would involve both modifying the Process to help this clarification occur, and developing clearer means of verification that it has occurred.

9.5.1 Overall evaluation of the Process for each case study

It is instructive to consider each case study as if its project had been self-contained. If the Process steadily improved, on application of the action research cycle, and each case were successively more successful (in terms of the above execution criteria) this would serve as evidence that the development process was an effective one. However, because of likely random variation between cases, it should not be expected that the success curve – if success could be reduced to a single continuous variable – would show a smooth increase.

The following table, matching Table 9.8, compares each case, again averaging out the number of stars from Table 9.7. No stars means “no evidence that criterion was fulfilled at all”, one means “partly fulfilled,” and two means “strongly fulfilled.”

<table>
<thead>
<tr>
<th>Case</th>
<th>Average stars (range: 0 to 2)</th>
<th>Relevant criteria (of 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio network</td>
<td>1.2</td>
<td>10</td>
</tr>
<tr>
<td>Engineering manufacturer</td>
<td>1.5</td>
<td>13</td>
</tr>
<tr>
<td>Iraq war</td>
<td>1.3</td>
<td>3</td>
</tr>
<tr>
<td>Legal service</td>
<td>1.1</td>
<td>13</td>
</tr>
<tr>
<td>Credit union</td>
<td>0.9</td>
<td>13</td>
</tr>
<tr>
<td>Service club</td>
<td>1.6</td>
<td>12</td>
</tr>
<tr>
<td>Barossa Valley</td>
<td>1.6</td>
<td>9</td>
</tr>
</tbody>
</table>

There was no clearly discernible trend throughout the project, except that the two cases with the most satisfactory outcomes were at the end. Comparing the above scores with my own holistic perceptions, it was surprising that the credit union and legal service cases came out so poorly. The LS case had seemed to be highly successful in its own restricted way (though not so useful for the development of the Process), while the CU case had also worked well - except that the credit union had not used the findings. In summary, the Process can be regarded as moderately successful in achieving satisfactory outcomes for clients.

The following paragraphs note the success of each case, in two key respects: (a) the effects of the Process on the subsequent success of the entity, and (b) the contribution of the case to the further development of the Process.
Radio network: Many of the execution criteria either did not apply in this case or could not be assessed. The key methodological question asked of this study was “Is this proposed Process likely to be able to produce viable scenario maps?” A negative outcome would have resulted in a different thesis project. The answer derived from the RN case, was a provisional Yes – though many aspects of the Process could not be fully employed in the short time available, and many of the aspects that were used clearly needed further development.

Engineering manufacturer: Though the chair of this company was highly interested in the SNM, and I carried out many long interviews with him, others in EM were much more skeptical about the project. As the method was not fully developed at this stage, it was something of a surprise to discover, on follow-up two years later, that EM had taken my report very seriously, and had made several major changes based on its conclusions. (Of course, other factors existed, and because of the participative nature of SNM, the report largely echoed what the managers had told me.) A major methodological finding from this case was the feasibility of using interviews rather than workshops – though more time is required for the former.

Iraq: This case study differed from the others in two respects: (a) there were no participants (so the case study can have had no effect on the outcome), and (b) because there were no participants, it was possible to revisit the case frequently, comparing outcomes with foresight, and thus sharpening the conceptual framework. The main contributions of this case to the development of the Process were:

1. Revealing the importance of actors’ motives in the outcomes of a set of events.
2. Highlighting the difficulty of combining attribution with the formation of the four-layered hemispherical model.
3. The need for subdividing actor groups as more information becomes available.
4. The lack so far of a way to integrate stakeholder perspectives into the hemispherical layers.

Legal service: In terms of the entity’s view of the Process, this was a great success. The Process was credited by the organization’s management with enabling the passing of a new constitution, and I was twice invited back to conduct additional change management work with the organization. However, in terms of contribution to the improvement of the Process, this case added little.
Credit union: Technically this case was successful, in that the Process worked very smoothly with two separate sets of participants, with only minor differences in the two scenario maps. However the exercise had no discernible impact on the organization, which did not change in any way because of it. In terms of the development of the Process, the problems experienced by these participants with the hemispherical model contributed strongly to a clarification of that model.

Service club: During the workshops for this case, it seemed at times that the Process was going badly wrong. The participants were unable to formulate a coherent scenario network, though this was perhaps due to the lack of constraints on the entity's future. In retrospect, though, this was perhaps the most successful case of all — in terms of the contribution of the Process to the attainment of the organization's objectives. On follow-up, seven months after the final workshop, clear action had been taken by the organization, as a direct result of the workshops. In terms of the development of the Process, this case led to the innovation of deliberately developing multiple futures, from which individual clubs could choose, and all could learn from each others' experiments.

Barossa: As this study explored only one additional aspect of the Process, and was not completed at the time of writing, the overall success of this case study cannot yet be judged. In terms of the method, this case confirmed the viability of an image-based approach to envisioning futures.

In summary, bearing in mind the exceptions and reversals noted above, the development sequence did improve the Process, though often the implications for process improvement of one case study were not realized until several studies later. Perceptions by entities' participants of the success of the Process were generally not correlated with the contribution of that case to the further development of the Process. This was initially worrying, but in retrospect there was no clear reason why such parallelism should have occurred.

9.6 Review of this chapter

Following this evaluation, the Process was found to be more successful at the implementation stage and the application stage than at the influence stage. The two most problematic criteria are in the influence stage. On review, it seems that the criterion "creating future memory" is over-ambitious for a Process of this kind, and is not a realistic expectation for a short series of
workshops. Criterion E3 on exploring the boundaries of uncertainty and plausibility was not fulfilled, due to a design defect in the Process. As this was found in chapter 3 to be very important, it would be desirable to undertake further development of the Process, designing this criterion into the fabric of the workshops.

Bearing in mind the findings from this chapter, a basic instruction manual for an improved version of SNM has been completed, and is presented as Appendix 5 below. It incorporates most of the reflections made in chapter 8, but does not address the design problem with criterion E3 (which would require further development work).

Limitations and shortcomings of the evidence
Because of the qualitative and formative nature of this research, it was not possible to produce hard numerical evidence of the execution criteria that was fully relevant. It can fairly be said that the results presented in sections 9.2 to 9.4 are indications rather than findings. However a determined attempt was made to assess the evidence from as dispassionate a viewpoint as possible, consonant with retaining full relevance. While it would not have been difficult to develop numerical indicators, these would have faced the usual problem with performance indicators: that the variables they are measuring are only weak proxies, and not fully relevant to the task at hand. In these circumstances (the formative development of a social inquiry method) relevance was favoured over an illusion of precision.
To recap the beginning of this thesis, the central purpose of this research was to develop a viable new method of anticipating the future. The main argument (as presented in chapter 1) is that a viable Process for Scenario Network Mapping has been developed. The research question drawn from that argument was

**What are the characteristics of a scenario-based anticipation process that best meets emerging needs that were identified from the literature of foresighting?**

A review of the literature (chapter 2) concluded that the Process to be developed would be more flexible than normal scenario planning, with readily modifiable possibilities, and more suited to development on a modest scale. A network-based approach to scenarios was used, using many small scenarios rather than a few large ones. Criteria for a suitable Process were identified (chapter 3 and appendix 1). A conceptual framework (chapter 4), embodying a layered view of futures (similar to causal layered analysis) was developed to guide the development of the Process (chapter 5).

The original intention was that a standard method of developing a social inquiry methodology would be found, and that method would be used to develop the Process. However, after finding no such method, one was developed (chapters 6 and 7): a variant of action research, with more explicit use of cycling than normal. Seven case studies were undertaken (chapter 8), and assessed (in chapter 9) against the execution criteria from chapter 3. The broad conclusion was that most criteria were fulfilled to some extent, particularly those relating to implementation and application of findings. Criteria relating to the influence of the Process on participants were fulfilled to a lesser extent. No criterion remained clearly unfulfilled, except the one relating to the convergence of plausibility (E3).

This final chapter includes:
- A comparison of the evidence presented in chapter 9 relating the central argument back to the literature review in chapter 2;
- A critical review of the work carried out, covering the Process itself, the evaluation criteria, the conceptual framework that was developed, and the method of development.
- The limitations of this research and its findings.
- Outstanding issues for further research.
The chapter concludes by assessing the possible contribution to knowledge made by this thesis, in two separate areas: the methodologies of foresighting and of methodological development.

### 10.1 Comparison of findings with literature

The literature review in chapter 2 found that a futures method able to handle emergent issues would have six key characteristics: it would be scalable, verifiable, transparent, nimble, eclectic, and usable:

1. **Scalable.** From the findings of a single exercise, it should be possible to divide or combine scenarios or their equivalents.
2. **Verifiable.** It should be possible to confirm whether an envisaged future is occurring.
3. **Transparent.** The means by which input data become anticipations should be obvious (or at least easily explained) to all involved; this makes it possible to identify and challenge assumptions.
4. **Nimble.** A process which could be completed in a few weeks, if necessary, and updated at least as quickly.
5. **Eclectic.** Able to incorporate a diverse range of input data.
6. **Useful.** Able to help those involved anticipate change — and better attain their desired futures.\(^1\)

To what extent did the final form of the Process fulfil those indicators? As demonstrated in chapter 6, the first four indicators are accomplished by the design of the Process. The use of holons enables scalability, both in terms of time and in terms of social group. The use of small, focused scenarios enables verifiability. In addition, the assessment in chapter 9 of the execution criteria, of which this was one, confirmed that view.

**Transparency** is enabled by the qualitative means of generation of the scenario network, the components of which are developed by participants using simple pen-and-paper technology, then jointly creating a network map.

**Nimbleness** is ensured initially by having four workshops, usually a week apart, with time for data collection and dissemination between them. Nimbleness on follow-up is more pronounced, because holons that turned out to be dead ends need not be pursued, while those of current interest can be expanded (using the scalability property).

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1. The italicized words after the dash were not originally included under “usable” in chapter 2, but were added after finding a strong desire for normative futures, as discussed in chapter 8, section 8.7.2, reflection 6.
Eclecticism, using a broad variety of input data, depends on having the widest possible range of stakeholders involved in the workshops. Though this was inherent in the design of the process, it did not always occur in the execution. One solution, proposed in chapter 9, and to be trialled soon after completion of this thesis, is to partially redesign the Process, to convert execution criteria (sometimes not fulfilled) into design criteria (always fulfilled, as long as the Process methodology is followed).

The sixth indicator, usefulness, must always be an execution criterion: it is an outcome, rather than an output, and as such cannot be designed into the methodology. Much of chapter 9 covers this indicator, divided into specific criteria. One indication of the usefulness of the Process is that elements of it have already been used independently by others. Thus Böhme et al (2004:55), in a study for the European Spatial Planning Observation Network, report being “inspired” by part of the conceptual framework in chapter 4, as reported in List (2004a). However, based on the analytic inductions of case studies reported in chapter 9, it cannot defensibly be claimed that this Process was always found useful, in the sense that it directly contributed to improved futures for all the cases studied.

The key circumstance in which usefulness does occur (from this small sample) seems to be when the top management of an organization feels an urgent need to change, but is not sure how this could be accomplished. In such cases, however, perhaps almost any OD or large-group intervention method might have been equally successful; because the focus in such cases is generally on a short-term future, a foresighting method may not be the best choice.

10.1.1 New developments in the literature

The original review of the futures literature (chapter 2) took place during 2001. Since that time, further developments have become evident – in that literature, and in related areas. After that review, because academic literature lags several years behind professional practice, it became clear that the principle of scenario network mapping was not as unprecedented as it might seem from the foresighting literature. Thus I discovered that defence researchers in the UK, NATO, Australia, Finland, and the USA were using similar methods for anticipating military threats, but often considered them to be methods of operational research, systems dynamics, or strategic management, rather than foresighting or futures studies.

When initially reviewing the futures literature for chapter 2, the Process being designed here was unusual in that it involved a large number of small scenarios, rather than (the conventional wisdom) several detailed scenarios. However, during the last few years, other writers have been publishing similar ideas. In this new century, a number of journal articles have been
published on such topics, many of them not in the futures publications but in the literature of operational research and its offshoots. Morphological analysis and its derivatives such as Field Anomaly Relaxation (FAR), with few publications between 1980 and 2000, have experienced renewed interest. Recent publications in this area include Coyle (2000 and 2004), Dortmans (2005), Dortmans and Eiffe (2004), Lempert, Popper and Bankes (2002 and 2003), Powell and Powell (2004 — following Powell and Coyle, 1997, and Powell, 1999), Rhyne (2003), Ritchey (2002), and Sahin and Ülengin (2003). Though some of these have been mentioned in chapter 2, details came too late to be used in the initial development of SNM.


A third development has been the flowering of causal layered analysis (CLA). I had not initially considered SNM to be a form of CLA, but on studying that emerging literature (particularly in a special issue of Futures, volume 34, number 6, and more recent contributions such as Inayatullah, 2004a, and Voros, 2005), it became clear that the two are very similar in some respects. As human futures are in large part the outcomes of human actions, the layered approach seeks to anticipate the future by attempting to unearth the roots of those actions. Since those actions are rooted in actors’ teleologies, a layered approach almost inevitably involves critical and normative elements. Underpinning the events layer, the key questions are “Who has power? Which futures are they pursuing? What are the desired futures of this entity? And how might those futures be reached, without being derailed by more powerful entities, and without derailing the desired futures of dependent entities?” In the course of this project, these questions became salient, but the only literatures directly addressing them were those of CLA, the closely related area of integral futures (e.g. Slaughter, 2004), and to a limited extent the literatures of conflict management and peacebuilding (e.g. Beyna et al, 2001; Galtung, 1996 and 2000; Glenn and Gordon, 2003; Irani and Funk, 2000; van Geelen, 2002).
A fourth recent trend is renewed interest in large-group and median-group participative processes. From the 1960s to the early 1980s, much was written in this area, on socio-technical systems, the search conference, and related methods (cf. Crombie, 1985), but until the late 1990s, little more was written on this. When the World Bank became interested (Narayan, 1995, found quite conclusively that in international development, participative methods were more effective than hierarchical) others followed. Subsequent writings on the value of participation in world development include those of Blackburn, Chambers, and Gaventa (2002), and the more critical Campbell (2002). In organizational development ("OD") and its successors, new approaches similar to SNM include Bohmian dialogue (Bohm, 1996; Isaacs, 1999) and the related World Café (Brown, 2001; Brown and Isaacs, 2005) and presencing (Senge, 2004). Geurts and Joldersma (2001), Tegarden and Sheetz (2003), and Mathieson (2004) have written on participatory approaches in operational research, including group cognitive mapping. Steil and Gibbons-Carr (2005) have developed a large-group method of scenario planning, flowing more from the large-group intervention tradition than from that of futures studies. Midgley and his associates (Midgley, 2000; Midgley and Ochoa-arias, 2004) have worked extensively on community operational research, further developing the work of Ulrich (1994) and Churchman (1971). My forthcoming paper in Futures (List, 2006) discusses participatory action research in futures work in more detail.

A further recent development has been in concept-mapping software. Initially I knew of only Inspiration and Decision Explorer, but in the last few years, a much greater variety has become available, with details published not in journals but on the Web. Such software includes CMap, Compendium, Octopus Lite (an Excel add-in), Omnigraffle, VisualMap, and several others. Reviews can be found at www.cul.co.uk/software/istruct.htm and on my own site at www.audencedialogue.org/soft-visu.html. Though none of this software was designed specifically for depicting scenario networks, some of is usable for that purpose.

Despite the convergence of these strands of work, I have found no new futures method that closely resembles SNM. Coyle’s (2004) simplified form of FAR is one of the most similar: it produces maps similar to SNM. However, the nodes represent “situations” rather than events, and the holonic and causal layered elements of SNM are lacking from Coyle’s FAR. Another network-based method is Johnson’s (2004) “networks of predictions.” Though this could produce maps similar to those of SNM, the networks are derived purely from content analysis, are not built using a systematic, participative procedure, and are not layered. Thus, despite these recent developments, the SNM method still appears to be unique.
10.2 Critical review of the work

This section reviews four elements of the work described in this thesis: the Process itself (as described in chapter 5, applied in chapter 8 and appendix 4, and evaluated in chapter 9), the evaluation criteria used (from chapter 3), the conceptual framework (from chapter 4), and the method of development (from chapters 6 and 7).

10.2.1 Review of the Process

During the application of the conceptual framework during the Process, various practical weaknesses were identified. Following the case studies and the review in chapter 9, the workshop activities, in the creation of scenario maps, were altered as follows.

<table>
<thead>
<tr>
<th>Table 10.1</th>
<th>Changes in the applied conceptual framework</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
<td><strong>Initial</strong></td>
</tr>
<tr>
<td>Hemisphere model</td>
<td>4 layers: events, motives, values, worldview.</td>
</tr>
<tr>
<td>Leaf of Goals</td>
<td>Undifferentiated in the vertical dimension.</td>
</tr>
<tr>
<td>Futures wheel and backcasting</td>
<td>Create “weaving”, forward from recent past and back from future milestones.</td>
</tr>
<tr>
<td>Paths for backcasting</td>
<td>Not included.</td>
</tr>
<tr>
<td>Midcasting</td>
<td>Name = middlecasting Placed anywhere in centre of scenario map.</td>
</tr>
<tr>
<td>Stakeholder star</td>
<td>Focal entity in centre, surrounded by first-level actors.</td>
</tr>
<tr>
<td>Envisioning preferred futures</td>
<td>Not included – regarded as deleterious.</td>
</tr>
</tbody>
</table>

However, even if the workshops had been conducted perfectly, another problem remains: the issue of all actor groups being fully represented. Despite ever-increasing efforts on my part throughout the sequence of case studies to ensure that all relevant groups were participating, this did not always occur. Even in the SC case study, the most successful in terms of stakeholder representation, the less-interested members were—almost by definition—not included. Those who were quite happy with SC would not want to waste five Saturday mornings considering its future. The only solution to this difficulty is probably to organize an environment in which less-interested people can participate easily, perhaps using a central venue, in the manner of the charrette process (Lennertz, 1999). As noted in chapter 8, section 8.8.3, this change should ideally become part of the Process design, to ensure its execution as long as the Process is followed faithfully. Taking into account the above findings, a manual was prepared for a revised version of the Process. This is reproduced in Appendix 5.

10.2.2 Review of the evaluation criteria

As the case studies took place, the evaluation criteria—particularly those related to execution—were frequently modified. The final list of criteria, as used in chapter 9, is shorter than the original list (from 19 execution criteria to 13) because some of the original criteria were so similar that their attainment could not easily be separated in practice. By the same token, the amalgamated criteria were broader than the original ones, and thus their evaluation had to be less specifically directed. The problem is thus one of attaining a suitable balance between highly specific hypotheses (as in a typical hypothetico-deductive study, the execution of which can be tested rigorously) and more general propositions, which accommodate more variation in the means of fulfilment, but the successful execution of which is more arguable. The present study may have erred in the latter direction, but for developing a method, my contention is that the broader criteria are more useful when using a formative approach.

Was this an appropriate way of testing a new method?

Some might claim that the criterion-based approach used here was not the most productive way of testing a new and still-developing method. Given that no evidence could be found of such an approach having been used for the development of any previous social inquiry method, and that most methods seem to have developed intuitively, is the laborious approach of defining criteria and testing the method against them any improvement?

My argument is that the criterion-based method used here, because of its rigour, is likely to result in a shorter development time—when combined with the explicit use of action research cycles. In the absence of the action research component, a criterion-based development
method would certainly result in rapid iteration to the point where the criteria were being met. However, if cycling had not been actively used to modify the criteria, the danger would be that a method would have met its original criteria perfectly, but would not be relevant to the needs of its potential users.

Also, despite the obvious limitations of the same researcher both establishing criteria and evaluating them, no other useful method of evaluating foresighting has so far been found. For example, Glenn, Gordon, and Dator (2001), reviewing previous attempts to evaluate futures work, note that findings have been inconclusive. Georghiou (2003) reviewing the evaluation of national foresight programs, reaches a similar conclusion. Thus I suggest that, even though this study may also be inconclusive, its multiple-criteria-based approach, adapting the Kirkpatrick model, has enhanced the development of a method that at least provides a way of viewing the future — even if such views are not applied by the participating entities.

10.2.3 Review of the conceptual framework
The conceptual framework could be divided into two: the more theoretical aspect (covered in chapter 4: the axioms and components), and the more applied aspect (in chapter 5). With the theoretical aspect, minor changes were made, mostly in the set of axioms. Chapter 4 as it stands includes those changes, which had no effect on the development of the Process.

10.2.3.1 Relating the Leaf of Goals to the levels of the hemisphere
The major uncertainty in the conceptual framework applied to the relationship between the Leaf of Goals and the hemispherical model. Both were useful in practice, but the precise nature of their obvious interrelationship was not clarified until the last case study. In some circumstances it seemed possible to align the Leaf of Goals with the hemisphere layers: moving toward the right on the Leaf is similar to moving down through the levels, particularly for the top two layers: events and motives. In principle, though the two are not quite commensurable. This again reveals the difference between chronos and kairos: The Leaf of Goals embodies kairos: the future of purpose. Chronos corresponds to left-right movement on the hemisphere. Descending through the hemisphere is not quite the same as kairos.

A way to view the two together is to superimpose the Leaves of Goals (one for each actor group) onto the hemisphere, as in the following diagram:
In this view, the Leaf of Goals can be seen as a scoop that gathers together motives, and feeds them up into events. The movement is upward and to the left: in other words, from visions toward actions, and from long-term goals to short-term. The long timescale of the bottom layer corresponds to strategic goals at the right of the leaf; visions drive medium-term intentions in the centre of the leaf, and motives drive short-term tactics to the left of the leaf. At the upper left point of the leaf, those tactics guide the actor’s decisions about activities.

The width of the leaf at each point along its length corresponds to the number of options available: a few visions, a few more options for immediate action, but a larger range of possible tactics (driven by motives) and strategies (driven by visions). The important point revealed by the above diagram (which I had not realized initially) is that the movement along the Leaf of Goals is from right to left, which seems counter-intuitive: but the leaf is teleological, not chronological, and long-term aspirations can drive present actions.

Though the above diagram is obviously a gross oversimplification, the purpose of that framework is usefulness: it was designed to help participants frame and distinguish the possible future actions of actors who might affect their entity’s future. A tacit understanding of the various actors and their likely future behaviour is thus intended to create more realistic scenario maps.

10.2.3.2 Simplification of the framework
In summary, the case studies led to the simplification of the original conceptual framework, as published respectively in List (2001b, 2004a) and List (2002a, 2003a, 2004d). The original concept of the hemisphere, with four layers, each influencing the one above it, did not clearly correspond with the reality of the cases. Though the first two layers (“events” and “motives”) were substantiated, the original lower layers of “values” and “worldview” could not be found to demonstrate a clear chain of influence. Though I made numerous attempts at modifying the conceptual framework to more accurately represent the influences on decisions, these
models were so complex that they could not readily be applied in workshops. As the original purpose of the conceptual framework was to create a minimal underpinning for the Process, the decision was made to apply Occam's Razor and remove unnecessary complexity. The original fourth layer, "worldviews," was found not to be a layer, but to pervade all the other layers.

10.2.4 Review of the development method

Two issues arose in reviewing the development method: the use of action research cycling for generalization, and the need to clarify the issue of facilitator involvement.

10.2.4.1 Action research cycling for generalization

The diagram of action research cycles shown in chapter 7 (Figure 7.2) includes an outer loop representing inter-case reflection. This implies that reflections from each case would be applied to the next case. However, due to the long time (months) it took to organize each case, and the time limits for this thesis work, often it was not possible to apply reflective changes to the subsequent case. The result of these two factors was that reflections from one case found solutions in another case that occurred up to several years later. For example, the problems with the morphological framework developed in the RN case (mid-2001) led to a revision of the Leaf of Goals concept in the Iraq case (early 2003). Thus, instead of representing the application of reflection between cycles thus (with arrows showing considerations carried forward) ...

![Figure 10.2 Simplified form of Figure 7.2, showing only between-case cycles](image)

...the use of reflection could be more accurately represented thus...

![Figure 10.3 More complex transmission of reflections between cases](image)
In explanation of Figure 10.3: I did not initially realize that my design for between-case reflection had been incomplete. While it is true that cycle 1 produces implications that can be used in cycle 2, which then has implications for cycle 3, and so on, it also is also true that for each new cycle, reflection dwells on all previous cycles, seeking learning from earlier cases that could be relevant to the new cycle. This is analogous to the difference between generalization (in the positivist sense, as exemplified by Cook, 1991) and its qualitative parallel of transferability (Lincoln and Guba, 1985). Generalizability is an output ("Are these findings generalizable?") while transferability is an input ("What previous findings can be applied in this situation?"). The general view among writers on action research (Carr and Kemmis, 1986, for example) is that reflection is an output. Because it occurs after the action phase, this normal form of reflection could be labelled post-reflection. However, another form of reflection, that might be labelled pre-reflection, involves reflecting on a variety of past situations in order to solve a new problem – similar to the retrospective sensemaking of Weick (1979) but with more emphasis on subsequent action. This is represented by the left-pointing arrows in Figure 10.3.

Another factor that standard post-reflection does not reveal is that a new situation can change old knowledge. Notably, in the present study, the original plan was that scenario networks would not include any element of the normative. A scenario map would show a wide range of possibilities, of which some paths might be more desirable than others. But late in the development of the Process, I finally realized that the main reason why the entities I had been working with wanted to examine their futures was that they had a strong impulse to work towards futures that they desired. Most of them had identified specific desired outcomes, but could not see a clear route to attaining them – hence their interest in working with the Process. This applied in almost every case study, but it took five case studies before I belatedly realized that the initial plan for the Process was mistaken in excluding normative futures. One implication of that finding is that learning is slower when unquestioned, so it would be better to develop a Process with other people who are equally involved. (Though I frequently discussed the Process with friends and colleagues, none was involved enough to keep up with the changes.)

10.2.4.2 Process consultation vs. involvement
The initial intention was that my own role (apart from being an observer in the research process) with each case would be purely consultative, in the sense of Schein (1988): the client or entity I was working with was expected to find its own futures. In practice, with most cases, I became drawn into the activity to some extent; if not during the workshops, then during the planning sessions. The following table notes the extent of my involvement.
The above table covers my role in the workshops and substantive interviews. What I did not realize till late in the project, however, was that preliminary planning sessions and follow-up sessions were in many cases as important in providing material for scenario maps as were the formal workshops. However, none of these involvements was as pronounced as Schein's (1988) medical model, in which the consultant diagnoses and solves problems. The closest approach to that was in the service club case, in which (at the clients' request) I helped formulate an application of multiple futures within that organization.

Reflecting on reasons for this role creep, it occurred because I became drawn into the organizations I was working with. They were helping me by co-operating with the Process and I thus felt it would have been unethical to refuse to help in return, according to the "principle of beneficence" of Beauchamp et al (1982, p19). However, in order not to influence the main part of the Process, I refrained from any advisory involvement until almost at the end of the work with that entity.

10.2.4.3 Limitations of the initial concept
Towards the end of the fieldwork, notably in the service club case, I at last noted the limitations of the initial concept: of developing a methodology. With the service club, I realized that part of the problem with fulfilling the workshop design was that I was trying to impose on the participants an arduous methodology. Though simple and obvious to me – because I had worked on it with five previous cases – it seemed arcane and impenetrable to some participants. I now suspected that the methodology was simply too complex for others to follow. Even though I made a point of being flexible in the facilitation, perhaps the methodology itself, simply by virtue of being a methodology, was unrealistically ambitious. The test will be if others use it, in anything approaching the form laid out in Appendix 5.
10.3 Limitations of this research

Four types of limitations and reservations were identified: the small sample, the restricted scope of the sample, the possibility of investigator bias, and the possibility of a placebo effect.

10.3.1 Limitation 1: small sample
The total number of case studies was seven, and the total number of participants was officially 89 (though in fact more). Because new information was still obtained in the final case study, the point of sampling redundancy, when no new data is being added (Lincoln and Guba, 1985, p202) has not quite been reached.

10.3.2 Limitation 2: restricted sample
The sample had two clear limitations. Firstly, all but two of the cases were based in South Australia. Secondly, none of the cases involved the future of an abstract concept, though the content analysis of published futures studies described in chapter 7, section 7.1.3, had classified 41% of those articles as including such futures. (This was not for want of trying, but it turned out that such studies were difficult to organize, due to their lack of constituencies.)

10.3.3 Limitation 3: the possibility of investigator bias
A limitation perhaps inherent in qualitative theses is the possibility of investigator bias; here, particularly in respect to chapter 9. In such cases, the chief investigator serves as “judge and jury” and may feel under psychological pressure to report that the null hypothesis (or its qualitative equivalent) was rejected. One solution might have been to have others review the conclusions drawn from the data; though I sought somebody to do this, I was unable to find anybody willing to devote the time required: several months’ full-time work. But in this case, the potentially biased investigator now suggests that this was not a significant factor, for several reasons:

1. This has been a formative study, not a summative one (Scriven, 1967). The outcome was never intended to be “this Process is better than method X” or “this Process fulfils all requirements for the new ISO Futures Methodology standard,” but rather “by working through a series of cases, this Process has been steadily improved, to the point where it can now be applied by others, with reasonable confidence of attaining a useful outcome.”

2. Having previously developed two methods of qualitative inquiry (as described in Chapter 6, section 6.2.1.3) I have both a realistic view of the time-frame and effort needed for such a project, and little to gain from prematurely claiming the present method to be viable.
The International Association of Facilitators' Statement of Values and Code of Ethics (2002), the spirit of which is deeply ingrained in my facilitation and moderation work, states that "We are vigilant to minimize our influence on group outcomes." Though the term "outcomes" seems deliberately vague, the principle's intention in this context is clear: not to influence the content of outcomes. It would be pointless to try to do that: even if a specific sample could be influenced, this would not affect the population from which it was drawn, the active consent of which would be required for any consequent action.

10.3.4 Limitation 4: the possibility of a placebo effect
One might argue that, though this Process has been reported as successful, perhaps the same result would have been obtained from any futures process. Though Kienle and Kiene (1997) in a review of Beecher's widely-reported 1955 paper on the placebo effect, reported that such effects have seldom been identified, and though Draper's (2004) comprehensive review confirmed that expectancy effects in general are not common, this remains a possibility.

However, as noted in chapter 6 (section 6.2.2, Issue 3), demonstrating the presence or absence of a placebo effect would require an enormously expensive and time-consuming experiment. Also, because many criteria were not evaluated solely on the basis of participants' reactions, a placebo effect could account for only part of the findings. On the other hand, given the nature of this study, it was not possible to demonstrate conclusively that the usefulness of this Process was specifically due to the nature of the Process. It is possible that the use of any other method of facilitated workshops could have led to similar organizational outcomes.

10.3.5 Limitation 5: Coverage of multiple perspectives approach
Linstone (1984, 1999) and Mitroff and Linstone (1993) discuss the multiple perspectives approach using the TOP typology, in which T represents the technical perspective, O the organizational, and P the personal. This approach, though familiar to the author and often borne in mind, has not been explicitly woven into scenario network mapping. It may have been advantageous to have more deeply embedded this approach into the SNM methodology. One consequence of this lack of embedding has been that the methodology does not explicitly recognize the differential level of time discounting inherent in the three perspectives: the short-term horizons of the personal, the medium-term horizon of the organizational, and the long-term horizon of the technological perspective. The assumtional analysis of Mitroff and Linstone (Linstone, 1999, p283; Mitroff and Linstone, 1993, p144) would also be useful in creating a Leaf of Goals for each main actor group.

10.3.6 Implications of the above limitations

What is the likely impact of the above limitations on the findings? The small size and restricted scope of the sample restrict generalizability of findings. There is certainly no assurance that use of the Process to study the future of a concept will produce outcomes that meet the criteria for usefulness; this is yet to be tested. However, as explained in the previous two sections, there are no grounds for belief that investigator bias and placebo effect significantly impacted on the findings. The major implication is that the project is not yet completed. Further work is needed, outside the restrictions imposed by doing this as a doctoral thesis.

10.4 Outstanding issues for further research

Following the review of execution criteria in chapter 9, as well as the modifications to the Process that arose from that, and the above catalogue of limitations, considerable work remains to be done. The main research issues are:

1. To what extent will SNM work in settings outside those in which it has so far been tested – for example, in other cultures, and in other languages?
2. To what extent will other interpretations of the method influence the Process and the outcomes? (It is likely that others who decide to apply SNM will vary some elements.)
3. Can the method be further simplified without losing its essence?
4. Since the preparatory meetings are used to decide which actors to include, and can occupy as much time as the workshops, guidelines should be created for those meetings, then evaluated against the design and execution criteria in the same way as for the main workshops in this thesis. For this, some new criteria will be needed.
5. It would be possible to create software to supplement (or even replace) the workshop method, thus allowing incorporation of the views of people unwilling or unable to attend four half-day workshops – but would the use of such software inhibit communication and thus the comprehensiveness of the scenario networks?
6. An extension to SNM is the possibility of creating a methodology for what might be called Emerging Constructs Analysis, as described in Reflection 5, section 8.4.2, on the war in Iraq. Some preliminary work suggests that such a method could be useful in studying the future of a concept: a type of future not included in cases for this thesis.

It would be useful to seek a situation in which control groups can be used. In retrospect, I missed a useful opportunity with the credit union case, which used two sets of workshops. Though it was helpful to compare the scenario maps produced by two well-matched groups in
the same organization, it might have been even more helpful to use two different methods, comparing SNM with, say, a set of scenarios generated by the Critical Uncertainties method.

The above questions can potentially be answered in several case studies that were not ready in time for the case studies, but are still imminent. Two in particular are:

1. a study of the future of lifelong learning in a suburb of Adelaide (the future of a concept: included in the original sample design but not carried out);
2. the continuation of the Barossa Valley project, but on a smaller scale than originally planned, as the second (large) grant application has been unsuccessful.

Both of these, being geographically based, are scheduled to use the charrette-like "rolling groups" format. It is also possible that the publication of this thesis (and the manual in Appendix 5) will stimulate further use of the Process by others. This could result in an independent evaluation of the foreshadowed changes, as well as the practicality of the SNM Process as a whole, when administered by people other than its originator.

10.5 Conclusion

It is hoped that this thesis has made a contribution both to practice and to theory. Its contribution to practice includes (a) the development of a viable (though still imperfect) method of foresight, and (b) the development of a method for developing new methods of social inquiry. The contribution to theory is twofold. The comprehensive conceptual framework in chapter 4 (with its axioms, "formula for the future," stakeholder-impingement model, hemispherical layered model, and Leaf of Goals) has broad application to the futures of human groups. The action research model (chapters 6 and 7), conceptualizing methodological development through a succession of triangular iterations (chapter 7: figures 7.2 and 7.3), could be used to guide the development of any social inquiry method, including qualitative research and OD large-group intervention techniques. Reviewing those elements (as well as other minor innovations noted in earlier chapters) it is not unreasonable to claim that this thesis has fulfilled the requirement of an original contribution to knowledge. It would have been heartening to be able to conclude the case studies with one in which everything worked flawlessly. On the other hand, continuing to add new cases in the hope that a perfect solution would eventually be reached would probably have uncovered more (though successively smaller) problems. I argue, however, based on the case studies completed to date, that enough has now been learned that the Process can be offered to other potential users, with reasonable assurance of their obtaining some useful outcomes.


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A1.1  The uneasy relationship between scenarios and prediction

To complement chapter 2, which searched the theoretical literature of futures studies and from that deriving some criteria for evaluating a method, this paper takes an empirical approach, comparing a group of published scenarios for the year 2000 with the outcomes in that year. Even though scenarios are not intended to be predictions, by making such a comparison, it was expected that some problems with the practice of foresight might emerge that were not evident from the previous chapter.

Though modern scenario planning disavows any pretence of prediction, Bell and Olick (1989) argue that some form of prediction is inherent, or implied, in any futures studies exercise. Among scenario developers it is recognized that no scenario will be accurate, no matter how large the ensemble (van der Heijden, 1996; Schwartz, 1991; Slaughter 1995a). However, the clients of futurists may reasonably hope to find the eventual outcome lying somewhere in the dimensional space filled by the scenarios. In fact, the currently most common method of scenario building, the “critical uncertainties” approach, explicitly searches for the two or three most critical dimensions on which the future might vary, by first creating a hypercube of that number of dimensions (i.e. a square for two dimensions, or a cube for three dimensions). The next step is to create an ensemble of scenarios that correspond to the vertices of the hypercube. If those dimensions are well chosen, the outcome must, by definition, lie somewhere within that hypercube.

Though single scenario can ever expect to fully predict an outcome, if a study has examined a comprehensive scenario space, it should be possible to locate the eventual outcome somewhere in that scenario envelope. The most useful results are likely to be achieved when the outcome, as it materializes, reveals a position similar to one of the scenarios. In that case, the users of the scenarios can point to a metaphorical map, saying “now we are here.” If they have already identified the likely consequences of that position, they will be in a position to take appropriate action. Though this approach may be controversial among the advocates of the

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1. An earlier version of this paper was presented at the conference “Innovation and Social Development in the Knowledge-Based Economy/Society,” Dubrovnik, Croatia, May 2004 (List, 2004e).
“scenario learning” position (such as van der Heijden, 1996), it is supported by Slaughter, one of the most respected futurists of the present time:

It is logically barred to us that we could ever have future facts about human and cultural systems. So we move to the next best option. That is a provisional, but fairly detailed and grounded picture, or view, of the terrain ahead. This view is continually informed and updated as events occur and our interpretations of the world change. (Slaughter 1995a:32)

In fact, the above passage (like the next, from the same book) can be interpreted not only as a justification for the approach taken here, but also as a broad description of scenario network mapping:

In general terms, the purpose of futures work is not, as I have indicated, to predict. It is rather to ‘map’ the near-term future insofar as this is possible with the knowledge of, and from the vantage point of a particular point in time. Like any map, including maps of the physical world, there will be much that cannot be represented. But the futures map does try to indicate such things as areas of danger, areas needing attention and a range of directions, options and alternatives. Given that people have had so much practical experience in foresight, no-one should have too much trouble ‘reading’ this futures map. (Slaughter 1995a:51)

However, this is not prediction in the generally accepted sense of the term (as critiqued in chapter 3). A more appropriate word, used in this study, is foresightfulness: it implies a level of foresight which turns out to be justified by later developments.

A1.2 Basis of this analysis

Bearing in mind Slaughter’s and Bell’s views, and my initial hope that SNM might enable scenario users to place their entity somewhere on the metaphorical territory of a map of the future, it seemed useful to compare the “predictions” of various foresighting techniques (particularly scenario planning) to outcomes. The aim of this content analysis was to develop an understanding of the problems involved with the development of foresighting, so as to be able to find some ways of overcoming them.

In order to assess foresightfulness, this study sought anticipations of a wide range of types (particularly scenario ensembles), which met all of the following criteria:

1. extending over an outlook period extending from at least 5 years ahead (because a shorter time span would make the assessment of outcomes more ambiguous);
2. whose target dates had already passed;
3. for which the outcomes data would already be available.
Because much had been written anticipating the millennium year 2000, and also because it had recently passed, I chose that year as the target date, and searched for published anticipations to review in this process. (The word “anticipations” is used here to refer to any kind of description of a possible future, including but not limited to scenarios; the word “foresight” here has a similarly broad implication.) The specific questions addressed were:

- For each document: to what extent did the outcomes match the anticipations?
- How did the degree of matching vary according to the scale and type of foresighting method used? And what can this tell us about the effectiveness of each foresighting method?
- To what extent did the matching increase with proximity to the target date? Specifically, were the later anticipations closer to outcomes than the earlier ones, and was there any point at which the outcome suddenly became generally “correct”?
- What general problems became evident on reviewing these anticipations?

Answers to these questions are addressed in sections A1.4 to A1.7 below, and section A1.8 offers some lessons for a futures Process.

### A1.3 Summary of studies

I obtained abstracts, reviews, or full documentation for 128 anticipations that had been published before the main cut-off date of 1995 (or 1997 for the ICT industry, which changes rapidly). The following table shows the number of works for which some details were found, and the numbers used in this review.

<table>
<thead>
<tr>
<th>Type of work</th>
<th>Found</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single scenarios, developed in detail - “fiction,” utopias, intuitive reports: De la Bretonne (1771), Bellamy (1888), Morris (1890), Kipling (1905), De Closets (1978)</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Scenario ensembles, created in formal scenario planning</td>
<td>64</td>
<td>7</td>
</tr>
<tr>
<td>Sample surveys: Gallup and Proctor (1984), Ornauer et al (1976)</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Other types of scenario and anticipation (mainly econometrically based)</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Uncertain - have not found enough detail to determine</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>128</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
Unfortunately, many of the 128 studies could not be evaluated in detail, for one or more of the following reasons:

(a) The full report was unobtainable;
(b) The report was in a language that I could not read;
(c) Outcomes could not be evaluated, for lack of data on the situation in 2000;
(d) The study provided insufficient detail for outcomes to be evaluated;
(e) The study turned out to use only econometric or mathematically derived scenarios on a small range of variables, rather than scenario planning. This was the commonest reason for exclusion.

After allowing for those exceptions, the final sample was chosen on a purposive basis. That purpose was to collect documents from a wide range of different anticipatory approaches (but particularly scenarios), in order to both compare the effectiveness of these different approaches and to discover problems that might be overcome with a new method. Documents with later published reviews were favoured. The final sample included 15 studies. The following table describes these, using the following headings:

<table>
<thead>
<tr>
<th>Name of study</th>
<th>Reference</th>
<th>Base year</th>
<th>Area scope</th>
<th>Subject scope</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>A brief name, used to refer to this study throughout this document.</td>
<td>The major published document on this study.</td>
<td>The year the study was performed or completed. When no information was supplied in the document, the year before publication appears here, italicized.</td>
<td>When this is not explicitly stated in the document, the country or area of origin is italicized.</td>
<td>The content focus of the study.</td>
<td>Distinguishes between intuitive (e.g. science fiction writers) and expert intuitive (an intuitive forecast, informed by extensive domain knowledge).</td>
</tr>
</tbody>
</table>

Studies in the table are arranged in a sequence from largest to smallest scope: firstly, general, worldwide studies, then general country-based, then industry-based, and finally studies of a single industry in one country. The discussion below the table follows the same sequence.
### Table A1.2 Anticipations of 2000 Included in this Review

<table>
<thead>
<tr>
<th>Name of study</th>
<th>Reference</th>
<th>Base year</th>
<th>Area scope</th>
<th>Subject scope</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Year 2000</td>
<td>Kahn &amp; Wiener (1967)</td>
<td>1966</td>
<td>world</td>
<td>general</td>
<td>1 main chain scenario, with derivatives; also forecasts and modelling</td>
</tr>
<tr>
<td>OECD Interfutures</td>
<td>Norse (1979)</td>
<td>1976</td>
<td>world</td>
<td>International economic development</td>
<td>Scenario planning by team of experts</td>
</tr>
<tr>
<td>Today Then</td>
<td>Walter (1992)</td>
<td>1893</td>
<td>USA</td>
<td>anthology: comprehensive</td>
<td>Expert intuitive</td>
</tr>
<tr>
<td>Poland in 2000</td>
<td>Wierzbicki (1991)</td>
<td>1985-89</td>
<td>Poland</td>
<td></td>
<td>Scenario planning (3 scenarios)</td>
</tr>
<tr>
<td>Europe 2000</td>
<td>Hall (1977)</td>
<td>1974-76</td>
<td>Europe</td>
<td>Comprehensive, etc</td>
<td>Team of experts</td>
</tr>
<tr>
<td>Information commerce</td>
<td>Randall (1997)</td>
<td>1996</td>
<td>USA</td>
<td>Business use of the internet, etc</td>
<td>Critical Uncertainties scenarios, with drivers</td>
</tr>
<tr>
<td>As We May Think</td>
<td>Bush (1945)</td>
<td>1945</td>
<td>USA</td>
<td>Information technology</td>
<td>Expert intuitive</td>
</tr>
<tr>
<td>Telecom 2000</td>
<td>Telecom Australia (1975)</td>
<td>1975</td>
<td>Australia</td>
<td>Telephone communications</td>
<td>Mixed methods, no scenarios</td>
</tr>
</tbody>
</table>

Each of the 15 studies is now compared on the five research questions raised in section A1.2 above.
A1.4 To what extent did the outcomes match the anticipations?

On this first issue of inquiry, each study is compared separately, beginning with a brief summary of the study.


<table>
<thead>
<tr>
<th>Topic:</th>
<th>The natural world as it could be in 2000.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Computer analysis, using a modified version of the econometric model developed for the Club of Rome, and described in Meadows et al. (1970) and Mesarovic and Pestel (1972).</td>
</tr>
<tr>
<td>Output:</td>
<td>A set of numerical parameters of major economic, social, and environmental measures.</td>
</tr>
</tbody>
</table>

This generally pessimistic book was followed by The Resourceful Earth, an optimistic riposte produced by Simon and Kahn (1984); outcomes generally fell between the two. Chenoweth and Feitelson (2005) compare Global 2000 and The Resourceful Earth in the context of a debate between Neo-Malthusians (the former) and Cornucopians (the latter), concluding that “as a whole The Resourceful Earth was more accurate”. Cole (2005) somewhat disagrees with Chenoweth and Feitelson’s conclusions, emphasizing their commonalities, taking a similar approach to that of Richardson (1985). Dator (2005), also commenting on Chenoweth and Feitelson, also disagrees with their conclusion, and points out that both books were intended more as political influences than as scientific prediction. My own view is that on many issues (such as world population) both books produced broadly accurate projections, but neither anticipated the widening gap between different groups of countries - such as life expectancy rising in rich countries while falling in Africa, perhaps because at the time economists were generally focused on aggregates rather than on distributions; cf. Atkinson (1982).

Study 2. The Year 2000 (Kahn and Wiener, 1967)

<table>
<thead>
<tr>
<th>Topic:</th>
<th>The world (on a macro scale) in 2000.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Eclectic one, incorporating forecasts and projections as well as scenarios, which appear to have been intuitively derived.</td>
</tr>
<tr>
<td>Output:</td>
<td>One main “surprise-free” scenario, with a set of eight “canonical variations”, in three groups: more integrated worlds, more inward-looking worlds, and worlds with greater disarray.</td>
</tr>
</tbody>
</table>
The more general anticipations were expressed so vaguely that it is not possible to say precisely whether or not they occurred: for example, "the rise of new great powers" (could that include the EC or China?), "new political, perhaps even 'philosophical' issues" (to what extent can an issue be described as "new", versus a refocusing of an old issue?). Clearer anticipations were often not borne out: there are no indications that communism might end, and the rapid economic growth in China that occurred in the 1980s and 1990s was regarded as unlikely. Of a list of 100 technical innovations, 30 were clearly in use by 2000, 50 were not in use, and the other 20 were uncertain.

Some of the outcomes foreseen in a later but similar book by Kahn (1976) were reviewed by Galtung (2003b). On comparing 11 of Kahn’s predictions for Western Europe in 2000 with the actuality, Galtung found only 7 to be substantially wrong, and 4 to be partially wrong, including the "normalization of both Germanies." As Galtung suggests, Kahn had the US government as his major audience, and the findings may have been coloured by that.

**Study 3. Interfutures (Norse, 1979)**

<table>
<thead>
<tr>
<th>Topic:</th>
<th>The economic prospects of the world in 2000,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Economic modelling was used, but as an input to the scenario planning process, not as an output in its own right.</td>
</tr>
<tr>
<td>Output:</td>
<td>Six end-state scenarios, with a limited analysis of dynamic paths leading to some of the end-states defined. Three scenarios were slight variations on a theme. The report also produced a &quot;mixture&quot; scenario, preferred as being most plausible.</td>
</tr>
</tbody>
</table>

The "mixture" scenario (though lacking specific numbers) is closest to the economic climate of 2000. A remarkable characteristic of these scenarios is that, in a supposedly world-wide study, they completely ignore the "Communist bloc" (as it was then). Thus its dissolution is simply not envisaged. Though almost no other writers envisaged a dissolution, except Shell Oil's scenario group (Bennett and Khalifa, 2000), and to some extent Ayres (1979, pp37-38), with a retrospective claim by Dewar (2002, p190), the failure of this study to even consider the Communist bloc must be regarded as a weakness - particularly given its proximity to Western Europe, which was the focus of the study, and the fact that the study did include other continents.

| Topic: Images of the world in the year 2000, among the general public and experts. |
| Method: Surveys of 11,000 people in 10 countries, and of experts. |
| Output: Responses to individual survey questions. |

In a follow-up report to this study (Galtung, 2003a and 2003b) the findings of the 1967 survey are contrasted with the experts' prognostications for 2000, and concludes that while the general public in 10 countries (in aggregate) had fairly accurate expectations of the future, those of the experts (discussed in detail in Galtung, 2003b) were generally wrong, because those experts "see the world from above, in a system perspective, from the vantage point of the rich and powerful." He concludes that "the most relevant question to an expert is not what do you see, but who paid you?" These remarks are reinforced by the generally poor performance of experts in studies 7 and 8 (below).


| Method: Three scenarios were developed by experts. |
| Output: Scenario 1. low openness, low co-operation: i.e. revival of protectionism |
| Scenario 2. high openness in international trade, without government economic co-operation: "fluctuations" (seen as most probable) |
| Scenario 3. high openness, and high co-operation (the most desirable for Canada). |

It was clear that in 2000 the G8 economy was clearly (as expected) still in Scenario 2. However, economic growth in China was far above the predicted rate - even in the late 1980s, while Japan's growth was far below the rate expected in Scenario 2. This revealed a problem with these scenarios: the conflation of co-operation and economic openness across all countries: the scenarios did not deal with the possibility that not all economies would fall into the same quadrant. So on the whole, even though the (G8) world as a whole lay in the predicted quadrant in 2000, many of the implications that grew from that scenario were not fulfilled.

Study 6. Europe 2000 (Hall, 1977)

| Topic: The futures (in several aspects) of Europe in 2000. |
| Method: Very large scale study, using full-time workforce of experts. |
| Output: Five scenarios. |
Outcomes are clear: scenario 2 applies ("Western Europe united, with a politically strong EC") and so does scenario 5 ("Explosive change in Eastern Europe"). The latter was dismissed by the authors as "prospects...almost non-existent," despite precedents such as the Prague Spring of 1968. The brief treatment of scenario 5 may have been added as an afterthought, as if the 200 experts noticed at the last minute that Eastern Europe had so far been ignored. The actual outcome, of a strong EC extending into Eastern Europe (at least with "candidate states" in 2000) would have been even more unthinkable than scenario 5. In fact, in the remainder of the book, Eastern Europe and the USSR are mentioned only in passing, on a few pages - yet nowhere is it stated that the scope of the study was to be confined to Western Europe.

Study 7. Today Then (Walter, 1992)

| Topic: The USA in 1992, as foreseen from 1892. |
| Method: 74 contributors were asked to state their expectations for 1992, addressing 33 questions. |
| Output: Given the limitations of the format, most writers devoted only a sentence or two to each question they addressed, and many did not address all the questions. |

In the same way that the questions reflected the times (e.g. those quoted above on the servant problem, temperance, and suffrage) so did the responses. Some of the keenest perceptions came from those who were well-informed, but without vested interests. Thus Thomas Dixon Jr, a lawyer, legislator, and Baptist minister, foresaw a wide range of changes that would occur well into the 20th century - both social and technological, including the increasing complexity of society. On the whole, the record of these experts was poor - as with Galtung's study. For example, though the automobile already existed in the 1890s, and one question specifically asked about the future of transport, not one of the 74 mentioned the widespread use of personal motor vehicles in the 1990s.

Study 8. Forecast 2000 (Gallup and Proctor, 1984)

| Method: Survey of 1,346 opinion leaders in the USA. |
| Output: A book containing the survey results and discussion of them. |

Given the very general nature of the survey questions, outcomes are difficult to compare with these anticipations, but it is clear that the experts were quite wrong on many small details. This book is that it is prescriptive rather than forward looking; it describes its own time much
better than it describes 2000: what the experts regarded as desirable, perhaps, rather than what they expected to happen.


<table>
<thead>
<tr>
<th>Topic:</th>
<th>Macro-scale issues in Poland for 2000.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Large scale study with full time staff.</td>
</tr>
<tr>
<td>Output:</td>
<td>Three normative scenarios, with priorities for (1) energy and resources; (2) consumer demand, and (3) “civilizational progress.”</td>
</tr>
</tbody>
</table>

On comparing the three scenarios from this study with the Economist Intelligence Unit's 2001 *Country Profile for Poland*, (Economist Intelligence Unit, 2001b) the outcome for Poland in 2000 appears to lie between Scenario 2 and Scenario 3, but closer to Scenario 2. Some changes that were expected to arise from Scenario 3, such as an increase in tertiary education levels and a population flow from villages to cities, were well under way in 2000, with the participation rate in higher education rising from 10% in the 1980s to 28% in 1999-2000. The contribution of heavy industry to the Polish economy had fallen rapidly, with increased concerns about pollution and joining the EU. Emissions of dust and of sulphur dioxide approximately halved between 1990 and 1999, partly reflecting the closure of much of the heavy industry that caused the pollution. Given the massive changes arising with the end of Communism in Poland, this study performed well in anticipating the future of the country - except for the political future.

**Study 10. Australia at the Crossroads (Kasper, Blandy, et.al, 1980)**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Large scale study with full time staff.</td>
</tr>
<tr>
<td>Output:</td>
<td>Econometric analysis, from which two scenarios were intuitively derived.</td>
</tr>
</tbody>
</table>

The outcome in this case is very clear: Australia moved decisively toward the “libertarian alternative” in the mid-1980s, with extensive economic deregulation. However, the scenarios were for 2000, not the mid-1980s, and some of the supporting data - derived from forecasting in the two scenario situations - were very wrong indeed. Far from expanding the manufacturing sector at the expense of the service sector, the projected sectoral share of manufacturing in 2000 turned out to be one third less than in 1990.

This study was very likely a contributing factor to the economic policies adopted by the new Labor government after the 1983 election. The presentation of two scenarios, with the
"business as usual" model widely perceived in official quarters as dysfunctional, caused governmental attention to fall on the libertarian scenario, which in turn perhaps eased its accomplishment.


<table>
<thead>
<tr>
<th>Topic:</th>
<th>The Norwegian economy and society in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Large scale study with full time staff.</td>
</tr>
<tr>
<td>Output:</td>
<td>Three scenarios.</td>
</tr>
</tbody>
</table>

These scenarios were compared with outcomes, based on the 2001 profile of the Norwegian economy from the Economist Intelligence Unit (2001a). Of the three scenarios, one was clearly dominant; it foresaw continuing expansion of the welfare state, more influence for women, slower economic growth, and Norway still not being a member of the EC. All of these outcomes occurred. This was an interesting example of a set of scenarios with a background agenda of change, which socially conservative forces prevented from happening. In one sense the outcome of the scenario planning was successful, in that one of the three scenarios was essentially correct. In another sense, the scenario planning was unsuccessful, in that there had been no change; this makes a clear contrast with the Australian scenarios discussed in Study 10.


<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Intuitive foresight by one expert</td>
</tr>
<tr>
<td>Output:</td>
<td>60 predictions.</td>
</tr>
</tbody>
</table>

In 2000, Jencks followed up his 1967 book with a new book, following up the earlier work. In retrospect, he scored his predictions at 37 right, 15 half-right, and 8 wrong - though perhaps an independent assessment may not have been so kind. By my own reckoning, 30 of the 60 predictions were clearly correct in 2000. As many of the predictive statements were not at all "safe" (e.g. the rise of complexity theory and of the post-modern/ neoclassical style of architecture, neither of which existed in 1971) this is a highly successful achievement, perhaps arising through Jencks' thorough immersion in his subject. As an independent commentator rather than a practitioner, he was not in a position to gain from the fulfilment of his predictions.
Study 13. As We May Think (Bush, 1945)

<table>
<thead>
<tr>
<th>Topic:</th>
<th>Technology for knowledge management, but not specifically for 2000.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>Personal intuition, from Dr Vannevar Bush</td>
</tr>
<tr>
<td>Output:</td>
<td>An article in the <em>Atlantic Monthly</em>.</td>
</tr>
</tbody>
</table>

In this article, Bush describes devices that later became the fax machine, digital cameras, hyperlinking, and the "memex" - almost a modern PC, including a mouse with a scrolling wheel, multiple screen windows, and several database-like features that do not yet exist. On the whole, the degree of foresight was remarkable. Since Bush was a chief scientist for the USA during World War II, he was probably informed by a wide range of other scientists, so this article could well be a synthesis of available data rather than the result of pure intuition.

Study 14. Internet commerce (Randall, 1997)

<table>
<thead>
<tr>
<th>Topic:</th>
<th>Commerce on the internet in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method:</td>
<td>The &quot;critical uncertainties&quot; scenario method, interviewing 30 leading experts.</td>
</tr>
<tr>
<td>Output:</td>
<td>Four scenarios.</td>
</tr>
</tbody>
</table>

Comparing data for 2000 with Randall's four scenarios, the only scenario not fully borne out was "Crumbling walls." To a large extent, all four scenarios were true in 2000 - for the Worldwide Web. However the most frequently used facility on the Internet (email) was not even mentioned in this paper, which also failed to anticipate the rapid growth of business-to-business e-commerce. The latter was outside Randall's declared scope, but one might have hoped that 30 leading experts might have drawn his attention to these factors.

Postma and Liebl (2005) made similar comments on Randall’s paper: “if a company had constructed these four scenarios and had been focusing on the drivers without realizing the segmentation, it might have become helplessly confused when interpreting the occurring events because the level of analysis (the Internet) turned out to be inappropriate” (Postma and Liebl, 2004, p8).
This report offers a clear demonstration that what is measurable may not always continue to be relevant: its prediction of the percentage of Australian households with a telephone in 2000 was accurate, but it failed to foresee the growth of mobile telephony. Nor did this study foresee the huge changes in the industry that occurred in the 1990s, in terms of ownership, scale, and customers’ willingness to spend far more money on telecommunications than previously.

However, as Ascher (1981) points out, the most accurate forecasts are those made by authorities that can regulate both supply and demand. Telecom Australia, as monopoly supplier of telecommunications services until the late 1990s had exactly this characteristic. With high latent demand for telephone services in Australia, Telecom Australia, by controlling its rate of connections, was free to fulfil its own forecasts. Had it not been the introduction of competition in the 1990s, the forecasts in Telecom 2000 might have been even more accurate.

Telecom Australia (1978) followed up the 1975 publication with a report on its outcomes. Chapter 4 deals with reactions to the original report, including those from Telecom's own staff. Many responses criticized the emphasis and assumptions in the 1975 report, but only one – from a media organization – was recorded as pointing out the focus on the organization itself rather than its context.

A1.5 How did foresightfulness vary with the foresighting method used?

For each of the 15 studies, the following table considers the level of foresightfulness, operationally defined here as the difference between anticipations and outcomes. The column headings are interpreted as follows:

*Method.* This column summarizes the method/s of anticipation used in the study.

*Scale:* shows the scale of the work, as an estimated number of person-years. As this factor was often not reported, many of these entries are necessarily rough estimates; such entries are followed by a tilde. The person-years figure does not include time spent in data collec-
tion, for either respondents or interviewers; thus the focus is more on the time spent in high-level thinking.

Creators: the category of persons who produced the scenarios or other anticipations: whether experts in the subject matter (for these studies, most were economists), futurists, or members of the general public. "Experts" may include some futurists; not all documents specified this.

Match: a comparative five-point scale (denoted in a semi-graphical form by using between one and five bullet symbols) to rate the difference (in my assessment) between anticipations and outcomes. The comparison is not of course absolute, but reflects a broad ranking of the studies. Thus a single asterisk means "among the lowest level of matching of all this sample" while five asterisks denote "among the highest degree of matching among this sample."

<table>
<thead>
<tr>
<th>Study</th>
<th>Method</th>
<th>Scale</th>
<th>Creators</th>
<th>Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mankind 2000</td>
<td>survey in 10 varied countries</td>
<td>5</td>
<td>11,000 public</td>
<td>*****</td>
</tr>
<tr>
<td>Architecture 2000</td>
<td>intuitive forecasts by one expert</td>
<td>1</td>
<td>1 expert</td>
<td>****</td>
</tr>
<tr>
<td>As We May Think</td>
<td>1 intuitive scenario</td>
<td>&lt;1</td>
<td>1 expert (+advisers?)</td>
<td>****</td>
</tr>
<tr>
<td>Australia at the</td>
<td>2 scenarios: status quo &amp; normative</td>
<td>5</td>
<td>experts, futurist</td>
<td>****</td>
</tr>
<tr>
<td>Crossroads</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perspectve 2000</td>
<td>3 scenarios: critical uncertainties</td>
<td>1~</td>
<td>2 experts</td>
<td>***</td>
</tr>
<tr>
<td>(economic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway 2000</td>
<td>3 scenarios: normative</td>
<td>15~</td>
<td>experts</td>
<td>***</td>
</tr>
<tr>
<td>Poland 2000</td>
<td>3 scenarios: normative</td>
<td>10~</td>
<td>experts</td>
<td>***</td>
</tr>
<tr>
<td>Telecom 2000</td>
<td>modelling, forecasting</td>
<td>10~</td>
<td>experts</td>
<td>**</td>
</tr>
<tr>
<td>Europe 2000</td>
<td>5 scenarios: mixed methods</td>
<td>200~</td>
<td>experts</td>
<td>**</td>
</tr>
<tr>
<td>Kahn &amp; Wiener</td>
<td>1 main + 8 other scenarios, intuitive; forecasting</td>
<td>8~</td>
<td>futurists</td>
<td>**</td>
</tr>
<tr>
<td>Interfutures</td>
<td>6 scenarios: mixed methods</td>
<td>10~</td>
<td>experts</td>
<td>**</td>
</tr>
<tr>
<td>Internet commerce</td>
<td>4 scenarios: critical uncertainties</td>
<td>1~</td>
<td>futurist</td>
<td>**</td>
</tr>
<tr>
<td>Forecast 2000</td>
<td>survey of 1,346 experts</td>
<td>2~</td>
<td>1,346 famous people</td>
<td>**</td>
</tr>
<tr>
<td>(Gallup)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global 2000</td>
<td>econometric modelling</td>
<td>20~</td>
<td>experts</td>
<td>**</td>
</tr>
<tr>
<td>Today Then</td>
<td>survey of 74 experts</td>
<td>2</td>
<td>74 famous people</td>
<td>*</td>
</tr>
</tbody>
</table>

Before discussing the implications of the above table, there are three types of reservation to be taken into account: the possible effects of selection bias, limitations of the outcome
A1.5.1 Possible effects of selection bias

A commonly noted problem with assessing predictions is that the less successful predictions tend to be quietly forgotten (Sherden, 1998). Therefore, a search of the published literature is likely to under-represent forecasts that were well off the mark. For example, Vannevar Bush (1945) is much cited, perhaps because of his prescient image of the Internet. Acknowledging that this affirmative bias may exist among the documents found for this project, the issue is to what extent it might differentially affect the different types of method. For example, were the more successful individual predictions (such as Bush’s) more easily found than the more successful scenario plans, because of the numerous references to the former? For every Vannevar Bush, could there be a dozen Mother Shiptons?2

A strong argument against such bias having occurred in this study is its thorough sampling of original documents, with only the Bush paper sourced from post-2000 citations.

A1.5.2 Limitations of the outcome variable

The Matching scale, the outcome variable in the above table, has several limitations:

Selection of statements for matching. Because many of the documents were entire books, and most of these included hundreds of anticipatory statements, selection of one subset of statements rather than another might produce quite different ratings for outcome matching. To minimize the effect of my own subjectivity, I relied as much as possible on the authors’ own summaries.

Subjective matching. However, the assessment of the matching between the anticipation and the outcome is mostly my own. I originally intended to recruit a group of judges for this task, but inquiries failed to find anybody willing to devote perhaps a full month to reading all fifteen documents being studied, as well as the comparative outcomes data. I attempted to enter this matching process without prejudgements: the purpose here was not to hypothesize that one type of foresighting method produces more “accurate” anticipations

2. Mother Shipton was an English prophet of the 15th century, whose name was attached in Victorian England (Harrison, 1881) to rhymes such as

“In eighteen hundred and eighty one
The end of the world shall surely come.”
than another, but rather to unearth the more subtle factors that made some anticipations closer than others. Though it is possible that another judge might produce quite different results on the Matching score, I presented tentative findings at both a local seminar and an international conference – to audiences predominantly of economists rather than futurists. Disagreement was expressed with only one judgement in the above table, and then only mildly. Further, writers who have made similar comparisons of anticipations and outcomes (including Wise 1976, Cornish 1997, Galtung 2003b, and Postma and Liebl, 2004) have drawn conclusions similar to my own.

Given the above reservations, the scoring method was restrained to a simple 5-point scale: finer judgement could have been spurious.

A1.5.3 Could anticipations have influenced their own outcomes?
To some degree, each of the above anticipations could be a self-fulfilling prophecy, or self-negating – the “Oedipus effect” of Popper (1957, p13) or the “bandwagon effect” of Henshel (1982). On the whole, however, the potential influence of most of these studies was low, and none of the above studies could be described as self-negating. However some of the most widely publicized studies were potentially self-fulfilling. This is partly because these studies were (necessarily) published, and published studies tend to describe large entities – such as entire continents. Thus the sponsors of such studies have less scope to influence the outcomes than does (say) an oligopolistic business to influence its own future. The highest influence potential occurs when, for example, a study of a country’s future is commissioned by the government of that country, and one of those futures is officially preferred, and that government remains in power until that preferred future is implemented. This applies to three studies in the above list: Norway 2000, Australia at the Crossroads, and Telecom 2000. For these, the matching score was correspondingly adjusted downwards by one step.

A1.5.4 Comparing anticipations with outcomes
Bearing in mind the above limitations to drawing firm conclusions from Table A1.3, the columns headed Method, Scale, and Creators permit three kinds of tentative conclusions:

In terms of the anticipatory method. In general, the closest matches occurred for intuitive and normative scenarios. (As the Ornauer survey was sui generis, no clear conclusion can be drawn from that.) Critical Uncertainties scenarios did not fare nearly so well; nor did econometric modelling.
In terms of the scale of the project. The largest projects, in terms of person-hours spent, were Europe 2000, OECD Interfutures, and Global 2000. The Polish project, The Year 2000, and Mankind 2000 were also large-scale operations. The smallest projects were Architecture 2000 and *As We May Think*, each involving a single person. Though one might expect that larger projects would produce closer matches, this was clearly not the case. If anything, the correlation was negative. A tentative reason for this is political pressure: a large-scale project, if centrally funded, is likely to face subtle pressures from its funders to produce acceptable findings, and to avoid unexpected outcomes. (There was evidence of this in the Norway 2000 study.)

In terms of the creators of the findings. The tentative conclusion from this very small sample is that the general public (in aggregate) is best at anticipation, famous people are worst, and futurists and experts are in the middle range.

A1.6 What other factors are related to foresightfulness?

This question covers two further points relating to the characteristics of a study: the time lag between anticipation and outcome, and the scope of the study. The following table presents the basic data for this analysis. The column headed Match has the same meaning as in the previous table, with a maximum of 5 symbols indicating the highest degree of matching, and one symbol indicating the lowest degree. The Scope column is a simple categorization: also ranging from 1 to 5 symbols, with the largest scope reserved for studies with global coverage geographically that also covered a very wide range of human activity. At the other extreme, a scope of 1 symbol (not in this sample) would apply to a single business in a single country. Telecom 2000 was scored at 2 points on this scale, because at the time of the study the sponsoring entity was a national monopoly: both one organization and one industry.

Time lag in the following table means the number of years between the year when the study was carried out, and the year for which the anticipation was made (generally 2000).
Table A1.4 Factors related to foresightfulness

<table>
<thead>
<tr>
<th>Study</th>
<th>Scope</th>
<th>Time lag (years)</th>
<th>Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mankind 2000</td>
<td>****</td>
<td>33</td>
<td>*****</td>
</tr>
<tr>
<td>Architecture 2000</td>
<td>**</td>
<td>31</td>
<td>*****</td>
</tr>
<tr>
<td>As We May Think</td>
<td>**</td>
<td>55</td>
<td>*****</td>
</tr>
<tr>
<td>Australia at the Crossroads</td>
<td>***</td>
<td>20</td>
<td>*****</td>
</tr>
<tr>
<td>Perspective 2000 (economic section)</td>
<td>***</td>
<td>12</td>
<td>***</td>
</tr>
<tr>
<td>Norway 2000</td>
<td>***</td>
<td>12</td>
<td>***</td>
</tr>
<tr>
<td>Poland 2000</td>
<td>***</td>
<td>13</td>
<td>***</td>
</tr>
<tr>
<td>Telecom 2000</td>
<td>**</td>
<td>25</td>
<td>**</td>
</tr>
<tr>
<td>Europe 2000</td>
<td>*****</td>
<td>23</td>
<td>**</td>
</tr>
<tr>
<td>Kahn &amp; Wiener</td>
<td>*****</td>
<td>33</td>
<td>**</td>
</tr>
<tr>
<td>OECD Interfutures</td>
<td>***</td>
<td>22</td>
<td>**</td>
</tr>
<tr>
<td>Internet commerce</td>
<td>***</td>
<td>3</td>
<td>**</td>
</tr>
<tr>
<td>Forecast 2000 (Gallup)</td>
<td>***</td>
<td>15</td>
<td>**</td>
</tr>
<tr>
<td>Global 2000</td>
<td>*****</td>
<td>22</td>
<td>*</td>
</tr>
<tr>
<td>Today Then</td>
<td>***</td>
<td>100</td>
<td>*</td>
</tr>
</tbody>
</table>

**Relationship of scope to matching.** Given the qualitative, subjective nature of the two scales, as well as the non-random nature of the sample, statistical testing of this relationship could have been misleading. However, inspection of the above table shows a slight negative relationship between scope and matching, muddied by a few exceptions, such as Mankind 2000. Other things being equal, it seems, a study with a very restricted scope tends to produce a closer match than a study conducted on a global scale.

In this case, there were two other plausible hypotheses that were not confirmed. The first was that foresightfulness would increase with scope, because perturbations at a small scale (such as for a single business) might be averaged out on a larger scale. The other unconfirmed possibility was for a curvilinear relationship, with middle-sized anticipations (such as for a region of a country, or an industry in a region) more successful than larger or smaller ones.

**Relationship of time lag to matching.** Considering the time lag between anticipation and outcome, two questions arose: (1) whether the later anticipations were more accurate than the earlier ones, and (2) whether there was any point at which the outcome in 2000 suddenly became much more obvious (though note, on the latter point that post-1995 anticipations, except in the area of ICT, were excluded for that very reason).
The scattergram below plots the Match variable against the time lag. The obvious hypothesis in this case is that the shorter the time-lag, the more accurate the anticipation. However, the above graph does not confirm the hypothesis at all, with a non-significant negative relationship between the two variables ($r = -0.14$) – though of course with such a tiny sample, the difference would have to be very marked indeed to be statistically significant. Removing the most distant outlier (the Galtung study, the only one with a Matching score of 5) makes the correlation slightly worse ($r = 0.21$) but still not significant at the 95% level of confidence. The conclusion is that there is no clear linear relationship between time lag and matching score.

![Scattergram of Matching against Time Lag](image)

**Figure A1.1 Scattergram of Matching against Time Lag**

### A1.7 What general problems of foresight were revealed in this review?

After working through the above review, various problems with the above anticipations became evident:

**Problem 1: A restricted focus can obscure peripheral changes**

The restricted focus of many of these scenarios prevented their creators from envisaging important peripheral influences — in one clear example, the fact that *Europe 2000* excluded Eastern Europe meant that the project was unable to foresee the possibility of a European Union enlarged to the east, with its attendant potentials and problems. The use of a method such as Critical System Heuristics (Ulrich, 1994), with its focus on establishing the boundaries of a project, could have helped in these cases.
2. Scenarios were more similar to their creation date than to 2000

These visions of the future predicted their own times better than they did 2000. Corn and Horrigan (1984) mentioned a study that foresaw high-speed overhead trains and airships reducing the journey time from New York to San Francisco to no more than 24 hours. Though it is not difficult to guess that this prediction was made *circa* 1930, it would be much harder in retrospect to guess which year the prediction applied to. Also, there were clear fashions in the focus of scenarios. In the 1960s, most were concerned with transport. In the 1970s, the focus moved to pollution and the environment, while in the 1980s it became computers. Scenarios mentioning globalization and sustainability belonged mostly to the 1990s. By paying so much attention to emerging trends and newly popular concepts, scenarists risk overlooking longer-established factors.

**Problem 3: Lack of justification for the target year**

Though the scenarios were labelled as being for 2000, none of them supplied any intrinsic reason why they should apply in 2000 (rather than say 1990 or 2020). This problem is effectively an alternative to Problem 1: perhaps some of the errors described above were due not to poor foresight but to poor estimation of the target year. For example, *Australia at the Crossroads* (Kasper, Blandy, et al, 1980) predicted the world of 1985 more accurately than it predicted the world of 2000. However, a discussion with the second author revealed that the target year of 2000 was chosen almost arbitrarily, and there was no clear reason why the developments foreseen would take 20 years; in fact, many of them had occurred within five years.

**Problem 4: Technological change exaggerated, but social change overlooked**

A useful way to summarize the above scenarios is in terms of the error typology used in statistics, as described in most statistics textbooks (e.g. Abelson, 1995). When the true status of a null hypothesis (H₀) is compared with a decision, four possibilities exist, as shown in this contingency table:

<table>
<thead>
<tr>
<th>Decision</th>
<th>If H₀ is true</th>
<th>If H₀ is false</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail to reject H₀</td>
<td>No error</td>
<td>Type II error</td>
</tr>
<tr>
<td>Reject H₀</td>
<td>Type I error</td>
<td>No error</td>
</tr>
</tbody>
</table>

Thus a type I error is a "false alarm" - the null hypothesis is true, but it is rejected, while a type II error is the failure to observe a true change. Applying this concept to the comparisons of scenarios with outcomes, a type I error corresponds to a foreseen situation that does not
occur, while a type II error is equivalent to the occurrence of an unforeseen situation. Thus those of Kahn and Wiener's (1967) 100 predictions for 2000 that did not occur - such as human hibernation - were type I errors, while the failure of Poland 2000 to foresee the end of communism was a type II error.

Applying this typology to the above studies, it is evident that (in general) technological change was overestimated (type I errors) while social change was overlooked (type II errors). It is useful to consider why this should be so. The over-prediction of technological change seems to be related to the social climate at the time and place of the scenarios' creation. For example, Kahn and Wiener's confident predictions about technology were not made in isolation. Particularly in mid-20th-century USA, there was wide discussion and public awareness of new technological developments. During that period, technological solutions were widely expected; for example, there was much focus on speed records. Ascher (1981) notes the extremely high forecasts for general aviation made in the 1950s for the 1960s: at that time, it was expected in North America that many men would commute by air, often piloting their private helicopters.

Against this demand factor (public expectation of rapid technological development) was a wide range of supply-related factors:

1. It takes many years to develop a technology from a demonstration level (such as one moon-landing) to wide use (mass holidays on the moon);

2. For communications-related technologies, Metcalfe's law (Metcalfe, 1995) applies: that the value of a communications system is proportional to the square of the number of participants. Thus fax machines took many decades to become widely used outside the newspaper industry; there is no value in owning the only fax machine in a inter-communicating group (Petroski, 1996, pp104-119).

3. A chicken-and-egg law applies to sets of technologies that are inter-related. For example, compact disc players are useless without compact discs, and without the efforts of Philips Electrical and Sony – active in both the electronics and music industries – the quick success of this medium may not have occurred. (The other prerequisites, such as audio components, a stable electricity supply, a retail distribution system, and public interest in owning recorded music by that already existed.)

4. Even if a technology exists, the price may be too high for would-be users, and only the eventual interaction of demand with economies of scale can establish financial viability.
5. Governments, influenced by vested interests, play a strong role in technology adoption, even if strong demand exists. Examples are the long-delayed introduction of television in South Africa under the apartheid government, and the legislated ending of analog television broadcasts in various countries around 2010.

6. Even if all the above factors are favourable, there may be insufficient demand for a technology: for example, the video telephone (Schnaars and Wymbs, 2004).

All six factors can cause delays, but there exist few counterbalancing factors that could accelerate the adoption of technologies. One such factor is a national sense of urgency in response to threat, involving government control and massive funding, exemplified by the NASA moon-shot in 1969, the result of a ten-year plan in response to the USSR's satellite launchings in the late 1950s.

Turning next to the reasons for the under-prediction of social change, let us return to the example of commuting by helicopter. One illustration to a future-related article from a US publication *circa* 1960 (which I have been unable to find again, to cite) shows a man taking off in his private helicopter from the front lawn of his house, leaving for work. His wife, wearing an apron, is waving goodbye. In this vision for 2000, men commute by helicopter, while women stay home to do the housework: a classic example of technological over-prediction and social under-prediction. It is useful to reflect on why this error was made. Because the author's focus was solely on technology, the possibility that by 2000 most women might be working was completely overlooked. However, even in terms of the mindset of the 1950s in the USA, the idea that most women would be working by 2000 was probably quite conceivable. What may not have been conceivable in the 1950s was an illustration of the managerial woman taking off to work in her own helicopter, while the "help" (probably a Hispanic woman: in the enlightened twenty-first century, there is no "servant problem") waved goodbye. Factors causing the growing disparity of incomes that would enable such an illustration may not have been visible in the 1950s.

**Problem 5: Scenarios were often not distinct from each other**

From the 1980s onward, most of the references were ensembles of scenarios (rather than single predictions). Often, all the scenarios in an ensemble turned out to be fulfilled to some extent — and, from a post-2000 perspective, all the scenarios in an ensemble often seemed very similar to one another, as noted by Liebl (2002).
Problem 6: Outcomes were specified too vaguely to evaluate
Some scenarios and predictions were written so imprecisely that it was impossible to determine whether they had been achieved or not. Often this arose through a failure to quantify. For example, to say "the level of public health will be higher in 2000" is all but meaningless, because the key variable was not described fully and not even approximate quantification was attempted. Unless some indication is given of prevalence, such statements are almost meaningless.

Problem 7: End-state scenarios were difficult to envisage, lacking detail at human scale
A scenario is intended to be a description of a unified world, but on reading the end-state scenarios, it became obvious that lack of provenance led to a lack of clarity. Thus some scenarios were only vague descriptions of ill-defined attributes; an example is some of the variant scenarios described by Kahn and Wiener (1967). The few chain (sequential) scenarios presented clearer pictures of possible worlds, even though the descriptions of successive states in the chain were usually sketchy. However unlikely these might have seemed in retrospect (e.g. some of Herman Kahn's scenarios for World War III), and however unpopular, they at least had enough coherence and plausibility to provide a basis for action.

Problem 8: Overlooking the personal perspective
Looking at the domains on which the scenarios focused, a concentration on external issues and the macro scale was evident: these were scenarios of the etic rather than the emic, *Gesellschaft* rather than *Gemeinschaft*. Of the studies in Table 2, only that of Jungk and Galtung (1969) extended its coverage to the ways in which people would live and think in 2000. If one accepts the view taken by thinkers including St Augustine (397), G H Mead (1932), and Jaques (1982), that the future exists only in people's minds, to omit any consideration of those minds in 2000 seems a serious omission - particularly if it is also accepted that expectations can create the past as well as the future (Michael, 1985).

Problems noted by others
Some related problems discussed in other writings on the comparison between anticipations and outcomes have been discussed by other writers. Galtung, in his review of expert predictions for 2000, found that "the basic mistake made by the experts quoted is their inability to identify countertrends" (Galtung 2003b:129n). In the present study, such countertrends were not clearly evident, except perhaps the relative decline of the Japanese economy following its
"bubble" in the late 1980s. Several of the above studies, such as Kahn and Wiener (1967) and Interfutures predicted a much stronger economic ranking for Japan in 2000 than eventually was the case.

Kahn and Wiener (1967) include a section entitled "Ways to go wrong." They list ten of these: criteria too narrow; decisions at inappropriate point in the structure; inadequate thought; bad luck; unknown issues or unlikely events; changes in actors; inappropriate models; inappropriate values; over- or under-discounting of uncertainty or the future; and "the best may be the enemy of the good" (implications of which were not clearly defined).

Cornish (1997, p48) identifies as the main problem "shifts in the factors underlying the trends that [the forecasters] had projected into the future." For example, the drop in space exploration funding from the 1970s meant that predictions of human colonies on the moon by the 1980s were not borne out. Another common problem identified by Cornish was predicting a trend correctly, but overestimating its rate of diffusion. This is another aspect of problem 3 above.

**A1.8 What implications for foresighting arise from this study?**

For each of the eight problems listed above, this section suggests some possible solutions.

**Problem 1. A restricted focus can obscure peripheral changes**

A solution is the use of methods such as Critical System Heuristics (Ulrich, 1994), and the boundary critique of Midgley (2000). These have been successful in establishing the boundaries of projects in the "messy" areas of human services. For those studies that had problems with boundaries, the problem was always that boundaries were too narrow, so a simple solution might be to begin a study with boundaries a little broader than initially seem necessary. A related solution used by Ulrich and Midgley is to begin a study by questioning its boundaries. This might usefully be done by reviewing first-order and second-order stakeholders.

**Problem 2. Scenarios were more similar to their creation date than to 2000**

Underlying this problem may have been that some aspects of issues studied seemed unimportant to the creators of the scenarios, and they thus assumed there would be no change on those variables - as in the case of the male helicopter commuter.
Solution 1: Focus on sequences of anticipated change, using a multiple perspectives approach akin to that of Linstone (1984), but applying it to multiple perspectives of times — looking both forward and back in time, both rooting the future in the past (as did Kahn and Wiener, 1967), and focusing on sources of potential discontinuity rather than continuing trends.

Solution 2: As for problem 1: avoid being restricted to too narrow a scope. Though there is clearly a danger in broadening the scope of a study too much, many of the problems found in these 15 studies resulted from terms of reference that were too restrictive.

Problem 3. Lack of justification for the target year
At least in the area of technology, it has been more difficult to predict when something will happen than what will happen. (To continue an earlier example: interactive television may yet succeed.) Technology roadmapping (Phaal et al., 2004) offers a short-term solution, for time-scales of only a few years. However perhaps a precise target year is often unnecessary, given that a frequent purpose of scenarios is to affect decisions in the near future, well before the target year is reached. For example, Australia at the Crossroads was adopted up by a recently elected government soon after 1983, well before its 2000 target date. A simple solution is that, instead of a target date, a range of dates, or an earliest-possible date could be estimated.

Problem 4. Technological change exaggerated, but social change overlooked
Each component of this double problem can be addressed separately. Firstly, a possible solution to exaggerating technological change is to take into account delays caused by technical coordination and market take-up rates. Methods that may be helpful are backcasting, technology roadmapping, and historical comparisons using concepts such as the empirically well-supported Bass curve for the diffusion of innovations (Mahajan, Muller, and Bass, 1990).

The problem of overlooking social change appears to be related to the focus and scope of studies: participants do not notice what they were not looking for. A possible solution is thus the same as that for Problem 1: willingness to enlarge the scope of a study.

Problem 5. Scenarios were often not distinct from each other
This seemed to occur particularly when the Critical Uncertainties method was used, and scenarios were based on extremes on a two-dimensional quadrant. This might be overcome by using a morphological relevance-tree approach to scenario construction, rather than a dimensional one. Relevance-tree classification, being hierarchical is inherently mutually exclusive.
However this cannot be a complete solution, because there remain the problems of the sequence in which variables are split, and the method of splitting when a variable is not Boolean.

**Problem 6. Outcomes were specified too vaguely to evaluate.**

One alternative to making a “safe” statement such as “the level of public health will be higher in 2000” is to specify expected incidence levels for particular health conditions. However, this faces the danger seen in the Telecom Australia study: precise prediction of a variable that will no longer be relevant. A preferred approach may therefore be to anticipate variables rather than values: in this example, and/or to list the conditions expected to be reduced below specified threshold levels in the target year.

**Problem 7. End-state scenarios were difficult to envisage, lacking detail at human scale.**

To increase vividness, in two aspects: both time-based (how exactly the present could lead to an envisaged future) and context-based (how that scenario would fit in with other aspects of life at the target time). Incasting, as used by Dator and Schultz (Schultz, 2003) can be helpful in this regard.

**Problem 8. Overlooking the lifeworld perspective.**

Perhaps because many of these studies were carried out by economists rather than psychologists, all but one (that of Ornauer and Galtung) focused on social rather than individual futures. However, some recent writers on foresight and related issues (Slaughter, 1995a, 2004; Wilber, 1997, Voros, 2001) have noticed the omissions and have tried to generate more person-focused futures. Again, methods such as incasting (Schultz, 2003) are helpful in this regard, as is the inclusion of citizen participation in foresight work.

**Conclusions**

Eight problems were found in this study, with tentative solutions as suggested above. In addition, three further observations were made, in the form of lessons learned.

**Lesson 1: Intuitive scenario methods produce closer matching than critical uncertainties and econometric methods.**

In scenario planning, the Critical Uncertainties method did not perform well (at least, on this outcome-based criterion - regardless of what it might achieve in terms of immediate impact.
on client organizations). Intuitive approaches to scenario building were more effective. Their value is widely accepted (e.g. van der Heijden, 1996; Schwartz, 1991) - with the proviso that success with these requires an unusually high degree of skill and futures awareness.

**Lesson 2:** Large-scale scenario exercises (involving more than 5 person-years’ work) were no more effective than smaller-scale exercises. As there was no correlation between the scale of a project and its accuracy, if the latter is to be the key criterion there appears to be little point in organizing large-scale foresighting exercises. The same budget might be better spent on a variety of small, independent studies – provided that these were not subject to political pressure to develop futures to please the clients.

**Lesson 3:** Include a wide range of participants, but avoid famous people with vested interests and experts in narrow subject areas. Since most of the studies that used input from experts did not fare well at anticipating 2000, there is clear danger in relying too much on experts. The problem appears to be that experts, by definition, have a narrow focus: they are experts on something. When the background to that situation changes, their expertise may no longer be relevant. This is borne out by some of the well-known quotations cited in Cerf and Navasky (1984) and Shuman (1997), including...

- "Aircraft are interesting toys, but of no military value." - Marshal Foch, France, 1912.
- "I think there is a world market for as many as five computers." - Thomas Watson, head of IBM, 1943.
- "There is no reason anyone would want a computer in their home." - Ken Olsen, founder of Digital Equipment Corporation, 1977.

These people were among the foremost experts of their time. Foch was one of the most progressive generals of the French army, Watson was the founder of IBM, and Olsen the founder of the Digital Equipment Corporation. All of them were proved wrong within a handful of years, yet the prognoses of Vannevar Bush, a more generalist expert, are still foresightful even now.

To summarize the above three lessons, it follows that an effective method of foresighting would use intuitive methods (though perhaps not solely), it would avoid using famous people with vested interests and experts in narrow fields, and if sufficient funds were available they would be used for several independent small studies rather than one large one. These conclusions, together with the tentative solutions to the problems found, are applied in chapter 3.
Appendix 2: Agenda for a set of scenario network mapping workshops

This original agenda summarizes a set of workshops for scenario network mapping. Though not one of the case studies followed this exact sequence (all had minor variations, tailored to the needs and preferences of the entities studied), most case studies included most of these elements.

Workshop I: considering the present

This workshop (like the subsequent ones) lasted around three hours, and was divided into about six sessions, averaging about half an hour in duration.

1. Introduction. A brief plenary session, in which the project is explained to participants, and questions answered.

2. Goals and intentions. Participants list all the goals and intentions they can think of for their entity, then organize them into a logical sequence, using the Leaf of Goals principle outlined in Chapter 5, section 5.3.4.

3. Stakeholder map. List all stakeholders that directly impinge on the entity. Arrange these in a large diagram on a wall chart, in the style of the stakeholder star (as in Chapter 5, section 5.3.1). Select a few key stakeholders as the most important for the entity’s future, then try to create a stakeholder map for each of those. What pressures are these key stakeholders subject to, that they might transfer to the entity?

4. Communications exchanges. With the entity at the centre, create a diagram showing the amount and type of communications exchanged between it and its enveloping stakeholder groups. Then create a separate map for the entity only, showing the same exchange relationships within the organization.

5. What would success look like? If the entity were wildly successful, what would this look like? How would it be manifested?

6. Evaluation of first workshop. The first meeting (like all subsequent ones) concludes with an evaluation session based on the nominal groups of Delbecq, van de Ven, and Gustafson (1975). Each participant spending a few minutes mentally evaluating the day’s process, and writing brief notes on it. These (anonymous) notes are collected, then briefly discussed.
Workshop 2: considering the pasts

This workshop, focusing on the recent history of the entity, in so far as it was likely to have a bearing on the future, was sometimes the first in the series of workshops, with the workshop focusing on the present occurring second. It was scheduled for a week after the initial meeting. The delay gave participants time to think about the issues, without forgetting them entirely. This meeting was centred on the creation of a graphical timeline: a large sheet of paper (usually around 3-4 metres long and 1 metre high), mounted on a wall. The distant past is shown at the left, the present at the right. The vertical dimension has no particular meaning, but enables the display of simultaneous trends. Throughout each component of the meeting, the timeline is steadily built up, with elements added in the form of not-very-sticky notes (easily moved, if necessary). Continuing trends are shown by drawing horizontal lines from relevant notes.

A typical collection of tasks for the second workshop was:

1. **Introduction.** A brief plenary session, including a review of the previous meeting.
2. **Timelines.** Create a timeline for the past few years listing major events, forces, and players that have potential to affect the future.
3. **Prouds and sorries.** Incorporating elements of Future Search (Weisbord and Janoff, 1995) and Appreciative Inquiry (Cooperrider and Srivastva, 1987). What elements of this entity's history should not be lost in any future changes? Which elements are regrettable and should not be continued? Combine these in a timeline.
4. **Unfinished business.** Recent concerns, viewed as unlikely to go away, are added to the timeline.
5. **Dotmocracy.** Vote on importance of each thread in the timeline, using multiple coloured adhesive dots or “dotmocracy” (Schulz, 2004).
6. **Evaluation.** Like the other meetings, this consists of completing open-ended questionnaires, followed by brief discussion.

Workshop 3: considering the future

In this workshop, the large sheet of paper resulting from the “pasts” workshop was displayed on the wall” and extended with a new sheet, extending from the present into the future. The main focus of the workshop was to create and extend this scenario network map.

1. **Introduction.** A brief plenary session, including a review of the previous meeting.
2. **Trends and forces.** From the previous session, list trends and forces impinging on the entity.
3. Futures wheel. Beginning from the present (or multiple presents, when applicable) consider a number of possible directions that the entity might take in the near future. Represented on the scenario map in the form of a tree rather than a wheel, to be consistent with the convention of time moving from left to right on the graph.


5. Backcasting. Working back from each of the morphological possibilities toward the present, linking these when possible with the extended branches of the futures wheel.


Workshop 4: combining the strands

In this final workshop, the almost-completed scenario map from the previous workshop was displayed, and the details completed.

1. Introduction. A brief plenary session, including a review of the previous meeting.

2. Midcasting. Thinking of a number of unexpected occurrences that might impinge on the paths created so far, and how these might be handled if they occurred.

3. Reviewing the map. On the completed map, the nodes are reviewed, and sometimes combined, split, or deleted. The links between the nodes are also reviewed, and sometimes changed.

4. Examining the links. The links (representing attributions) are questioned as to their meaning, e.g. “If A does lead to B, how could that happen? What would be causing it? And what else would that cause?”

5. Evaluation. Completing open-ended questionnaires, followed by brief discussion.

6. Refocus on the present. Finally came an opportunity to determine actions the organization might now take to improve its likely future. This was not strictly part of the scenario mapping process, but was of strong interest to participating organizations.
Appendix 3: Evaluation Questionnaire

1. How much did today’s workshop improve your understanding of what's happening with [insert name of entity]? Please tick one box
   - [ ] Not at all
   - [ ] Just a little
   - [ ] Quite a lot
   - [ ] Very much indeed

2. What did you think was the best, most useful, or most interesting part of today’s workshop - and why?

3. What did you think was the worst, least useful, or least interesting part - and why?

4. How do you think the process could have been improved?

5. Are there any other comments you'd like to make?
This appendix supplements chapter 8, providing detail on each case study in a volume that would impede the flow of the argument had it been included in that chapter. For each case study, the information presented is

1. Information about the entity of the case.
2. Classification of the case, in terms of the sample design in chapter 7.
3. The procedures used: recruitment method, the environment for the study, the activities used.
4. Samples of the output produced, with emphasis on how this output changed since the previous case study.

Each case study in chapter 8 draws on this information, but the emphasis there is on the development of the Process, while the emphasis here is on the substantive case studies.

Case I: A radio network in Indonesia (RN)

The entity

History. Before 2000, RN had been part of the central government’s Departemen Perhubungan (Department of Communications), whose head office adjoined that of RN in Jakarta. RN’s mission had been to provide an informational and cultural radio service to all 29 provinces of Indonesia. The government clearly saw RN as a unifying force in a country troubled by secessionist impulses on its fringes, in trouble spots such as Aceh, the South Moluccas, East Timor, and Irian Jaya. With the end of the Suharto era in 1998, Indonesia returned to democracy. In 2000, its Parliament passed a Media Law authorizing many new commercial radio stations. This ended RN’s monopoly of radio in Indonesia, but also released RN from direct government control.

RN remains fully owned by the national government. RN receives nearly all its funding from the national government. When it became independent from the Department of Communications, its budget was effectively reduced, and it was expected to find more funding through
the sale of airtime for commercials. It is governed by a national board, appointed by the
government.

RN’s sole output is radio broadcasting, including news-gathering, and producing entertain-
ment programs. Programming policy is determined by network heads in Jakarta. In each
province, locally made programs, generally following those principles, are broadcast during
most daylight hours, with networked programs outside peak listening times.

Riau province is in central Sumatra, some 1500 km west of Indonesia’s capital city, Jakarta.
The capital of Riau is Pekanbaru, an inland city with a population around 600,000. Riau’s oil
industry makes it the richest province of Indonesia. Another unusual factor is Riau’s proximity
to wealthy Singapore and Malaysia. With Indonesian being very similar to Malay, coastal
dwellers in Riau can receive and understand radio and TV programs from Malaysia. RN Riau
had three offices, with around 150 staff (of RN’s total of 8,000). Two offices were in Pekan-
baru, and there was a small branch office in the city of Tanjung Pinang, on an island very
close to Singapore and therefore somewhat subject to the wealth and influence of that city-
state.

Classification

To first consider the type of social entity involved, in terms of the taxonomy in chapter 8, this
case met the following criteria:

Category 2.7 A government agency
Category 3.3 Located in a province
Category 4 A time scale of around 10 years

In terms of the specific entity types sought for this study, it fulfilled the following additional
characteristics:

A4 Entity undergoing major organizational change
A7 Entity forming part of a larger organization, with its own sub-entities
A21 Services sector

Procedure

Recruitment

The participants had been selected by the head of RN in Riau to take part in a course on
audience research. They were mostly journalists and middle managers, and formed a high
proportion of all such staff members: probably more than half of all those working in such positions. To that extent, therefore, the participants formed a representative sample of the more senior staff of RN in Riau province. Several junior staff (mostly young, well-educated reporters) were also included.

Environment
This workshop was one small part of a two-week course on audience research, for which I was the instructor. It was conducted mostly in Indonesian, a language of which I had only a rudimentary knowledge. However, a skilled interpreter was present, and many of the participants knew a little English, more in written than spoken form. I thus made much use of a whiteboard, writing on one side in a mixture of English and Indonesian, while the interpreter translated the notes (on the other side of the board) into Indonesian.

The workshop took place in a long, narrow room, around 6 metres wide and 15 long. The long wall facing the inside corridor was all glass, which caused some acoustic problems, but was also ideal for displaying findings on large sheets of paper. Another factor brought about by the long glass wall was that any local RN employee walking past could see what was happening in this training room, and could drop in. Though there were only 14 official participants, the provincial manager encouraged others to attend when they could, and at times up to 35 people were present. During the futures session, the average was around 20 to 25, though with a lot of coming and going.

Activities
Since less than one working day was able to be allocated for this process, I realized it would not be possible to develop a full scenario network – particularly given the slowness of communication through an interpreter. Accordingly, I planned this sequence of activities:

1. Identify the systems impinging on RN, to tease out the various stakeholders, their roles, and their likely reactions to RN.
2. Create a set of generic scenario paths, using a morphological process.
3. Working in three small groups, one group would create a futures wheel, another would backcast some of the scenario paths, and the third group would attempt midcasting. This was the first time I had tried the latter process.
4. Finally, the paths would be fleshed out in more detail, using data collected in the previous activity.
1. System Impingement

Participants first listed all the stakeholder systems connected to RN in Riau, as shown in Table A4.1.1. RN in Riau turned out to have a tangled set of enveloping systems, subsystems, and linked systems. All stakeholders on this long list had some bearing on the future of RN in Riau. Having established all the stakeholders, participants were then divided into small groups, with the task of considering each stakeholder group and the pressures it was perceived to put on RN. Though all participants were RN staff members, and therefore might have been expected to have narrow views, most of them were working journalists, and thus familiar enough with local powerbrokers to be able to produce a detailed list of stakeholders' motivations toward RN Riau.

The data in Table 9.2.1 formed the basis of the System Impingement Diagram in Figure A4.1.1. The diagram displays the nine main systems that participants decided were affecting RN in Riau, both directly and indirectly. Arrows denote the directions of influence.

Thus five major systems were seen as directly impinging on RN Riau, and three systems impinged indirectly. One of the latter (the IMF) was two systems removed from RN Riau, thus of less direct significance. All other systems listed in Table A4.1.1 were not regarded by participants as significantly important to the future of RN, so they were not considered in the diagram.

Interestingly, their list of major systems excluded some of those listed in Table A4.1.1: media competitors, as well as subsystems of RN Riau, and the Swedish project (which was the main system impinging on the participants during this two-week course, and was to have major influence over the next six months). I queried the omission of these systems, but the participants agreed that they were relatively unimportant. As an outsider, and one who understood little Indonesian (most of the above work was done through an interpreter) I was not in a strong position to disagree. However, my assessment was that since the participants were running a partly-commercial radio station, RN's media competitors were in a clear position to influence at least its commercial income, and eventually, to some extent, its programming. So perhaps these should have been added to Figure A4.1.1, with a mutual link to Advertisers.

2. Morphological analysis

Before creating a scenario network map it was necessary to create some major paths, for which the obvious method was morphological fault-tree analysis. The participants did not understand what I meant by this - perhaps because of linguistic problems. Given the ensuing
confusion between a time hierarchy and a conceptual hierarchy, I produced the hierarchy mostly by myself. However, when participants began to understand the diagram I was creating on a whiteboard, they were able to offer useful amendments. The hierarchy is shown in Figure A4.1.2. It has 13 numbered endpoints, representing the scenario paths from which the backcasting could begin.

3. Developing a scenario network

Having defined the impinging systems and the morphology, we moved onto developing a network of scenarios, by considering (for each link in Figure A4.1.2) the influences created by the forces listed above. Working in three small groups, the participants were asked to imagine some possible futures:

- One group worked forward from 1998, using a futures wheel;
- A second group worked back from the endpoint of 2008, backcasting from some points in the morphological analysis. (As this was only a one-day session, there was insufficient time to backcast all 13 scenario paths. This group thus focused on one set of options which worried the participants: that RN (or at least one of its Riau networks) would be sold to a private organization. This was effectively options 6, 7 and 8 combined in Figure A4.1.2.)
- The third group was asked to midcast around intermediate point, not specified in time.

The combined network covered six large sheets of paper, and had around 100 nodes. However, it was not finished, because we ran out of time, with this session taking much longer than I had expected.

Output

The three most relevant outputs (for the present discussion) from this project are:

- Table A4.1.1 A table of all the impinging stakeholder systems
- Figure A4.1.1 A system impingement diagram
- Figure A4.1.2 A diagram of the morphological hierarchy

These are displayed on the following two pages.
<table>
<thead>
<tr>
<th>Enveloping systems</th>
<th>whole of RN (headquarters in Jakarta)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indonesian central government</td>
</tr>
<tr>
<td></td>
<td>Department of Information</td>
</tr>
<tr>
<td></td>
<td>Indonesian language / culture / ethos</td>
</tr>
<tr>
<td></td>
<td>province of Riau</td>
</tr>
<tr>
<td></td>
<td>island of Sumatra</td>
</tr>
<tr>
<td>Subsystems</td>
<td>Staff of RN Riau</td>
</tr>
<tr>
<td></td>
<td>Production staff*</td>
</tr>
<tr>
<td></td>
<td>Administrative staff</td>
</tr>
<tr>
<td></td>
<td>RN Pro-1: radio station for whole of Riau</td>
</tr>
<tr>
<td></td>
<td>RN Pro-2: radio station at Pekanbaru</td>
</tr>
<tr>
<td></td>
<td>RN station at Tanjung Pinang</td>
</tr>
<tr>
<td>Linked systems</td>
<td>Colleagues</td>
</tr>
<tr>
<td></td>
<td>RN offices in other provinces (28 of them)</td>
</tr>
<tr>
<td></td>
<td>Authorities</td>
</tr>
<tr>
<td></td>
<td>RN national news and current affairs</td>
</tr>
<tr>
<td></td>
<td>Riau provincial government</td>
</tr>
<tr>
<td></td>
<td>Major political parties</td>
</tr>
<tr>
<td></td>
<td>ABRI (Indonesian military)</td>
</tr>
<tr>
<td></td>
<td>Competitors / substitutes</td>
</tr>
<tr>
<td></td>
<td>Other radio stations</td>
</tr>
<tr>
<td></td>
<td>12 in Pekan Baru</td>
</tr>
<tr>
<td></td>
<td>TVRI (national TV station)</td>
</tr>
<tr>
<td></td>
<td>Private TV stations</td>
</tr>
<tr>
<td></td>
<td>3 in Pekan Baru</td>
</tr>
<tr>
<td></td>
<td>Satellite TV stations</td>
</tr>
<tr>
<td></td>
<td>~2% of households have</td>
</tr>
<tr>
<td></td>
<td>Press</td>
</tr>
<tr>
<td></td>
<td>national, local, international / daily and weekly</td>
</tr>
<tr>
<td></td>
<td>Worldwide Web</td>
</tr>
<tr>
<td></td>
<td>esp. in Bahasa</td>
</tr>
<tr>
<td></td>
<td>Other stakeholders</td>
</tr>
<tr>
<td></td>
<td>Audience to RN</td>
</tr>
<tr>
<td></td>
<td>native to Riau, &amp; immigrants from elsewhere in Indonesia</td>
</tr>
<tr>
<td></td>
<td>able / unable to speak Bahasa Indonesia</td>
</tr>
<tr>
<td></td>
<td>(other audience variables may also be relevant)</td>
</tr>
<tr>
<td></td>
<td>Advertisers on RN</td>
</tr>
<tr>
<td></td>
<td>Suppliers to RN</td>
</tr>
<tr>
<td></td>
<td>Sveriges Radio (coordinating this project)</td>
</tr>
<tr>
<td></td>
<td>Sida (funding the project)</td>
</tr>
</tbody>
</table>

*The production staff and the administrative staff work in separate buildings and communicate infrequently; thus there are two separate subsystems of local staff.*
If still existing:

Ownership:
- central government (as now):
  - one entity (as now) [1]
  - one entity, combined with television [2]
  - each network as a separate entity [3]
- provincial or local government:
  - mini-RN for Riau (all networks) [4]
  - One local network owned by province [5]
- privatized:
  - RN nationally [6]
  - RN Riau, part of a larger private network [7]
  - RN Riau, independently owned [8]
  - Local network/s sold to local owners [9]
- listener-owned:
  - Local network owned by listener co-operative [10]

If not existing:

- Functions (i.e. radio production) continue in some way
  - As program source for other outlets [11]
- Other [not further defined] [12]
- Functions do not continue; RN is simply shut down [13]
Development of the morphological hierarchy

To illustrate the output from the morphological hierarchy, one path in Figure 9.2.2 (option 6) was that RN nationally would be sold to a private media organization – either an international media group, or an Indonesian conglomerate. The participants involved then developed this possibility, to produce a set of “whys” and “hows.” They concluded that this sale would only occur if all the following inputs occurred:

i1. The IMF kept pushing the Indonesian government to reduce its budget deficit,
i2. ...and also to privatize those state-owned enterprises which already (like RN) had private competition
i3. The radio audience continued at a high level: i.e. radio listening did not decline much with the growth in ownership of TV sets.
i4. A keen buyer (possibly an overseas-based owner of many radio stations) pressed the government to sell.
i5. The likely revenue from the sale was high enough to tempt the government.
i6. The anticipated volume of public objections was low.
i7. A number of other state-owned enterprises were also sold.
i8. The Media Law of 2000 would have to be changed, which would require a majority of Members of Parliament to agree.

I had expected a more chain-like sequence of events, but the above structure, if shown as a diagram, would take the shape of eight inputs producing one output. Though individually the probability of any one of the above events occurring was seen as “very low,” it does not follow that the joint probability of all of them occurring was a simple product of the eight individual probabilities: almost infinitesimally low. If a mood for privatization were to sweep the country, all of the above could happen together – though it would take several years for all of those preconditions to occur.

The consequences of selling one or more RN radio networks were seen as three major outputs, labelled o1 to o3:

o1. The network’s less profitable stations (those serving the smallest populations) would be closed down, or used only as repeaters, or resold to act as vehicles for networked advertising.
o2. Because news is expensive to gather, and commercial radio operators want to maximize their profits, many staff would be laid off - particularly those producing labour-intensive spoken-word programs, and thus:
03. Radio would lose its perceived role as major news and information provider, ceding this to newspapers, TV, and the internet.

The following diagram expresses the structure of the above statements in the form of an event tree:

![Event Tree Diagram](image)

**Figure A4.1.3 Expansion of Path 6 into an Event Tree**

**Output from the midcasting**

In the midcasting, some events were linked with "and" logic: all the preconditions had to be true before a change would happen. Other events were linked with "or" logic, in which just one of several preconditions would by itself bring about change. It follows that the more "ands" (ceteris paribus) in a chain, the less likely an event would be to occur. But the more "ors," the more likely it would be to occur - hence the growth in news sources following the 1998 decentralization, which for the first time allowed news media to be set up without going through a long sequence of government permissions.

Some of the midcast possibilities, though radical in political terms, were not expected to have major likely effects on RN. These included:

1. Singapore, following a dispute over water rights with Malaysia, buys some almost uninhabited parts of Riau province. Singapore is rich, and short of water; Indonesia is poorer, and some Riau islands near Singapore are almost empty, partly because of an excess of water. Singapore would build reservoirs on these islands and water mains under the Straits of Malacca. This was seen as not unlikely, but would make little difference to the situation of RN in Riau.
2. Following the example of East Timor has done, and under international pressure, Aceh province becomes independent from Indonesia. Any ensuing war should not spill over into Riau, separated from Aceh by one other province. RN Riau would not be greatly affected. This was seen as highly unlikely.

Another possibility, seen as not unlikely, would have a much stronger effect on RN:

3. Democracy in Indonesia turns out to be too messy for the powerful TNI (military establishment). Fearing that TNI corruption is about to be exposed, a general persuades the president (female, and seen as compliant) to hand over de facto power to him. The country gradually returns to the pre-1998 status quo, with RN again taken over by the Department of Information. However, many social forces would deter such an outcome, including the need to suspend the recent Media Law, and international condemnation from wealthy backers such as the USA.

Each of the above possibilities is a mini-scenario: a holon that could be developed further. For example, the third scenario could branch into several ways for the government to deal with RN to reduce public scrutiny, including closing it down, selling it, centralizing control over news and information programs, and gutting the RN news service. Each of these could become a separate linked mini-scenario.
Case 2: An engineering manufacturer (EM)

Background

The entity
Though this case began as a study of a single entity, it later became evident that two different entities applied: the company, and its electric motor. Each of these is discussed separately.

Entity I: the company
EM is a light engineering manufacturer, based in an Australian state capital city. It considers itself to be in the business of “repetition engineering.” The company’s main business involves using lathes to manufacture small metal components. It uses lathes and robots to make small metal objects by machining: cutting away metal from a large, rough piece to make a smaller, precise piece.

Though this was a factory, the general manager stated that “we’re not a manufacturer but a service company.” EM saw itself as servicing its customers by providing metal objects for them.

Business model. This company seemed at first to use a very simple value-chain model. It bought raw metal and machinery from manufacturing suppliers, used the machinery to transform that metal into small objects, and sold those objects to industrial suppliers. During the study, more complexity became evident: for example, in some cases the supplier/customer role was arbitrary.

Scale. At the time of this study, the company had a turnover of 8.6 million Australian dollars a year, and a staff of 42, almost all of whom were full-time employees. All but about 10 of the staff worked on the factory floor, which operated on three shifts, 24 hours a day. In terms of futures studies, this was a small business – much smaller than had been anticipated for the sample.

History. EM was founded in the 1920s by the father of the present chairman. For decades it continued as a small enterprise, with a staff of around 8 people. The late 1990s saw the beginning of major change. EM grew dramatically, with a compound annual growth rate of 38% from 1997 to 2002. Over that period, EM’s annual turnover rose from 1.2 million dollars to 8.6 million, and the staff grew fivefold, to 42. This growth occurred for three main reasons:
(a) with the privatization of water supplies in the state where EM operated, it had bought the workshop of the former water supply authority, which made components for water meters.

(b) the purchase of an electroplating plant from a customer.

(c) one of Australia's largest manufacturers of lawnmowers had closed its antiquated engine factory, and chose EM as a major subcontractor for new engine components.

Additions (a) and (c) to the business were in the form of long-term contracts: 10 years, in the case of (c). Both the chairman and the general manager were concerned about "putting all their eggs in one basket" and had set out to make the company recession-proof, as far as possible. They had no plans to enlarge the company further in the next 2 to 3 years, and wanted to consolidate before any further substantial growth.

The chairman and general manager stated that the company's recent growth was unplanned, and that they had done no "marketing". The chairman told me, "our success hasn't happened through anything that we've initiated. We were just in the right place at the right time." Nevertheless, if the company had not taken the risk of improving its infrastructure, and if this had not become known among potential suppliers, the growth could not have occurred. In discussion, it became clear that the company had poured considerable resources into improving its infrastructure, by buying advanced computer-controlled metalworking machinery, and by instituting an unusually thorough program for the development of staff skills - such as sending final-year apprentices to work in Switzerland for 6 months with the company's supplier of horizontal machining centres. EM also took a lot of trouble to "look after" its suppliers - unlike (it said) other customers of those suppliers. This was done by giving long-term contracts to suppliers, and notifying them in advance when the pattern of orders was about to change. This helped to maintain regular supplies (all imported), and product quality, which EM took very seriously.

Ownership and governance. This was a family company, two thirds owned by the chairman and his family, and one third by the general manager. The management style was quite informal - in contrast to the highly formalized accounting system.

Objectives. The long-term goal of the chairman and general manager was to reach a $1 million net profit level, and to sell the company in about 10 years' time and retire - hence the 10-year timescale for the study.
Having outgrown its current factory, EM was now looking for new premises; this was the main preoccupation at the time of the study. Its focus was on long-term contracts. The managers did not want small jobs; in fact the electroplating division was deliberately not listed in the Yellow Pages, in order to discourage one-off requests, such as car enthusiasts who wanted their engines electroplated.

**Time horizons.** The general manager said that he looked about one year ahead: the current financial year, and a little into the next year. His job involved making the company profitable over this time horizon. As a verification of Jaques’ (1982) theory of the time horizons of managers, the chairman had a much longer view – and was thus particularly interested in my study. His time horizon was generally about 5 years into the future. The following table shows time horizons for various aspects of EM.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow on a daily basis</td>
<td>60 days *</td>
</tr>
<tr>
<td>Planned contract for lease of new factory</td>
<td>4.5 years</td>
</tr>
<tr>
<td>Completion of training for a new apprentice</td>
<td>5 years</td>
</tr>
<tr>
<td>Contract with lawnmower manufacturer</td>
<td>10 years</td>
</tr>
</tbody>
</table>

a. Though 60 days may not seem a long time for cash flow planning, the cash flow for each individual day was planned that far ahead: e.g. the accountant could supply on 27 February the estimated payments and receipts expected on 26 April. This was feasible only because of EM’s long-term contracts with its customers and suppliers, and because it discouraged small jobs.

**Staff.** The most significant staff within EM were:
- the chairman
- the general manager
- the factory manager
- the QA manager, who also looked after OH&S issues (a new position, established only 6 weeks before my first interview with the company)
- the accounts manager
- the inventor: a semi-retired engineer who was developing a new type of electric motor with EM.

Most of the 42 staff worked on the factory floor, with three shifts operating around the clock.
Entity 2: the electric motor

For several years, EM had been slowly developing a new type of electric motor. Technical details are not relevant here, and if published may result in the refusal of a patent, but the comparative advantage of this type of motor is that it has a much higher efficiency than normal: around 95%, compared with a typical figure for other medium-power motors of less than 75%. Though efficiency is not a significant factor in many situations, it is important (a) when the motive power comes from batteries, (b) for higher-powered motors, (c) for motors that run for many hours per day, and (d) in enclosed situations where heat load must be minimized.

According to a marketing consultant I interviewed as part of this study, EM had made some “half hearted attempts” at marketing the motor but marketing development was hampered by several factors:

- insufficient spending on development (because insufficient funds were available);
- the fact that a major component of the motor could not be patented;
- lack of initial customers (and insufficient management time devoted to finding them);
- EM’s inability (because of its small scale) to fund development of the motor in its own right, and its consequent need to depend on licensing other manufacturers.

Thus one of EM’s interests in going ahead with the futures work was to find a profitable way forward for its motor.

Classification

In terms of the taxonomy of types of futures listed in chapter 8, this case met the following criteria:

- Category 1: The general future (not specific) of...
- Category 2.5: A business
- Category 3.3: Geographical scale: a country (Australia)
- Category 4: Time horizon: specified as 10 years

In terms of the additional entity types sought for this study, it fulfilled four criteria fully, and one partly:

- A8: Self-contained entity, not part of any other, nor with any parts
- A14: High level of innovation
- A16: A growing entity, highly successful in recent years
- A20: Manufacturing industry

420 Appendix 4
A3 (partly) Cluster of manufacturers. (Though not a member of a formal cluster, this company worked so closely with other actors in its supply chain that it was effectively in a cluster.)

In holonic terms (fulfilling A8) EM consisted of a single entity: it was not part of anything else, nor did it, in practice, have components. (It did have several business names and activities, but they all took place in the same factory.) Though the electric motor could not be regarded as a separate holon, its future was potentially quite different from the future of EM. The chairman told me that if the company was sold, it was quite possible that the rights to the motor would not be sold with it: in that case, the electric motor would become a separate entity.

Procedure

Recruitment

Participants in this study were the managerial staff of the company. I interviewed six of them in detail: the chairman, the general manager, the factory manager, the quality assurance manager, the accounts manager, and the inventor. The participants were chosen by the chairman, with occasional prompting from me.

Environment

Though the Process was designed to use participative workshops, it was not feasible to run such workshops at EM. They did not want external people involved in this study (except for one marketing consultant), but in such a small organization, all the staff members were very busy, and could not spend much time with me. The exception was the chairman, whose work did not involve day-to-day matters, and was highly interested in the future of his company. Therefore, instead of using workshops, the development of futures for EM was done as a series of 11 interviews, mostly involving the chairman, with others present at times. As most of these interviews lasted from 2 to 3 hours, the total interaction time (27 hours) was longer than the 14 or so hours that would have been spent in the "standard" workshop process.

The interviews were relatively unstructured, in that a broad list of issues (but not questions) was drawn up for each interview, and often continued from one interview to the next. The atmosphere at interviews was kept informal. Often, for example, a staff member would come into the chairman's office for another reason, and stay for a while to join the futures discussion. My role, as interviewer, was to maintain a low profile, trying above all to listen and
understand. To handle these requirements, I developed a technique of increasingly-structured interviewing – as noted in chapter 8.

**Activities**

Given this shortage of management resources, the scenario network was developed largely by myself, using input from the staff involved. The following aspects of the Process were used

- Stakeholder map
- Morphological scenario paths
- Futures wheel
- Midcasting.

Elements of the Process that were not used included (a) the analysis of multiple presents and multiple pasts - I found no evidence of these, and (b) backcasting - largely replaced by the detailed midcasting.

**The Stakeholder Star**

Following the slow process of discovering stakeholders in the RN study, I devised a system for mapping stakeholders into seven broad groups, labelled the Stakeholder Star, (as described in chapter 5, section 5.3.1). By considering each group in turn, omission of any stakeholder type becomes less likely. Having identified a provisional set of stakeholders, it was then possible to ask, for each stakeholder, “are there any other organizations or people that both you and this stakeholder also deal with, or have some influence on both of you?” Using this process, additional stakeholders, who were not initially obvious, could be identified.

Applying the Stakeholder Star to EM, all stakeholders (gradually discovered over several meetings) were listed, and placed into the seven categories:

1. suppliers, direct and indirect
2. customers, direct and indirect
3. peers (including competitors)
4. regulators, governments, etc.
5. neighbours
6. news media
7. dependents, including staff.

Though EM had far fewer stakeholders than RN, it had a more complex value chain, because some of its suppliers were also customers. Its largest and most powerful “customer” was not
actually a customer at all, but the customer of another customer. This complexity is addressed in more detail in List (2003c).

**Futures wheel**

We developed a first-level set of 8 morphological possibilities intended to be comprehensive and mutually exclusive, following the principles of Zwicky (1969). Normally a futures wheel (as in Glenn, 1972) takes a more passive approach: “What might happen that could affect us?” as opposed to “What might we do?” For SNM, the former is handled by the midcasting phase.

**TABLE A4.2.2 FIRST-ORDER FUTURES WHEEL FOR EM**

<table>
<thead>
<tr>
<th>Scenario path</th>
<th>Issues for second-order futures wheel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Consolidate recent expansion</td>
<td>How can this best be done?</td>
</tr>
<tr>
<td>2 Sell the company</td>
<td>Who to? All or part? Advertise or wait?</td>
</tr>
<tr>
<td>3 Seek more work of current type</td>
<td>Through which avenues?</td>
</tr>
<tr>
<td>4 Drop some current activities</td>
<td>What basis for decision? Which activities?</td>
</tr>
<tr>
<td>5 Add new activities</td>
<td>What basis for decision? Which activities?</td>
</tr>
<tr>
<td>6 Add a new industry</td>
<td>What basis for decision? Which industry?</td>
</tr>
<tr>
<td>7 Drop an existing industry</td>
<td>Machining: outsource all manufacturing</td>
</tr>
<tr>
<td></td>
<td>Electroplating: sell plant</td>
</tr>
<tr>
<td></td>
<td>Electric motor: sell or abandon</td>
</tr>
<tr>
<td>8 Any other possibilities</td>
<td>(None were identified)</td>
</tr>
</tbody>
</table>

At the time of the study, EM was operating in Path 1: consolidation mode. They were not seeking new customers, having acquired a very large customer 9 months previously, and were still trying to come to grips with their ensuing expansion. For example, on the day my study began, they hired a QA manager to improve the quality control. Their other preoccupation at the time of the study was a planned move to new premises, which occurred largely due to the major new customer. A consequence of this move was to sell older equipment that was no longer needed. Part way through this study, EM decided to postpone the move.

**Midcasting**

For an indeterminate point in the mid-future, we postulated some surprises – developed jointly by myself and several senior managers. For EM, these surprises (extending over a range of time horizons) were:
### TABLE A4.2.3 SOME MIDCAST POSSIBILITIES FOR EM

<table>
<thead>
<tr>
<th>Item</th>
<th>Possibility</th>
<th>Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Major customer overreaches in its export attempts, and is declared insolvent without warning, leaving EM with a now-worthless stock of engine parts</td>
<td>1 week</td>
</tr>
<tr>
<td>2</td>
<td>Attempt by major customer to buy EM</td>
<td>2 months</td>
</tr>
<tr>
<td>3</td>
<td>Several major competitors merge in a large, low-cost, aggressive operation</td>
<td>6 months</td>
</tr>
<tr>
<td>4</td>
<td>Sustained 30% increase in value of Australian dollar</td>
<td>1 year</td>
</tr>
<tr>
<td>5</td>
<td>The lawnmower motor wins an enormous contract overseas, and EM is asked to set up a factory there</td>
<td>18 months</td>
</tr>
<tr>
<td>6</td>
<td>Unsuccessful diversification by EM into a non-manufacturing industry. Almost all invested funds lost.</td>
<td>2 years</td>
</tr>
<tr>
<td>7</td>
<td>Advances in metal casting technology eliminate the need for machining (EM's expertise)</td>
<td>3 years</td>
</tr>
<tr>
<td>8</td>
<td>Decline in industrial relations, resulting in strikes and sabotage</td>
<td>3 years</td>
</tr>
<tr>
<td>9</td>
<td>Successful marketing of the new electric motor in a role to which it is well suited, such as propulsion of small electric vehicle, refrigeration, or as a portable generator</td>
<td>3 years</td>
</tr>
<tr>
<td>10</td>
<td>Engineering plastics replace many of the small metal parts that EM produces</td>
<td>5 years</td>
</tr>
<tr>
<td>11</td>
<td>A 3D copier comes onto the market and is bought by many of EM's customers</td>
<td>10 years</td>
</tr>
</tbody>
</table>

For each of the above surprises, the Process weaved back and forth between the present, the future, and the surprise, by asking this series of questions:

1. What would be the factors influencing this surprise?
2. What sequences of events would precede the surprise: the leading indicators (if any) that it was about to occur?
3. What would be the likely warning period?
4. What sequences of events would follow from the surprise?
5. What previous analogies or models exist for such a surprise?
6. What is the likelihood of such a surprise occurring?
7. What steps could EM take to make the outcome more favourable for itself?

By applying this weaving process to many surprises, the ensuing "fabric" may eventually become complete enough that no matter which surprises were used as inputs, the scenario network would be similar. Even with the 11 surprises explored here, few new causes and effects had to be added for the last few surprises. The following example considers these factors for one midcast surprises that was considered highly likely:
Surprise 4: Revaluation of Australian dollar

Sustained 30% increase in value of Australian dollar against major trading currencies – US dollar, Euro, Yen, Yuan.

1. Influencing factors: (a) international interest rates, (b) the widely perceived undervaluation of the Australian dollar - e.g. occasional references in *The Economist* over the last few years.

2. Leading indicators: The Australian dollar moving steadily upwards over many months, particularly against the trade-weighted index, not only against the US dollar. A relative increase in Australian interest rates (which might involve no change in domestic interest rates, but a decline in interest rates among trading partners) may bring about a fairly sudden change. A key currency to monitor is the Yen: long-term problems in the Japanese economy, together with some unpredictable precipitating factor, may cause a rush by Japanese investors toward the Australian dollar.

3. Warning period: around 1 year - for practical implications of the revaluation.

4. Consequent events: (a) Imported materials become 30% cheaper (lowering EM’s input costs), but (b) so do imported goods (increasing the attractiveness of imports to EM’s customers). Thus (c) goods exported from Australia also become 30% more expensive at their destination. If the currency realignment persists, this could have strong effects on EM – and every other Australian manufacturer, with a consequent decline in Australian manufacturing. The chairman stated that this wouldn’t affect EM much, because they don’t export, and import costs are a small component of their inputs. However, some EM customers may be exporters, and they would be under pressure to reduce costs to remain competitive. A warning sign was that EM recently missed out on a valuable contract: an Italian company won the job, at a much lower cost than EM could match. This was thought to be because the Italian company had more advanced machining equipment, with much greater economies of scale.

5. Previous analogies: The cut in Australian tariffs in 1974, which had a strong negative effect on Australian manufacturing for at least 5 years afterwards.

6. Likelihood: This has a strong possibility of happening, and thus would hardly be a surprise at all. For example, from August 2002 to February 2003, the Australian dollar rose from 48 cents US to 61 cents: a rise of 27% in six months (though the trade-weighted index rose less). The US dollar is acknowledged by many economists to be over-priced, while in terms of purchasing-power parity, the Australian dollar is clearly under-priced.

7. Steps EM could take: Outsource manufacturing to a low-cost country in Asia. With EM’s strong focus on quality control, this might involve EM’s QA staff permanently working in the supplier’s factory. In Australia, EM’s focus would change from production to design and quality management.
Multiple pasts

Though the method as designed includes an analysis of multiple pasts influencing multiple futures, I could find no clear evidence of multiple pasts in discussions with EM. Part of its growth had occurred through the purchase of a water-meter manufacturing business in 1998, and they had acquired only the shopfloor staff with the purchase of the business. Though few of those staff had left, the work they were now doing was essentially the same as they had been doing up till 1998, and there were too few of them (about five) to have a noticeable effect on EM.

The only indication of a “multiple past” I encountered was from the general manager, who before joining EM in 1998 had worked in the management of supermarkets and distribution. His ideas for EM’s future growth included a diversification into these two industries, and the gradual replacement of skilled staff by unskilled staff operating more mechanized equipment. The chairman, who had inherited EM from his father, tended to favour retaining the more skilled staff as a potential competitive advantage for the company. He too was interested in diversification into other industries, but expressed doubts about supermarkets and distribution as likely possibilities.

Multiple presents

No clear evidence emerged of the existence of multiple presents. All the people I spoke to shared essentially the same vision of EM’s present operations. This probably arose (or so it seemed at the time, without any other sites for comparison) because of the small number of staff: only 42 in total, all but about 8 of whom worked on the shopfloor, on 3 rotating shifts for 5 days per week.

One obvious reason for the lack of multiple presents and multiple pasts was the homogeneity of participants: all but one (the marketing consultant) worked for EM. Had some of its other stakeholders taken part in this study, such multiple perspectives may have emerged.

Morphological scenario paths

With EM, I explored a different approach to the morphological analysis, which had not been highly successful with RN. In RN’s case, the morphological endpoints had consisted of events outside the control of the part of RN (the Riau provincial office) that was effectively the client.
Though this was realistic, it had also meant that the staff did not feel involved with the process, or empowered by it.

Since EM was a more independent entity than was RN in Riau, I experimented by setting up the morphology in a different sequence. Though the first split was still existence/nonexistence, the second and third splits involved choice-based criteria. The focus here was what the entity was trying to do, not what might happen to it, and the morphological options were consequently purposive and endogenous.

**Morphology for EM's electric motor**

The problem with that set of paths was how the electric motor might fit in to that. After considering several options I realized that it was best to treat the electric motor project as being a separate entity: a subsystem of EM. After all it had its own staff (the inventor and his assistant), a separate line of funding, and a potentially very different future to the rest of EM. Also, the chairman indicated to me that if EM were sold, the electric motor project might well not form part of that sale. Thus we created a separate morphological set for the electric motor, with ten final outcomes. In the corresponding diagram for RN (Figure 9.2.2) final outcomes were simply numbered from 1 to 13, but I now realized that this was not conducive to extending the morphological hierarchy. Therefore the following figure uses an easily extensible (though more cumbersome) notation, alternating numbers and letters.

![Figure A4.2.1 Morphological Futures for EM's New Electric Motor](image)

Option 2B1 (increased funding from internal source) depended on significant growth in EM's earnings – a strong possibility, given its performance over the past 5 years, but by no means
certain. Options 2A1 and 2B1 to 2B3, given their funding restrictions, would imply developing the motor for a local niche market, for which the motor's characteristics were particularly suited. These included three obvious applications: electric wheelchairs, miniature wind-powered generators, and brewery pumps. However, extending the above diagram to include them would upset the morphological hierarchy. To maintain the hierarchical structure, each of the three candidate applications would have to be included in each of those four funding cells, creating 12 new cells: not a useful solution. The morphological hierarchy would thus need to be replaced by a faceted morphological box (as described by Zwicky, 1969).

At the end of this study, the option of brewery pumps was being explored in detail. This was a reconstruction of option 2A1, which had originally been seen as from internal funding through other sales by EM. Now it could be split into two: the initial concept (2A1A), and an addition of self-funding through sales of the motor in its current prototype form (2A1B). The motor's larger-than-desirable size at the current stage of development was not a problem for brewery pumps, and servicing would be easier in situ than in a mobile device.

**Midcasting for the electric motor**

The midcasting process revealed two major potential surprises for the electric motor:

1. A large organization, probably an existing manufacturer of electric motors, releases a motor with similar properties (in particular, high efficiency) and markets it widely, at a lower cost than EM could produce it for. (The longer EM took to bring its motor to market, the more likely this would be to occur.)

2. EM tries to get funding for the motor, and releases details to a potential joint venture partner on a confidential basis, since one essential part of the motor is not patentable. That partner later markets a motor closely based on EM's design, but with minor variations, sidestepping EM's intellectual property. There are several variants on this possibility, in all of which EM has no recourse except to mount a protracted international legal case, the costs of which may outweigh the benefits.

Several other possibilities were identified, but these were considered to be part of the cause-and-effect weaving, not surprises. For example, the death or serious illness of the inventor (who was about 70 years old) might cause development to be abandoned. But this is simply an input to option 1, abandonment. Perhaps because of the limited number of people involved who knew enough about the motor to provide useful input, and/or because of the specialized nature of this particular set of futures, it would not be possible to generate a large enough set of midcast possibilities that they could form a network by being connected to each other.
Case 3: The 2003 war in Iraq

The entity

A continuing challenge of this case was to define the entity. The framework set out in chapter 7 characterizes any futures project as studying “the futures of [specified concern] among [specified social group] in [specified location] during [specified time range].” The category of concern covered both activities and concepts. Every other case in this project was a social entity: either an organization or a geographical area. In this case, the initial entity was the possible war in Iraq. Because this was becoming a worldwide political issue, other entities could also have been identified, such as the effect of a war in Iraq on other countries’ relationships with the USA. By specifying the entity too broadly, the scope of the study would become large and unmanageable. On the other hand, by specifying the entity too narrowly as events unfolded, there was a danger of ignoring important effects (just as the Europe 2000 study discussed in Appendix 1 overlooked the potential for change in Eastern Europe). Unlike every other case in this project, the scope was not specified by the entity’s needs, because there was no client.

The solution adopted was not to seek an exact definition, but a focus. Thus the final definition of the entity was “the conflict between the USA and Iraq, centred on the war in 2003.” The term “conflict” covered threats of war, possible war, and possible guerilla resistance during a US occupation of Iraq. The second half of the sentence allowed related issues to be included.

In terms of scale: compared with the other cases in this project, this was by far the largest-scale entity, in terms of number of people involved, number of people aware of it, and in financial terms.

Classification

In terms of the taxonomy in chapter 8, the Iraq case met the following criteria:

Category 1.1 An action
Category 2 No specific social entity – but see below
Category 3.3 Scale of location: a country
Category 4 Time scale: around 3 years
In terms of the additional entity types sought for this study, it was a member of the following groups:

A4 Entity undergoing major organizational change
A9 Complex set of large-scale events with many unknown factors
A13 International entity
A15 Situation with a high level of conflict
A26 Situation driven mainly by the intentions of the actors involved.

**Procedure**

As this study used secondary data, there was no recruitment of participants. The scenario map was prepared mainly by myself, with occasional contributions and suggestions from several colleagues who had closely followed the development of this issue. Most of these were doctoral students in management-related disciplines; none was a student of history or political science. Their contributions were more like peer reviews than participation in the sense of the other case studies.

The initial scenario map was created in February 2003, and presented at a seminar on qualitative research methods. Following feedback from other participants, I revised the network map and presented it again at another seminar a month later, a few days before the invasion of Iraq began. At that time, it was still uncertain whether or not the war would go ahead. The first version had included only the events (top) layer of the hemisphere (as described in chapter 4, section 4.7), while the revised version added the second layer, of intentions. The third layer was added later, by which time the war had officially finished.

The main data sources used for this case included news media (mainly online), peer-reviewed articles (few, because of the delays inherent such publishing), articles in news and current affairs magazines (fact-checked rather than peer-reviewed), web sites, and several books. The sources most frequently used were as follows. All website references were rechecked on 21 March 2005.

**News media:**

- BBC News Archive (www.bbc.co.uk)
- Online English-language newspapers and news services in Islamic countries, listed on the web site of the Brookings Institution's Saban Centre for Middle East Policy: *Major English-language Media Sources Within the Islamic World*, at www.brookings.edu/fp/research/projects/islam/resources.htm
- US newspapers, particularly the *International Herald-Tribune* and the *Christian Science Monitor*
- Public Broadcasting Corporation, USA (accessed through www.pbs.org)

Journals and current affairs magazines:
- *Aspects of India's Economy*, special issue on the US-Iraq war, nos. 33-34, December 2002

Books:
- Cerf and Sifry (2003) - a wide-ranging anthology on the war
- Marr (2004) *Modern History of Iraq*
- Kapitan and Schulte (2002) and Primoratz (2004) on issues relating to terrorism
- Pelletiere (2001), on oil as a factor in the 1991 Gulf war.

Reports and official documents:
- Glenn and Gordon (2003) on peace scenarios for the Middle East

Websites other than news:
- www.aeronautics.ru (a Russian military viewpoint)
- www.regiments.org (a British military viewpoint)
- Papers from a series of 2003 workshops from the Wharton Business School, University of Pennsylvania (knowledge.wharton.upenn.org), on the rebuilding of Iraq

The main uses of these sources were to determine the course of events, the relevance of these events as seen by various stakeholders, and the perceived motives of the actors involved.
Output

To assist with compiling the scenario map, two preparatory documents were created:

- a system impingement diagram – including only the major actors, because so many different groups were involved. (To some extent, most of the world’s population were stakeholders in this issue.)
- a Leaf of Goals, for the USA’s intentions. Leaves of goals for other actors were not attempted, because insufficient information was available.

Impinging systems

Figure A4.3.1 below shows the expected post-war state, with US occupying forces dominating the Iraq government (or what would be left of it) and also the Iraqi population. To keep the diagram legible, only the key actors are represented. Directions of arrows show influence: solid arrowheads show power, open ones, advice. (How could guerilla groups have power over the US cabinet? In that they could make it react.) Lines with question marks instead of arrows suggest that influence probably exist, but the direction is uncertain.

Note that the systems can be amalgamated into larger holons in several ways - such as (a) a Western Powers group on the left and a Middle Eastern group on the right, and (b) a US government group at upper left centre and an Iraqi group at upper right. Conversely each of the units in the diagram could be subdivided further - such as dividing the “Iraq Population” group into Sunni, Shia, and Kurdish components.

Figure A4.3.1 Systems impinging on the war in Iraq
Leaf of Goals

Figure A4.3.2 (below) was the first Leaf of Goals to be constructed. This shows various objectives of the USA in its “War on Terrorism.” The goals progress from left to right (the direction of *kairos*) but the diagram is more easily read from right to left, beginning with the ultimate goal of “survive well” at the far right of the leaf, with round-tailed arrows indicating that there are other ways of surviving well. The leaf is incomplete at lower left in the “Remove threat” strategy group: partly because it was not feasible for the USA to present a low profile, and partly because dealing with the terrorist threat at the root cause level does not seem to have been explored (Kapitan, 2002; Primoratz, 2004). The upward arrow from “Régime change” signifies side-effects arising from that action - which may either reinforce or work against accomplishment of the major objectives. Higher-level objectives, not involving specific action, do not have specific side-effects.

The diagram could be indefinitely expanded, using the holonic principle. For example, the “Régime change” box could be split first into different countries, then into different modes of régime change, including direct military attack, removal of key leaders, and fomenting opposition. To present a detailed Leaf of Goals, a succession of diagrams would be needed.

![Diagram of Leaf of Goals for the USA in its “War against Terrorism”](image)

**FIGURE A4.3.2 LEAF OF GOALS FOR THE USA IN ITS “WAR AGAINST TERRORISM”**

Note the use of some mutually exclusive pairs to ensure completeness at the higher (right-most) levels: Deal with Threat vs Obviate Threat, and Offensive vs Defensive. To that extent, the right hand part of the Leaf of Goals is a morphological hierarchy.

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With this first Leaf of Goals using a real case, some practical questions emerged. Chief among these was the issue of whether to present the goals as seen by the focal entity, or a potentially larger set of goals including some seemingly not considered by that entity. The solution (embodied in Figure A4.3.2) was to show as many high-level goals as could be identified, but to provide detail (toward the left) only for goals known to be considered by that actor.

It would also be useful to create a Leaf of Goals for the other major party in this conflict, the Iraqi government led by Saddam Hussein, but from the information available (such as Cerf and Sifry, 2003, and Fallows, 2004) it was not possible to create a coherent goal structure.

**Scenario map**

Having delineated the Impinging Systems and the Leaf of Goals, it became possible to create a scenario map. As this case was the first in which the hemispherical model was applied, each of the four layers is dealt with separately.

**Layer 1: events**

Figure A4.3.3 (overleaf) shows the top level, with events as holons. A key issue was how much detail should be included on the scenario map. Each of the holons could have been divided indefinitely: the challenge was to present few enough that the map could be clearly understood as a whole, but many enough that no major possibility was excluded. Accordingly, a practical decision was made to restrict the map to a single page: A3 size when displayed on a wall, and A4 when included in a report. This accommodated an upper limit of about 30 holons. Figure A4.3.3 has 29 holons, of which 9 are in the past and 20 in the then-future. Given the constraint of fitting the diagram onto a single page, the Past section of the map was much abbreviated. This enabled more focus on the future (at the time of preparation, in February 2003),

**Layer 2: motives**

As noted in chapter 5, the focus in a scenario map is more on the links between events than on the events themselves. Thus the second layer of the hemisphere shows the underlying motives for each transition between two events. The 29 events in Layer 1 were connected by 34 links between pairs of events: hypotheses that the occurrence of the first event in the pair would lead to, “cause,” or increase the probability of the occurrence of the second event. The corresponding question to ask for each link is “For what reasons would the first event lead to the second?” Because this is a study of human futures, those reasons would entail human agency, labelled here as “motives” in the broadest sense.
Figure 4.3 in chapter 4 implies that each layer would include less detail than the previous level. In this first application of multiple layers it became obvious that that assumption was mistaken. This was partly because there were more links than nodes in Figure A4.3.3 (almost necessarily: otherwise the scenario map could only be a single chain, with no branching), and partly because (in accordance with the multiple-cause axiom) most links between events had multiple and distinct reasons.
Gulf war 1991

Sanctions on Iraq

Iraq defies sanctions

Feb 2003

Other countries mediate

US loses interest in Iraq

US threatens Iraq

Iraq doesn't comply (enough)

US attacks Iraq

US loses [unlikely]

Other powers put sanctions on US

US bombs Iran, Libya, Syria...

Troublesome US colony

Successful US colony

Unrest among Kurds and Shiites

US military attention tied up

Anti-US coup in another country

Iraq split into 3: Sunni, Shia, Kurd

Iran and Turkey drawn into the conflict

Saddam stays on

Iraq loses interest in Iraq

FIGURE A4.3.3 LAYER OF THE SCENARIO MAP: EVENTS
As an example of a key transition, the following are possible explanations for question 1 on transition B in Figure A4.3.3. A question frequently asked at the time was “Why is the USA picking on Iraq?” when there was little evidence that Iraq had supported anti-US terrorism. One answer is that the multi-cause axiom applies: though there was no one overwhelming reason (unless the US government genuinely believed that Iraq possessed and was ready to use weapons of mass destruction), there are many minor reasons:

<table>
<thead>
<tr>
<th>B. US worries about more terrorist attacks → US threatens Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Internationally oriented reasons</td>
</tr>
<tr>
<td>1 Iraq is rumoured to have weapons of mass destruction, including rockets capable of attacking (US client state) Israel.</td>
</tr>
<tr>
<td>2 Iraq government is no longer co-operating with weapons inspectors.</td>
</tr>
<tr>
<td>3 Hussein/Baathist regime is tyrannical, probably unpopular with most Iraqis.</td>
</tr>
<tr>
<td>4 As régime is territorially aggressive (having attacked Iran and Kuwait), its removal should please neighbouring countries.</td>
</tr>
<tr>
<td>5 A more moderate régime in Iraq might help resolve the Israel/Palestine question.</td>
</tr>
<tr>
<td>6 Educated/moderate population compared with others in region, so Iraq could quickly become a modern developed state, an example to others such as Saudi Arabia.</td>
</tr>
<tr>
<td>7 Outstanding UN resolution from 1991 can be used to justify intervention.</td>
</tr>
<tr>
<td>8 Of all six &quot;rogue states&quot; identified by US, Iraq would be the most acceptable target to the UN, for the above reasons.</td>
</tr>
<tr>
<td>(ii) US domestic reasons</td>
</tr>
<tr>
<td>9 Proposals for Iraq régime change had circulated within the US government since at least 1991.</td>
</tr>
<tr>
<td>10 US desire to preserve flow of oil from Middle East (with US oil supplies running out).</td>
</tr>
<tr>
<td>11 Unfinished “son’s business” (President Bush Sr allowed Hussein régime to stay).</td>
</tr>
<tr>
<td>12 Iraq trading oil in euros, not US dollars, threatening stability of the US currency.</td>
</tr>
<tr>
<td>13 Divert US public from ailing US economy.</td>
</tr>
<tr>
<td>14 If US wanted to dominate world oil, Iraq is an ideal country to control.</td>
</tr>
</tbody>
</table>

All the above reasons could be combined to form a scenario map just as complex as the main map in Figure A4.4.3. Note that not all components can be described as strictly “motives”: that term is simply a label covering the reasons why human events occur. However, hindsight is perhaps more fruitful than foresight in supplying such motives. Turning now to a sample transition between future events, consider link Q, four which only four motives were identified:
TABLE A4.3.2 LINKAGES FOR TRANSITION Q IN FIGURE A4.3.3

Q. US attacks Iraq → Iraq becomes a troublesome US colony
1. US occupation is not welcomed, with Iraqi perceptions that US (and its occupying army) does not respect Islamic values.
2. USA and UN fail to deliver on promises, such as quickly ending sanctions. This creates hostility to the new government and US occupying forces.
4. Internal conflict, previously suppressed by Hussein government, flares up, with inter-ethnic fighting in Iraq between Sunni, Shia, and Kurdish groups.

Having found so many motives (95 in total, for the 34 links), it proved not feasible to show them all on one diagram; some method of data reduction became necessary. Because each major actor’s more tactical motives (toward the left of the Leaf of Goals) hardly varied through this period, the obvious solution was to group motives by actors. The result was this table of motives:

TABLE A4.3.3 MOTIVES OF ACTORS UNDERLYING EVENTS IN FIGURE A4.3.3

<table>
<thead>
<tr>
<th>Actor</th>
<th>Ascribed motives</th>
<th>Relevant links</th>
</tr>
</thead>
<tbody>
<tr>
<td>US president and cabinet</td>
<td>Be re-elected</td>
<td>IJKOPQUWZaa-ac ae-ah</td>
</tr>
<tr>
<td></td>
<td>Reduce risk of terrorism in US</td>
<td>Z aa-ac ae-ah</td>
</tr>
<tr>
<td></td>
<td>Increase US power in the world (political, military, and corporate)</td>
<td>OPQNSTWXagah</td>
</tr>
<tr>
<td></td>
<td>Make Iraq more like USA</td>
<td>PQ</td>
</tr>
<tr>
<td>US public</td>
<td>No foreign terrorist attacks in US</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Continued supply of oil</td>
<td>-</td>
</tr>
<tr>
<td>US military</td>
<td>Maintain influence on US cabinet</td>
<td>J K O P Q U X</td>
</tr>
<tr>
<td></td>
<td>Increase fighting skills</td>
<td>K U X</td>
</tr>
<tr>
<td></td>
<td>Increase equipment levels</td>
<td>K U X</td>
</tr>
<tr>
<td></td>
<td>Avoid casualties</td>
<td>K U V X</td>
</tr>
<tr>
<td>US industry</td>
<td>Continued supply of cheap oil</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Corporate growth *</td>
<td>-</td>
</tr>
<tr>
<td>European powers</td>
<td>Exert influence over Middle East</td>
<td>LPWY</td>
</tr>
<tr>
<td>(Germany, France, Russia)</td>
<td>Keep US power in check</td>
<td>K-NRSUX</td>
</tr>
<tr>
<td></td>
<td>Reduce Islamic terrorist threat locally</td>
<td>Z aa-ac ae af</td>
</tr>
<tr>
<td></td>
<td>Continued supply of cheap oil from Iraq</td>
<td>LPRS</td>
</tr>
<tr>
<td>UN</td>
<td>Appear to be strong, so enforce resolutions</td>
<td>GK</td>
</tr>
<tr>
<td></td>
<td>Reduce conflict within Security Council</td>
<td>KFPQU</td>
</tr>
<tr>
<td>Iraqi government (1)</td>
<td>Be source of all power in Iraq</td>
<td>IK</td>
</tr>
<tr>
<td>Baathist</td>
<td>Escape UN sanctions, no-fly zones, etc.</td>
<td>GIRS</td>
</tr>
<tr>
<td></td>
<td>Dominate region by military threat</td>
<td>K-NRS</td>
</tr>
</tbody>
</table>

438 Appendix 4
<table>
<thead>
<tr>
<th>Actor</th>
<th>Ascribed motives</th>
<th>Relevant links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraqi government (2) under US occupation</td>
<td>Do not offend USA</td>
<td>PQVXad</td>
</tr>
<tr>
<td>Iraqi public</td>
<td>Recover lost standard of living *</td>
<td>PQV</td>
</tr>
<tr>
<td>Iraqi resistance</td>
<td>Retain privileges from Baathist regime</td>
<td>Q</td>
</tr>
<tr>
<td>Iraq’s Islamic neighbours</td>
<td>Keep US power in check</td>
<td>LNRs</td>
</tr>
<tr>
<td></td>
<td>Guard Islamic heritage</td>
<td>LPQRS</td>
</tr>
<tr>
<td></td>
<td>Good relations with new Iraq government</td>
<td>PQVYad</td>
</tr>
<tr>
<td></td>
<td>No independence for Kurdistan [on the part of Turkey, Iran, Syria]</td>
<td>VYad</td>
</tr>
</tbody>
</table>

a. For the various publics, stakeholders rather than actors, these are wishes rather than intentions.

Though the above table is concise, unfortunately it is difficult to relate the motives to the links in Figure A4.3.3. However, after experimenting with several graphical methods of connecting motives to events, all were a tangled mess of lines, just as difficult to interpret as the above table, but more prone to error. One solution would be to use software that displayed a scenario map at the events level, which would display motives whenever the mouse was moved over one event. However this would not be simple to produce, and no existing software was found that could do this. On the positive side, the use of a table such as the above simplified the construction of the next (values) layer of the hemisphere.

Layer 3: Values - first classification

Following the model outlined in chapter 4 (section 4.7) and the data reduction implicit in figure 4.3, the third layer was initially based on a set of values derived from the research carried out in this field originally by Rokeach (summarized in his 1973 book) and continued by Schwartz and colleagues (most comprehensively summarized by S. Schwartz, 1994). The issue to be tested in this case study - to confirm the usefulness of the hemispherical model - was that a set of values could be drawn from the data that would plausibly link the frequently changing motives in Layer 2 with the imperceptibly changing worldviews in Layer 4. The following table derives two primary values underlying each motives listed in Table A4.3.3 (sourced mainly from attributions in news reports of the conflict).
### TABLE A4.3.4 VALUES ASCRIBED TO MOTIVES OF DOMINANT ACTORS

<table>
<thead>
<tr>
<th>Actor</th>
<th>Relevant motives, stated and deduced</th>
<th>Primary values</th>
</tr>
</thead>
<tbody>
<tr>
<td>US president and cabinet</td>
<td>Get president re-elected</td>
<td>power, achievement</td>
</tr>
<tr>
<td></td>
<td>Reduce risk of terrorism in US</td>
<td>security, tradition</td>
</tr>
<tr>
<td></td>
<td>Increase US power in the world (political, military, and corporate)</td>
<td>power, achievement</td>
</tr>
<tr>
<td></td>
<td>Make Iraq more like USA</td>
<td>security, prosocial ¹</td>
</tr>
<tr>
<td>US public</td>
<td>No foreign terrorists in US</td>
<td>security, tradition</td>
</tr>
<tr>
<td></td>
<td>Continued supply of oil</td>
<td>comfort, tradition</td>
</tr>
<tr>
<td>US military</td>
<td>Maintain influence on US cabinet</td>
<td>power, achievement</td>
</tr>
<tr>
<td></td>
<td>Increase fighting skills</td>
<td>self-direction, achievement</td>
</tr>
<tr>
<td></td>
<td>Increase equipment levels</td>
<td>stimulation, power</td>
</tr>
<tr>
<td></td>
<td>Avoid casualties</td>
<td>benevolence, conformity</td>
</tr>
<tr>
<td>US industry</td>
<td>Continued supply of cheap oil</td>
<td>comfort, tradition</td>
</tr>
<tr>
<td></td>
<td>Corporate growth</td>
<td>achievement, comfort</td>
</tr>
<tr>
<td>European powers</td>
<td>Exert influence over Middle East</td>
<td>power, security</td>
</tr>
<tr>
<td>(Germany, France, Russia)</td>
<td>Keep US power in check</td>
<td>power, prosocial</td>
</tr>
<tr>
<td></td>
<td>Reduce Islamic terrorist threat locally</td>
<td>security, tradition</td>
</tr>
<tr>
<td></td>
<td>Continued supply of cheap oil from Iraq</td>
<td>comfort, tradition</td>
</tr>
<tr>
<td>UN</td>
<td>Do not appear weak, so enforce resolutions</td>
<td>power, conformity</td>
</tr>
<tr>
<td></td>
<td>Reduce conflict within Security Council</td>
<td>harmony, achievement</td>
</tr>
<tr>
<td>Iraqi government</td>
<td>Be source of all power in Iraq</td>
<td>power, tradition</td>
</tr>
<tr>
<td>(1) Baathist</td>
<td>Escape UN sanctions</td>
<td>comfort, self-direction</td>
</tr>
<tr>
<td></td>
<td>Dominate region</td>
<td>power, achievement</td>
</tr>
<tr>
<td>Iraqi government</td>
<td>Do not offend USA</td>
<td>conformity, security</td>
</tr>
<tr>
<td>(2) under US occupation</td>
<td>Rebuild Iraq’s economy following sanctions</td>
<td>comfort, achievement</td>
</tr>
<tr>
<td></td>
<td>Resist partition of Iraq</td>
<td>power, self-direction</td>
</tr>
<tr>
<td>Iraqi public</td>
<td>Recover lost standard of living</td>
<td>comfort, benevolence</td>
</tr>
<tr>
<td></td>
<td>Freedom from arbitrary power</td>
<td>self-direction, benevolence</td>
</tr>
<tr>
<td></td>
<td>Peaceful life</td>
<td>security, comfort</td>
</tr>
<tr>
<td>Iraqi resistance</td>
<td>Retain privileges from Baathist regime</td>
<td>comfort, tradition</td>
</tr>
<tr>
<td></td>
<td>Guard Islamic heritage</td>
<td>tradition, power</td>
</tr>
<tr>
<td>Iraq’s Islamic neighbours</td>
<td>Keep US power in check</td>
<td>power, tradition</td>
</tr>
<tr>
<td></td>
<td>Guard Islamic heritage</td>
<td>tradition, power</td>
</tr>
<tr>
<td></td>
<td>Good relations with new Iraq government</td>
<td>harmony, comfort</td>
</tr>
<tr>
<td></td>
<td>No independence for Kurdistan [on the part of Turkey, Iran, Syria]</td>
<td>security, tradition</td>
</tr>
</tbody>
</table>

¹ Disagreed with by some reviewers of this case, but supported by evidence in Langewiesche (2004).

The most widespread values in the above table are power, security, and comfort: perhaps to be expected, when actors are political entities. Of course, the table is an over-simplification: it can be presumed that for any intention, many values apply, to varying extents. The central issue here is to what extent changes in values determine changes in the motives in Layer 2 - and vice versa. Because the above classification did not seem particularly helpful to anybody who reviewed it, other categorizations of values were applied to the same set of intentions.
Layer 3: values - second classification

For the second working of the data, values were based on two other taxonomies: the four mindscape\(_s\) of Maruyama (1980, 1982, 1994), and the eight VMemes of spiral dynamics (Beck and Cowan, 1996; Cowan and Todorovic, 2000). These are not so much individual values, as clusters of values.

The following table attempts to assess predominant values among the eleven dominant actor groups in this case, using both Beck’s and Maruyama’s categorizations. The VMemes in the table are from Wilber’s (2003) paper on the war in Iraq, hence the addition of two actor groups not included in the previous tables, but to which Wilber specifically referred. As an aid to memory, the colours are followed by number (in the range 1 to 8) illustrating the VMeme spiral of development. The mindscape\(_s\) are my own interpretation, after relating the descriptions by Maruyama (1980 and 1982) to my knowledge of events, drawn mainly from a wide range of online news sources based in the US, UK, Australia, and Middle East.

**TABLE A4.3.5 VALUES ASCRIBED TO DOMINANT ACTORS**

<table>
<thead>
<tr>
<th>Actor group</th>
<th>Main value clusters</th>
<th>VMemes</th>
<th>Mindscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>US cabinet &amp; president</td>
<td>blue (4) *</td>
<td></td>
<td>Individualist</td>
</tr>
<tr>
<td>US public</td>
<td>blue (4) to orange (4) *</td>
<td></td>
<td>Individualist</td>
</tr>
<tr>
<td>US industry</td>
<td>orange (5)</td>
<td></td>
<td>Hierarchical</td>
</tr>
<tr>
<td>US military</td>
<td>orange (5)</td>
<td></td>
<td>Hierarchical</td>
</tr>
<tr>
<td>European powers (Germany, France, Russia)</td>
<td>green (6)</td>
<td></td>
<td>Hierarchical, Stable</td>
</tr>
<tr>
<td>UN</td>
<td>green (6)</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Iraqi government (1) Baathist</td>
<td>red (3) *</td>
<td></td>
<td>Hierarchical</td>
</tr>
<tr>
<td>Iraqi government (2) under US occupation</td>
<td>blue (4) ?</td>
<td></td>
<td>Hierarchical</td>
</tr>
<tr>
<td>Iraqi public</td>
<td>blue (4)</td>
<td></td>
<td>Hierarchical, Stable</td>
</tr>
<tr>
<td>Iraqi resistance</td>
<td>red (3) to orange (5) ?</td>
<td></td>
<td>Hierarchical, Stable</td>
</tr>
<tr>
<td>Iraq’s Islamic neighbours</td>
<td>red (3) to blue (4)</td>
<td></td>
<td>Hierarchical, Stable</td>
</tr>
<tr>
<td>UK government (esp. Blair)</td>
<td>yellow (7) *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western media (esp. print, non-populist)</td>
<td>green (6) to orange (5) *</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. As stated by Wilber (2003)

The intended use of the above table was to help foresee changes in values (Layer 3) which in turn influence changes in motives (Layer 2), which in turn would influence changes in events (Layer 1). However, after three layers of the hemisphere had been completed, the usefulness of the values layer was not evident. Dividing values using the above taxonomies seemed of questionable value; further development was clearly needed.
Case 4: A community legal service (LS)

The entity

LS was founded in the early 1970s, to advance indigenous legal rights in South Australia. It had two main divisions: one dealing with land rights, and the other providing legal advice to people charged with crimes, as well as for civil and family law. The two divisions work autonomously, and only the latter was directly involved with this project – though, since it involved constitutional change, it had implications for the whole organization.

As a dispossessed people who had difficulty coming to terms with Western society, Aboriginal people had low social status in Australia. Compared with the Australian population as a whole, Aboriginal people have higher birth rates, lower life expectancy (and therefore a much younger population, on average), higher unemployment rates, less education, lower average income, and higher crime rates. A frequently cited statistic is that Aboriginal people are 10 times as likely to be imprisoned as other Australians. There was thus a clear need for a service such as LS.

The Aboriginal population is relatively small. In South Australia, with a population of some 1,510,000 at the 2001 Census, 25,544 people identified themselves as Aboriginal: 1 person in every 60. LS handles the majority of South Australian criminal cases involving Aboriginal people: 10,060 in 1999-2000 (the most recent figures available at the time). As this is one case for every 2.5 people, or about one case per household per year, LS is familiar to most of the Aboriginal population.

At the time of the study, it had a staff of 88, including 18 legal officers, with around half the total staff being Aboriginal. Its board had 21 members. Each of these represented a regional area averaging only about 1,000 adults, with some of these areas being several hundred kilometres broad. The method of triennial election of board members was decided locally in each region, but most regions conducted their elections at public meetings. LS constitution stated that every adult member of the Aboriginal population had a right to vote in these elections. Because of the distances involved in some cases, and the relatively small populations, attendance at these meetings was often small – as little as 6 people, and rarely more than 30. Committees were supposed to elect members on their merits and find the best person for the job; however it had been noticed over many years that a family, by organizing transport for its members to the place of meeting, could stack the election and elect a candidate of the family’s choice. Other things being equal (I was told), the largest and best-organized family
won. Though it could be argued that this was a classic case of grassroots democracy in action, there was also a contrary view that the quality of the Board was not always as high as it should have been, in terms of achieving disinterested community control and the best possible management.

The above situation is reported as described to me by LS managers with whom I was dealing; others may have had different viewpoints. Whether or not such election-stacking occurred, the outcome was that many board members were reported to be "only doing it for the money." Apparently, daily attendance fees and travel allowances for meetings, paid on the standard government scale, were very attractive for board members subsisting on an employment benefit – hence the push by families to have their own people elected. On the other hand, the 1999-2000 Annual Report showed that most council members were paid less than $2000 in that year: only about 10% of the unemployment benefit for an average family.

The core problem with many board members was their lack of experience in the conventions of government administration: how to be a competent board member, and make well-informed decisions in the best interests of the organization. Being well-intentioned and supportive of the organization was no longer regarded as sufficient. Since the 1990s, boards around Australia, under the pressure of more stringent legislation on accountability, have become more professionalized, seeking specific skills of their potential members. Another problem, not considered seemly in a boardroom setting, was the occasional physical threats and even personal violence between members. Following such threats, one board member had had a restraining order taken against him by a senior staff member.

In summary, the view of the senior staff of LS was that the Board was dysfunctional. This had been the case for some years, and LS’s reputation among some educated Aboriginal people (and others who had dealt with it) was low. Several people whom I spoke to about this case study advised me to have nothing to do with LS, because of the intense conflict between board members. However, my sample design included a high-conflict situation, and with 20 years’ experience in facilitation, I was reasonably confident of my ability to defuse most conflict. However, as I had no experience at dealing with intra-Aboriginal conflict, I took the precaution of engaging a co-facilitation team: a husband and wife who had lived among Aboriginal people for many years, and were also highly experienced mediators. They would facilitate the workshops, while I would be an observer.
**Classification**

In terms of the taxonomy in chapter 7, this case met the following criteria:

- **Category 1**: Specific activity or concept: governance
- **Category 2.6**: A non-government organization
- **Category 3.3**: Scale of location: one state of a country (South Australia)
- **Category 4**: Time scale for scenarios: very short (estimated as 6 months)

In terms of the additional entity characteristics sought for the study, this case fulfilled the following criteria:

- **A4**: Entity undergoing major organizational change
- **A8**: Self-contained entity, not part of any other, with no subsidiaries
- **A15**: Situation with a high level of conflict
- **A21**: Service sector
- **A23**: Very complex network of stakeholders
- **A25**: No major change for decades

In holonic terms (as noted by the presence of A8) this organization was independent: it was not a part of any other organization. It did have tiny regional offices, but because these were in constant contact with the main office, were very small (averaging 4 to 5 staff), and had a very high turnover, they were outposts rather than subsidiaries, and thus not separate holons for the purposes of this study. (But if the study had been on the future of LS's office accommodation, they would have been separate holons, and criterion A8 would not have applied.)

Though structurally LS was independent, this independence did not extend into all aspects of its operation. When the commonwealth government agency that supplied 81% of its 1999-2000 funding revised the funding formula that had been used for 30 years, LS realized it was not so independent after all.

**Procedure**

**Recruitment**

The actors involved included senior staff, board members, and community representatives. Because I was unacquainted with the possible participants, I left it to a working group of senior staff to make the invitations. My request was simply for around 20 participants for the

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1. More recent figures could not be obtained, but there was no reason to believe that the percentage was substantially different at the time of the study in late 2003.
workshops (anticipating that a minimum of around 12 would turn up), to include as wide as possible a range of people involved with the organization in some way relevant to this study. Many of the people associated with LS had known each other for decades, and had evolved various animosities, such that if Person A knew that Person B was to attend, A would be likely not to – but if both A and B attended there might be violent consequences. I hoped that at least one representative of GA, the government agency that funded LS, would turn up, but GA decided that their attendance in a process likely to result in a reorganization of LS’s governance structure would be a conflict of interest. In the end, because of extensive vetting of the list of potential participants (so I gathered), invitations were sent out only a few days before the first workshop, to a narrower range of people than I would have hoped.

Environment
The selection of a room for the workshop was an important factor here. I wanted a room that was larger than necessary, so that disputants could be physically separated from each other – but not too much larger, so that they would have to shout. I wanted the room to be acoustically dead, so that it would absorb sound, and act as a calming influence. It needed to have at least two separate entrances, so that disputing participants would not have to be in proximity when entering or leaving. The room also needed to have ample wall space – either on one long blank wall, or two adjoining blank walls. On this wall space would go the “recorded memory” as in Future Search (Weisbord and Janoff, 1995), and seats would be arranged so that the words written large on that wall would become the focus of discussion, rather than personalities (as recommended by Doyle and Straus, 1993). Participants (many of whom would know each other) would sit at small tables of about 6 chairs, so that they could feel supported by those at their table.

As there was no such room in LS building, a space was hired at the office of a local indigenous health organization. Apart from the fact that it had several large meeting rooms, this organization was admired by LS management, because of its reportedly harmonious operation and its smaller and more professional board, the structure of which LS managers were hoping to emulate in their own organization.

Activities
The initial plan (later modified) was for the workshops to follow this standard sequence:

Workshop 1: The past. The recent history of the organization that was still relevant for its future.
Workshop 2: The present: Discovering the current forces influencing LS, terms of stakeholders and their goals that could affect LS.

Workshop 3: Futures (1): components of possible futures. Building up elements of scenarios, using futures wheels, backcasting, and midcasting. Several broad morphological paths would be set up, so that the backcasting could work back along these.

Workshop 4: Futures (2): assembling the components developed in workshop 3 into scenario paths, and probing the lower levels of the hemisphere.

As it turned out, each workshop was preceded and followed by a planning meeting. The follow-up meetings proved useful for joint reflections.

The first workshop was held in a room that mostly met the specifications listed above, but with one clear difference: it had a wooden floor, and a long wall of windows, and therefore was acoustically live. 14 participants were present, plus the two facilitators, and myself as observer. Around half the participants were staff and board members, while the other half were community members. The workshop began dramatically, when a man leapt to his feet and demanded "Why are we here?" Not satisfied by the answers given by the facilitators and LS managers, he began to verbally attack the CEO. Several others at his table joined the attack. (After an hour or so of peace-making attempts by the facilitators, one senior manager quietly left. He told me later that he'd experienced this type of thing before, and he expected the conflict to continue for the whole morning). After repeatedly announcing imminent departure, the man attacking the CEO finally did so, along with others from his table. I later found that he was a former CEO of LS, disappointed at what he saw as its decline; those who had left with him had come with him to provide support.

Accordingly, very little of the program was accomplished during the first workshop. At the reflective meeting of the organizing subcommittee the agenda for the second workshop was reorganized.

The later workshops had a very different (and much more productive) ambience, for four reasons:

1. The CEO stayed away, saying that his presence could jeopardize the success of the project. (He was an outsider to South Australia, and recognized that as such he may have been unpopular with many local Aboriginal people, believing that a local should have been appointed.) He was particularly concerned at the presence of the former CEO.
2. The former CEO, however, also stayed away, having made his point, and having received little support from others present.

3. We managed to change to another room (which had been occupied by another group during our first workshop). This was carpeted, which provided a quieter working environment. Shouting is much less effective when a room is not acoustically live - though, as it turned out, no conflict at all was vented in the later workshops.

4. This room also had more wall space, enabling better focus on the wall-mounted “shared memory,” written in large letters on large sheets of paper.

Because so much time had been lost during the first workshop, and because of the tight deadline it was not feasible to add a further workshop to make up for it. Thus the second workshop (which was to have studied the present situation of LS) had the “past” element combined with the present, so that the last two workshops would be able to focus on the future. 16 participants were present for the second workshop, 14 for the third, and 12 for the fourth, final workshop. There was some turnover, with several new people appearing at each workshop (even the final one), and some others who did not turn up for the following workshop.

**New elements**

Because this was consultancy rather than purely academic work, and because the client had an overriding need for change, the final workshop involved not only laying out scenario paths, but also for participants making a choice between them. The senior counsel of LS (the main person with whom I dealt) had formed the opinion that of the five scenario paths we had identified, only one would ensure the survival of the organization. The final session, despite a push by me to treat all five internal paths in an even-handed way (as in criterion E7 in chapter 4, section 4.5), did not achieve this as well as I had hoped, with some participants actively trying to persuade others that one scenario path was the best. This was a new factor.

**Output**

**Internal and external scenario paths**

Two sets of issues were relevant here:

1. How LS could change to satisfy GA’s conditions and win the contract. Possibilities ranged between minimal change ((minimal changes to the constitution) and comprehensive change (also changing LS’s management practices).

2. The context into which LS fits: whether the tender goes ahead, and if so, its outcome.
To cover both sets of issues, two sets of scenarios were created - though other writers (such as Simpson, 1992) would maintain that because the first set is based on LS's own decisions, these are not scenarios at all. However, because SNM tries to anticipate the interplay between internal decisions and external forces, both were included in this study.

The internal scenario paths were derived from a futures wheel exercise. Initially four paths were delineated that were internal: changes could be made wholly within the organization. 10 participants (most of those present) voted on a preference. Nine of the 10 chose path 2 (board reform), and one chose path 4 (becoming a state government agency). Nobody chose the status quo or the model drafted by the Legal Services Commission. In the third workshop, a fifth path was added: the same as path 2 (board reform) plus extensive administrative reform. Most of those present at the time were staff members, as opposed to board members or senior management, and there was overwhelming support for path 5, though no formal vote was taken.

Four external paths were added at the next planning meeting, as none of the five paths listed by participants took account of circumstances external to LS.

<table>
<thead>
<tr>
<th>Path</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Internal</td>
</tr>
<tr>
<td>2</td>
<td>Internal</td>
</tr>
<tr>
<td>3</td>
<td>Internal</td>
</tr>
<tr>
<td>4</td>
<td>Internal</td>
</tr>
<tr>
<td>5</td>
<td>Internal</td>
</tr>
<tr>
<td>6</td>
<td>External</td>
</tr>
<tr>
<td>7</td>
<td>External</td>
</tr>
<tr>
<td>8</td>
<td>External</td>
</tr>
<tr>
<td>9</td>
<td>External</td>
</tr>
</tbody>
</table>

At first it seemed impossible to display all nine scenario paths in diagrammatic form. But by reducing the components to a minimum, it became possible to express all the above scenarios in one diagram, by focusing the diagram on the external scenarios. All five internal scenarios were contained in a single holon in that diagram, entitled “LS attempts reform.” All shared the same input (the need to solve the current problem) and one of two outputs: either the reform would be completed on time and in a form acceptable to GA, or else it would not. The following diagram is a network map for the external scenarios.
This was the simplest meaningful but comprehensive scenario diagram that could be created for LS, with just 20 nodes and 28 arcs. It looks more complex than it really is, because it was not possible to draw it in such a way as to avoid some lines crossing. The O at centre left is the origin, representing the pre-existing situation. Note that several holons in the above figure have a single output line, later branching. As explained in the Notation section in chapter 5, section 5.4.2, this indicates that only one of the branches can eventuate).

The above map focused on the context of the problem at hand for LS, by collapsing some possibilities in the chain - for example, whether private law firms might successfully bid for some ex-LS work, find it difficult and unprofitable, and then if unsuccessful in lobbying GA for more funding in the next round, they might not reapply, and LS might be able to re-emerge. All of this is shown above as “New contractors have difficulties.” Because this issue had been discussed several times in the meetings, those four words had a clear meaning to participants. To eliminate clutter from the map a little, several very remote possibilities have been omitted, such as LS being able to bid, but not doing so.

The above diagram covers only the Events layer of the hemisphere. This was largely due to the time constraints applying to the completion date of the study. Though the meanings of some arrows in Figure 9.5.2 (corresponding to the second layer: motives) were discussed at various points, no network diagram was created for the Motives level. Note that many of the arrows, even though they link events, do not correspond to motives. For example, the transition between “LS unable to bid” and “no more funding” is a simple cause-and-effect
chain, so the meaning of the linking arrow is simply “therefore.” This was unlike the Iraq war scenario map, in which almost every link contained a potentially detailed narrative. This could be because LS scenario map was on a much smaller scale, and covered a very short period: expected to be less than six months between the beginning and end of the scenario map. Also, the Iraq map formed almost a conversational narrative: actor A does something, B responds to A, C responds to B, and so on. Thus each new event in the Iraq war was preceded by its actor's motives. Also, the Iraq war was a very large-scale operation, extensively discussed by the press, while the restructuring of LS was on a much smaller scale and intrinsically less detailed.
Case 5: A credit union (CU)

The entity

Until around 1990, CU's membership had been restricted by Australian laws on credit unions to employees of organizations in the telecommunications industry in South Australia and the Northern Territory. Many CU members worked for Telecom Australia, one of Australia's largest employers. Like all Australian credit unions until the law changed, it was originally state-based. Since the 1980s, it had gradually absorbed some other small credit unions, growing by accretion. In the early 1990s, when the Australian government decided to stop paying social security beneficiaries in cash and required them to have an account with a financial institution, many beneficiaries had opened bank accounts for the first time. These accounts were not profitable for the banks, which began to impose fees on services that had previously been free. There was thus a steady drift of less-wealthy people, particularly the young, toward credit unions. Being not-for-profit, these charged lower fees than banks. As credit unions became larger, they were able to offer mortgages, which attracted more account-holders. All of these factors contributed to the growth of CU - along with several other credit unions in South Australia. At the time of this study in mid-2003, CU had become one of the largest credit unions in Australia.

While most other credit unions in South Australia had remained focused on their core business, and grown relatively slowly, the board of CU around 1990 decided to embark on an ambitious plan for growth. This was done with great success, with a growth in members from to more than 200,000 in 2003. Over that period, CU was one of Australia's fastest-growing financial institutions. However in recent years, CU's growth had slowed, and the board decided it was time for a review of the post-1990 policies. The current strategy at the time of the study was influenced by Treacy and Wiersema (1997), a book that CU management took very seriously. It recommends focusing on one of three main business strategies: product innovation, low cost, or customer service. CU's position was that only the third could apply, because innovative banking products (lacking IP protection) would be copied by competitors, with its relatively small size it could not compete on costs, and it had a very high level of customer satisfaction.

Activities. CU's main functions were to accept deposits from its members, invest these, and make loans. Some of these loans, made through subsidiaries (e.g. for buying new cars) were not restricted to members. For communication with members, CU had 22 branches, a call centre with around 100 staff, and a transaction-enabled website.
Scale. Despite being large by credit union standards, compared with banks CU was small. At the time of the study it had a total of around 420 staff. It had 205,000 shareholder-members, and managed members’ assets valued at over $A1.5 billion. However, to place this information in context, the smallest local bank, though it had fewer customers than CU, managed $A6.7 billion in assets (June 2002). CU had considerably less than a 1% share of all Australian deposits in retail financial institutions.

Funding. As a credit union, CU is in principle not-for-profit. However at the time of the study it had accumulated net assets of $A93 million, with a $13 million surplus in 2002-03 (KPMG, 2003). These were available for mergers and other business ventures.

Governance. CU is governed by a board elected by shareholders. In standard business fashion, the board appoints a CEO, who controls the staff. Legally, CU is owned by its members, with each member buying an initial $2 share on joining. When members leave, this money is refunded. Thus all shareholders have an equal share, and there are some 200,000 of them. With no factions among shareholders, they have no effective power.

Classification

In terms of the taxonomy in chapter 8, this case met the following criteria:

- Category 2.6 A non-government organization (officially, at least)
- Category 3.3 Scale of location: a country (Australia)
- Category 4 Time scale: 10 to 15 years (deliberately non-specific)

In terms of the specific entity types sought for this study, this case fulfilled two of the additional criteria:

- A6 Entity which had previously carried out scenario planning
- A21 Service sector of the economy

In holonic terms this organization was independent (not under the direct control of a larger holon) and had a number of separate components that were directly under its control.

Procedure

Recruitment
The procedure for this case followed the workshop format that I originally planned. The planning manager (the main person with whom I dealt) was highly interested in the project, as were the CEO and the chairman of the board. They arranged for a total of about 25 staff to attend, but because of difficulties with scheduling the time of these senior people, they suggested two separate sets of workshops, each with a group of about 12 people. I agreed to this readily, because it would be a useful chance to compare two slightly different approaches in the same organization. Even better, there was no clear difference between the types of people involved in the two groups—except that one group contained both the chairman and the CEO. As it turned out, the first group had only 8 participants and the second group 11.

Environment
The venue was the credit union’s boardroom. Physically, this was near-ideal. It contained a long, narrow table, with seating for about 20, a long blank wall for posting documents, and several nearby rooms for small group work. However, some middle-management staff who had not visited the boardroom before seemed a little over-awed at being allowed into the presence. My perception was that this discouraged them somewhat from disagreeing with statements made by more senior staff. In some ways a more independent venue, “untainted” by the scent of the board, might have been preferable.

The two sets of workshops were held in September and October 2003, a time when the RFS industry was not much in the news. The main relevant mainstream media interests at the time were news stories about overly high housing prices and possible small interest rate increases. Specialist media, read by many participants, included the daily Australian Financial Review and the weekly Australian Banking and Finance. Though these publications were highly relevant to their jobs, a focus on these would also have coloured their worldviews.

Activities
The standard SNM plan has four half-day workshops, a week apart. The intentions of that schedule are:

(a) to make it easier for people to attend (they could do their normal work in the other half of the day)

(b) to give them time between workshops to think about the issues from the previous workshops.
However, CU wanted full-day workshops, because some participants would have to fly from interstate, and to change to half-day workshops would have cost much more, in either air fares or accommodation expenses for participants. My co-discovery conferences with RN each occupied a full day, and with so much food for thought, participants were becoming tired in mid-afternoon: less motivated to pursue the workshop to its conclusion. The problem was solved in Indonesia by changing the full-day workshops to two consecutive half-days: an afternoon and the following morning. As this alternative was not feasible in the present case, one potential problem was a loss in concentration in the late afternoon of each workshop.

**Output**

As with most of the other cases, a separate report was completed for the entity's management. It summarized the two scenario network maps and offered some observations and recommendations arising from the Process. The major finding was that the CU had no clear route (at the time) to further growth. No suitably sized takeover targets existed, and the CU's best option seemed to be to better serve its existing shareholder-members. As this fitted closely with current policy, the entire exercise perhaps added nothing to the CU's strategic direction. The following photograph shows part of the scenario map for the second group, with each A3 sheet representing a separate holon. Later, arrows of coloured tape were used to connect the holons.

![Part of second scenario map (before linking)](image)
Each set of workshops produced a set of scenario holons, divided into three main groups:

1. looking ahead from the present (produced by the futures wheel method)
2. foreseeing possible external changes (from the midcasting)
3. possible outcomes (from the morphological exercise).

The holons were linked together by the futures wheel and backcasting exercises. Most of the holons in the first group that arose from the CU's past turned out to be conditions or situations, rather than events. This had not been found in previous cases, but would obviously recur in other cases where the entity was subject to many legal and other restrictions.

Both sets of workshops produced similar scenario maps, though with many small differences. The following table shows the degree of overlap.

<table>
<thead>
<tr>
<th></th>
<th>Set 1</th>
<th>Set 2</th>
<th>Unduplicated total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identical</td>
<td>8</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Broadly similar</td>
<td>9</td>
<td>19</td>
<td>20 *</td>
</tr>
<tr>
<td>Completely different</td>
<td>20</td>
<td>22</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>49</td>
<td>71</td>
</tr>
</tbody>
</table>

* To some extent a matter of judgement; others might find a few more or less than 20.

Several attempts were made to produce a scenario map covering both workshops. Though it was possible to fit all 71 distinct holons onto a single page, the result was uninterpretable: there were too many links. I therefore combined groups of similar holons, losing detail on the master map, but greatly increasing legibility. The resulting map, with 27 holons, is shown in Figure A4.5.2, on the following page.

We attempted to produce maps of the layers of the hemisphere (at that stage, there was a fourth, lowest, "worldview" layer), but again found it not possible to produce maps that were readily interpretable. Several attempts, some involving a single map and others a separate map for each layer, all produced illegible jumbles of boxes and lines. Thus the practical problem of how best to express the levels still remained to be solved.
Change in laws regulating FIs

All CUs grow

Financial environment becomes global

Rising economies of scale

ICT development enables more efficiency

World financial environment becomes volatile

Move from plain banking to wealth management

Consumers become more financially sophisticated

Public demand higher business standards

Consumers feel less involved with their FIs

Adoption of global FI standards, e.g. Basle II

CU aims to increase member satisfaction (MRM policy)

Growth of micro-business

MRM policy moderately successful

Economies of scale begin to vary

Giant FIs become cheaper for customers than CU

CU has less incentive to expand

Nothing changes for CU

Many tiny FIs occupy former CU positioning

Whole CU system grows - component size irrelevant

Growing movement against consumerism

Asian Economic Community founded

CUs set up holonic system of services and branding

CU continues to grow, with interstate M&A

CU demutualized

CU taken over or merged

Change in laws regulating FIs

Rising economies of scale

ICT development enables more efficiency

World financial environment becomes volatile

Move from plain banking to wealth management

Consumers become more financially sophisticated

Public demand higher business standards

Consumers feel less involved with their FIs

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Nothing changes for CU

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Asian Economic Community founded

CUs set up holonic system of services and branding

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Giant FIs become cheaper for customers thanCU

CU has less incentive to expand

Nothing changes for CU

Many tiny FIs occupy former CU positioning

Whole CU system grows - component size irrelevant

FiguRe A4.5.2 SIMPLIFIED, COMBINED SCENARIO MAP FOR CU
Case 6: A group of community service clubs (SC)

The entity
SC is a network of service clubs, which originated in the USA in the early twentieth century. The principle is that each club is based on a small area, such as a suburb in a major city. Membership is by invitation; prospective members must be "leading members of their profession," and their probity should be beyond question. SC is a highly decentralized organization. It has a constitution, which all members must observe, but the fundamental unit of organization is the individual club. These clubs are grouped into districts, of which there are 529 in the world, typically with between 20 and 100 clubs in one district. As most countries have several districts, there is little coordination at national level. This study was commissioned by two districts of SC, covering most of South Australia, with 106 clubs.

Governance. The international coordinating body organizes major projects with world organizations such as UNICEF, holds annual conferences, publishes magazines for members, and other head-office functions. However it is not a head office in the business sense, and has little jurisdiction over individual clubs. The district is even less an institution; districts generally have no separate offices: they do not control the clubs, but serve them. At all levels of SC: international level, district level, and club level, a new leader is chosen every year, with the difficulties of succession eased by the preselection of new leaders two years in advance.

Purpose. The main purpose of SC is philanthropic: to serve others by doing good works – which can range from small local initiatives such as planting trees in parks, to long-term worldwide projects such as public health initiatives, in which SC has worked with UNICEF and the World Health Organization on a sustained project to eliminate poliomyelitis. This project has continued since 1985, has cost several billion dollars, and is now almost complete. Thus SC internationally has been looking for a new large-scale project to succeed Polio Plus, probably relating to world peace. Another aspect of SC is its support of a high level of ethics in the businesses of its members; it has developed a brief set of ethical questions which can be used when making business decisions. A less publicized purpose of SC, but clearly an important one for members, is business networking; this is facilitated by the standard rule that each club may only have one representative from each occupation.

History. Membership of SC in South Australia peaked in the 1980s, and has slowly declined since then. For the northern district (which commissioned this study), the membership peaked in 1985, at 2,100 people. In mid-2004, when the study took place, membership was down to
1,500, though the figure had been stable for the past few years. In recent decades the age of members had increased, to the point where the average member was around 60 years old. Many members were retired, and were less active than previously. Through retirement they had lost some contact with the business world, and the direct and indirect support provided by that world for the district covering the southern part of South Australia, had declined at much the same rate, with much the same outcomes. (It was reported to me that this rate of decline had also been occurring in other developed countries, though SC's world membership (some 1.2 million) was still growing, particularly in former Communist countries.

SC has sometimes been slow to respond to social change. In the USA, until the 1920s, only whites were allowed to be members (Forward, 2003). Until the late 1980s, it was a men-only organization. It was only when SC exerted pressure to admit women members, and a court case disallowed another men-only club in Australia, that women were permitted to join in South Australia. Though there are no now rules preventing female members, a few clubs still have only men.

**Scale.** Combining the two districts taking part in this case, the total number of members was some 3,500 (of whom 30 - known to be among the most progressive) participated in the workshops). The typical club had around 50 members, though this varied from 12 to 200. Though there is some pressure on small clubs to combined, I was told by a district governor that the smallest clubs tend to raise the most funds per member.

**Activities.** Apart from the activities described above, as fulfilling the purpose of SC, there is also a strong tradition of “fellowship” among members. In fact, SC was originally founded because its founder was a newcomer to Chicago in the early 20th century, and found himself socially isolated in his small business. The philanthropic aspect of SC did not arise till later (Forward, 2003). The most frequent activity is the weekly club meeting, typically involving a restaurant meal with a guest speaker. This takes place in a jovial environment, with small fines levied for trivial reasons, such as having a birthday.

**Ownership.** As a voluntary organization, SC clubs are “owned” by their members, and SC is “owned” by the clubs. In fact, the concept of ownership is misleading in this case. SC’s main asset is cash in the bank, but that cash is destined to be given away. In the anthropological sense, SC is a gift culture (Mauss, 1967; Firth, 1972).
Funding. SC clubs’ funding is generated mostly from members and their fundraising activities, supplement by the sponsorship that members find (often from their own employers). This is not a cheap organization to belong to, with total costs of membership around 1000 dollars per year. Members are expected to spend substantial time with the organization, attending the majority of club meetings, and taking part in working bees and committees.

Classification

In terms of the taxonomy in chapter 8, this case met the following criteria:

- Category 2.6  A non-government organization
- Category 3.3  Scale of location: a region of a country
- Category 4   Time scale: specified as 20 years

In terms of the specific entity types sought for this study, this case fulfilled two of the additional criteria:

- A17  An entity in decline
- A21  Service sector

It partly fulfilled one other additional criterion:

- A2  An ad hoc or temporary organization. (Because of the annual change-over of management at every level, SC is continually beginning again.)

In holonic terms, this organization was part of an international organization, which exerted only very loose control. In fact, the organization (one district, at first) commissioning the scenario work was not an officially formed entity. The SC system divides the world into districts, each of which exists only to group a number of clubs. With rare exceptions, a district has no offices, no budget, and no staff.

Procedure

Recruitment

The newly appointed district governor, assisted by the governor of the adjoining district, selected potential participants and issued invitations to them. As with most other cases in this study, I was unable to participate effectively because I did not know the people involved. My role was to ask for as wide a range as possible of stakeholders who would be expected to have different perspectives. The governor, who was keen to change the organization, mainly invited people who she knew to agree with her wish for substantial change in the organization, and key figures who needed to be convinced of the need for change.
As with most other cases in this project, most participants were members of the organization whose future was being studied. Despite a range of other stakeholders being invited, few of them were involved enough to give up four Saturday mornings to benefit an organization that they did not belong to.

**Activities and environment**

Because the environment and activities were closely intertwined in this case study, the two subheadings are combined here.

The original design for the SC case was for the standard set of four workshops – but, as with other cases, it took as many meetings to plan those workshops: for me to explain the concept to the organizing committee in enough detail that they understood it well, and for the participants to be chosen. The workshops were intended to follow the now-standard pattern, except that the workshop focusing on the present was to come first, preceding the workshop on the past.

The first workshop was well attended, with 25 people present. As usual with this organization, the atmosphere was jovial, with much laughter. Compared with the previous two cases, though, there was not as strong a task focus. Because participants had been invited for their open-minded approach to change, they had a lot in common, and spent much time discussing issues of mutual concern. After several workshops, I began to realize that participants had come as much for the social experience as for the scenario work. As the communication was clearly useful for them, I did not insist on strict timekeeping, but let some sessions run longer when they seemed useful to participants. This approach worked well enough in the first two workshops, but caused problems in the third workshop, because of environmental factors.

Most workshops were held in one large room – the staff cafeteria in an old mansion which had become the local headquarters of an international charity. The room was about 10 metres by 15, with seating for around 30 people at small tables. These small tables could be moved for the small-group sessions into what were effectively four or five larger tables. Thus the break-out sessions were all held in the same room. In the third week, the cafeteria was booked for another purpose, and the meeting was held in a smaller room: about half the size. It was not feasible to have break-out groups in such a small room, so several offices elsewhere in the building were used for that purpose. From past experience in large groups, both as a facilitator and a participant, I suspected this would cause problems - and it did.
When given futures-related topics to discuss, the groups in the smaller rooms discussed them only superficially, and talked mainly about other topics, not directly related to the current exercise. Another unexpected event, in a plenary session, was an impromptu address given by a young woman who was not a member of SC, but whom others seemed to have been hoping was about to join. She declared emphatically that she would not join, and spend 25 minutes giving detailed reasons for this. The other participants, most of whom were older members of SC, then discussed her reasons in some detail, putting this session even further behind schedule. As this was highly relevant to the purpose for which the workshops had been convened, I was reluctant to cut off the discussion. However, with these delays, the futures wheels and backcasts scheduled to be completed in this session were hardly begun. With those delays, little of the plan for the third session was accomplished.

Thus in the fourth session, when the futures wheels and backcasts from the previous session would have been used to create the scenario network, these materials were not available. The participants did complete the futures wheels, but they seemed unable to come to grips with the backcasting, producing potential outcomes so vague and general that they were not useful in building a scenario network. After the previous three case studies, in which the creation of scenario networks had been working better and better, I was surprised at this backward step. Five simultaneous factors jointly created this effect:

1. The environments were not entirely suitable. Specifically, the rooms (even the largest) were too small, and did not have enough usable wall space for assembling the scenario networks.
2. Many of the participants seemed more interested in discussing other matters than in considering the organization's future in detail. In retrospect, however, given that they had so much in common, and had rarely met before, this behaviour was not so surprising.
3. Had I expected this, I could have prepared for it by issuing more explicit instructions — e.g. in writing for each small group. However, because the first two workshops ran according to plan, I was unprepared for the lack of accomplishment during the third workshop. I assumed that this was an anomaly, but it happened again in the fourth workshop.
4. The workshops were held on Saturday mornings, and something of a holiday atmosphere prevailed. Participants had come for pleasure as much as for work.

3. A few months later, it was thus surprising to find that, despite her strongly argued reasons for not joining an SC club, she had recently done so. Her participation in these workshops probably had some bearing on her joining.
5. The organization was not bound by the restraints that applied with most of the previous cases. As it had few financial constraints (no loans to repay, for example), and a wide range of possible outputs, it would be able to adapt to almost any situation — except its own gradual loss of members. This lack of limitations meant that there were a near-infinite number of ways to work back from any conceivable future to the present. Anything could be done, in any way, if only suitable people could be found to do it. Thus there were no clear paths for backcasting. Metaphorically, this was like trying to create a roadmap on a smooth plain which was effectively one huge road.

A combination of the above factors seems to have resulted in the participants' inability to frame clear future alternatives for the organization. Given the same tasks that the CU participants had performed thoroughly a few months earlier, the SC members did not produce much detail at all. Some of the outputs from their small-group work were so scrappy that there was no point in transcribing them for recirculation.

I had found in some earlier case studies that participants sometimes inadvertently took away the papers they had created in small group work, instead of leaving them for me to record. Accordingly, with the later cases I distributed extra-large sheets of paper (A3 size), so that these would stand out from other notes that participants were taking. Despite that precaution, some key documents from the SC workshops disappeared - though several of those were later forwarded to me.

In planning for these workshops, I did not foresee the high level of interest that participants would find in meeting like-minded people from other clubs, as well as meeting potential members, beneficiaries, and sponsors. This was obviously a valuable experience for them, and much useful material was covered — particularly in the third week, when the young woman explained at length why she would not become a SC member. I had not expected this. In the previous case studies, the participants generally knew each other already — or if not, they did not have a lot in common. SC members, though, were obviously different; thus when 25 people from different clubs came together, with a common interest in the future of SC, it was not surprising that they would spend a lot of time discussing their ideas and experiences. As facilitator, I could have suppressed this, insisting that everybody should follow the schedule exactly — but such an approach seemed inappropriate in the circumstances. With all that sharing of ideas, the workshops fell behind schedule.
It was clear during the fourth session that the scenarios were far from complete, and some participants voiced their dissatisfaction with stopping at the end of that workshop. We therefore scheduled a fifth workshop, to round off the process. The commissioning governor requested that this final workshop should focus on developing some specific visions for SC's future.

Normally, in the fourth workshop, the participants would have completed a detailed scenario map, from which their preferred paths could have been traced. These paths would outline the requested visions. As the map was far from complete at the end of workshop 4, I reviewed everything that had been done so far, and created a simple three-path model for SC. Creating scenario paths was not intended to be my role, but as no participants did so (despite my requests, and several suggestions), I tried to simply reflect what had been said in the workshops; as far as possible, generating scenario paths that participants would have created themselves, if only they had got around to it. These three paths – arranged in order of the degree of change – became the input for the final workshop.

Path 1. Stability - minimal change: trying to keep the old values above all else.
Path 2. Adaptation - pragmatic change - whatever it takes to survive.
Path 3. Transformation - redesigning the system according to its original principles.

During the fifth workshop, a group of participants devised a fourth path, falling between the second and the third in terms of degree of change. Reflecting its position in that sequence, they labelled it “Model 2.75.”

In the final phase of the fifth workshop, participants were divided into four groups, on the basis of their preferences for one of the four main paths. Each group was then assigned an incasting task (Schultz, 2003). “Imagine that you have won a prize of a holiday in Adelaide in 2025. You visit some SC clubs that are using the path you prefer. On your return to the present, you give a brief talk to your current club, describing what you found.” The four talks were given, discussed, transcribed, and published in a report on this study that was to be widely distributed among SC members in South Australia. The intention was that the annual conference in April 2005 would be used to discuss the ramifications of the futures work, and create an action plan for the multiple-futures model.
While devising a way of making the three broad paths as distinct as possible, I had the idea of producing a text table comparing each path in terms of a number of characteristics relevant to SC. Based on discussions in the four previous workshops, I produced a preliminary list of variables, checked it with some participants, and brought it to the fifth workshop, where it was modified again. The final version listed 28 characteristics on which paths might differ, as follows.

**TABLE A4.6.1 CHARACTERISTICS ON WHICH SC CLUBS COULD DIFFER**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Membership criteria</td>
</tr>
<tr>
<td>2</td>
<td>Main difference between members and population</td>
</tr>
<tr>
<td>3</td>
<td>Attendance levels</td>
</tr>
<tr>
<td>4</td>
<td>Involvement of members’ friends and family</td>
</tr>
<tr>
<td>5</td>
<td>Involvement of members with other activities</td>
</tr>
<tr>
<td>6</td>
<td>Related organizations</td>
</tr>
<tr>
<td>7</td>
<td>Level of conflict between SC groups in South Australia</td>
</tr>
<tr>
<td>8</td>
<td>Main international activity, to succeed Polio Plus [anti-polio campaign, nearing completion in 2004]</td>
</tr>
<tr>
<td>9</td>
<td>Main local activities</td>
</tr>
<tr>
<td>10</td>
<td>Recruitment of new members</td>
</tr>
<tr>
<td>11</td>
<td>Format of club meetings</td>
</tr>
<tr>
<td>12</td>
<td>Relationship with SC International [the US-based coordinating body]</td>
</tr>
<tr>
<td>13</td>
<td>Relationship with similar organizations</td>
</tr>
<tr>
<td>14</td>
<td>Local project work</td>
</tr>
<tr>
<td>15</td>
<td>Hierarchy of authority</td>
</tr>
<tr>
<td>16</td>
<td>Continuity of governance</td>
</tr>
<tr>
<td>17</td>
<td>International links</td>
</tr>
<tr>
<td>18</td>
<td>Fund-raising</td>
</tr>
<tr>
<td>19</td>
<td>Sponsorship</td>
</tr>
<tr>
<td>20</td>
<td>Membership basis</td>
</tr>
<tr>
<td>21</td>
<td>Inter-club projects</td>
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<tr>
<td>22</td>
<td>Demands on members’ time</td>
</tr>
<tr>
<td>23</td>
<td>Financial demands on members</td>
</tr>
<tr>
<td>24</td>
<td>Communication between clubs and members</td>
</tr>
<tr>
<td>25</td>
<td>Members’ accounts of their activities</td>
</tr>
<tr>
<td>26</td>
<td>Ceremony at regular meetings</td>
</tr>
<tr>
<td>27</td>
<td>The upside</td>
</tr>
<tr>
<td>28</td>
<td>The downside</td>
</tr>
</tbody>
</table>

Describing all 28 aspects for each model produced clear visions of how SC would operate in each of the four models, forming a basis for participants to create a vivid description of how each path would operate.
Case 7: The Barossa Valley landscape

The entity
The Barossa Valley is a region of South Australia, famed for its wines since around 1860. It is little more than one hour's drive north of Adelaide, the capital city of South Australia, with a population of more than a million. The Barossa Valley, approximately 40 kilometres square, had a population of around 29,000 at the 2001 census, with an annual growth rate of 1.5%. Most of these people lived in 10 small towns scattered around the valleys: despite the title, there are two valleys: the Barossa itself (closer to Adelaide, lower-lying, more populous) and the Eden Valley (more distant, higher in altitude, and thinly populated).

History. The Barossa was settled in the early 19th century by Lutherans from central Germany, and developed a distinctive local German culture. In recent years, Adelaide has grown to the point where its northernmost suburb, Gawler, is only around 10 km from the Barossa Valley. Since the 1980s, the valley's international reputation has grown, and most of its wine is now exported. The Barossa is the centre of operations for four of Australia's largest winemakers: Orlando, Penfolds, Hardy's, and Yalumba. As the Barossa lies between the port of Adelaide and several other major wine regions of South Australia, these major producers have been building large new plants in the Barossa. Because the relatively flat land on the valley floor has soil particularly suitable for grape-growing, and because of the pressure from potential residents of the attractive Barossa towns (also on the valley floor), strong competition for land has arisen.

Activities. The dominant industry is winemaking, with more than half the valley's arable land devoted to grape-growing. Tourism is the second largest industry, in terms of financial exchange between the Barossa and elsewhere. With its winemaking concentration (at least 84 wineries, many of which have visitor facilities), its attractive semi-rural landscapes, its German heritage, and its proximity to Adelaide, the Barossa Valley is very popular with visitors: from Adelaide, from elsewhere in Australia, and from overseas.

The Barossa is covered by a patchwork of government areas. The Barossa Council is the local authority covering most of the larger valley, but the Light Council covers a significant minority. Some aspects of the Barossa (such as public education and hospitals) are administered directly by the South Australian state government, while other authorities exist for other aspects, such as the Catchment and Water Management Board.
Classification

In terms of the taxonomy in chapter 8, this case met the following criteria:

Category 1.5 The use of part of the natural world
Category 2 None of these social entities applied
Category 3.3 Scale of location: a region of a country
Category 4 Time scale: specified as 20 years

In terms of the additional entity types sought for this study, this case full met two of the criteria:

A16 A growing entity, highly successful in recent years. Since the 1980s, the Barossa had grown in population, wealth, and international fame. Australia's most famous wine, Grange Hermitage, is made there.

A18 A small geographical area. Though it was not as small as hoped for on this criterion (it had a population of around 30,000 and an area of some 2,000 square kilometres) it had the advantage of being a self-contained entity.

These criteria partly applied:

A12 Local government agency (in that some of participants worked in local government, and the issues studied related to local government).

A19 Primary industry (in that the main industry of the area was winemaking, and most participants were connected with that industry in some way)

In holonic terms this organization, like most geographical areas, was not independent of its surroundings. It formed a small part of the Outer Adelaide statistical division (as defined by the Australian Bureau of Statistics) and it had several components, including two local government authorities. In topographical terms, it is really two valleys, not one: the Barossa Valley (for some purposes) includes the Eden Valley. However condition A7 (in the centre of a hierarchy) did not apply, because the valley itself is not a formal social entity.

Procedure

Recruitment

The Barossa Winemakers Association (BWA), mainly through the technical manager mentioned above, recruited participants for the study. My role, as in previous cases (not knowing the individuals involved) was limited to suggesting that the widest possible range of stakeholders should be included. Because this workshop was being done for the BWA, many of
those invited were members of that association. The workshop was organized for a Friday, in
the hope that people who might not otherwise be able to attend could do so on the last
working day of the week, when pressure of work might not be as great. Around 30 people
were invited, of whom 22 agreed to attend, and 19 did so. Most of these had strong links with
the wine industry; the second largest group was of administrators and public servants. No-
body present could be regarded as an ordinary resident of the valley.

Environment
The workshop was held in the conference room at the Yalumba winery near Angaston. The
room was some 13 metres square, and had suitable space on three walls for displaying written
materials. Tables were arranged in a large square U shape, leaving an open space in the centre
of the room. Participants sat on the outside of the U, about 8 of them on each of the three
arms. The U shape was the normal layout of the room. I did not consider it ideal, and would
have preferred participants to sit at 4 tables, each of about 6 people. However as I had no
solid supporting evidence for this preference, I decided to leave the room layout as it was, and
see how it would affect the proceedings.

The Yalumba winery is on the edge of Angaston, within a 10-minute drive of the two largest
towns in the Barossa, Tanunda and Nuriootpa, but about a 30-minute drive from the south-
ernmost towns, Lyndoch and Williamstown. This was probably related to the fact that nobody
from the latter areas was present at the workshop. Some potential participants – either general
members of the public or rival winemakers – may have been deterred by the fact that the
workshop was held in the somewhat baronial atmosphere of the Yalumba winery. If the
workshop had been held in the centre of Tanunda (the largest and most central town in the
Barossa) the participants and therefore the outcome might have been a little different. Specifi-
cally, one might have expected (1) more ordinary citizens, with therefore less focus on
winemaking; (2) a more urban and less rural focus; and (3) more people from the southern
Barossa, which is becoming a dormitory area of Adelaide, with hobby farms and the like.
Combining these factors, such an environment for the study would have been expected to
produce a less industrially oriented vision.

Preparation
Before the workshop, each participant was contacted and invited to bring along some images
illustrating desirable and undesirable aspects of the Barossa. Not knowing how many partici-
pants would bring images, I brought 164 images (mainly photographs of the Barossa, framed
in a documentary rather than an artistic style) to display at the workshop. The other partici-
pants collectively supplied 98 more images, half of them from one person. I arranged for a cartoonist to be present, to draw on the spot any images that participants had been unable to photograph or find an existing picture.

Activities
Because the workshop was to focus on the landscape values of the Barossa, such a vision would be largely visual - which might seem tautological, were it not that much corporate "visioning" focuses on abstract concepts that are not inherently visible. (Problems with conventional visioning methods are noted in the review of the literature on visioning in chapter 2) Thus rather than trying to "craft" the wording of a vision statement, it was considered more useful to capture participants' preferred images of the Barossa. Because the focus was on landscape, and because landscape changes very slowly, it was likely that most elements of preferred landscapes already existed, either in the Barossa or elsewhere. We thus explored visions in four different ways: pictorial, oral, map-based, and conceptual. Because different forms of vision were more relevant for different senses, and some participants would be more comfortable using one form than another, it was therefore considered that a combination of the four forms should yield more comprehensive results than a single approach. The expectation was that by spending a day considering the future of the Barossa in four different sensory modes, common threads would emerge, and it would be possible to find out to what extent the different types of stakeholder agreed.

1. To build pictorial visions, participants were asked to bring photos of what they most liked and most disliked about the Barossa. These images were mounted on the walls, numbered, and participants then voted, assigning them into the categories of Table 9.8.1 below.

2. For the oral visions, participants were asked to recount brief narrative vignettes, no more than about a minute, recalling their experiences of what was best and worst about the Barossa. The objective here was to uncover experiences that comprised "moments of truth" (Carlzon, 1987) or epiphanies ("a sudden spiritual manifestation...an extreme quality of beauty" - Joyce, 1944, p216; Shumar, 1959). Because such experiences are highly memorable, participants should have had no problems in recalling them.

3. The mapping exercise flowed from the pictorial and oral examples. We mounted a large-scale map of the Barossa on the wall, and asked participants to locate on the map the photos and experiences they'd mentioned. The purpose was to help make their visions more concrete and vivid, forestalling vague generalization.
4. Finally, in the afternoon, to bring more structure after the morning's creativity, five groups of participants worked through a checklist of ten sectors (two per group): housing, employment, community services, shopping, public space, infrastructure and energy, roads, transport, health services, and education. For each sector, they were asked to describe their hopes for the Barossa, as specifically as possible. So that the output would qualify as a vision, they were asked to describe not necessarily what they expected, nor even what they thought was a realistic goal, but a kind of "heart's desire" (in the sense of Yeats, 1894): what characteristics of the Barossa valley could make visitors want to abandon their roots, and go and live in the Barossa? Of course, it was the participants' own reactions that were sought; the imagined reactions of visitors were merely a proxy.

In each of the four activities, participants were asked to change roles, to see that type of vision from the aspect of a different stakeholder group, including residents, business owners, managers, employees, and visitors. Most of those present had at least three such roles. To guide participants' creativity in each the four sessions, following principles outlined by Santanen, Briggs, and de Vreede (2004), I developed a 2 x 2 contingency table of preference by current presence (similar to the SWOT method of Andrews, 1980) thus:

<table>
<thead>
<tr>
<th>Current presence</th>
<th>Desirable futures</th>
<th>Undesirable futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Now present in the Barossa</td>
<td>Keep this</td>
<td>Eliminate this</td>
</tr>
<tr>
<td>Not now present</td>
<td>Introduce this</td>
<td>Do not introduce this</td>
</tr>
</tbody>
</table>

All images, narratives, locations, and sectors considered in the four sessions were grouped into the above four categories.
A condition of the grant awarded to this project was that its findings should be widely disseminated among the stakeholder organizations involved. The report on this project attempted to convey the visions as a thick description (quâ Geertz, 1973), rather than summarizing them into a "vision statement." The major finding was that there was an extremely high level of agreement among participant actor groups about preferred Barossa landscapes. Strong preferences were expressed...

- for a semi-rural landscape, mixing urban, vineyard, and natural land use.
- for many small towns rather than a few large ones.
- for the regeneration of traditional vegetation.
- for the traditional "relaxed hospitality" values of the Barossa...
  ...but for these to be extended from private homes to public venues.
- against the Barossa becoming effectively an outer suburb of Adelaide.
- against the Barossa becoming a "tourist trap," as perceived in other outer Adelaide areas such as Hahndorf.

Note the conservative nature of these preferences: the only improvement sought was a better attitude to service quality among hospitality workers. The remaining preferences were to keep what the Barossa had (or used to have), and not to introduce undesirable urban elements. This was not so much a vision for change, as a vision for no change. The implication is that the

4. The report will be available online at www.gwrdc.com.au, as Project RT 04/05-1.
Barossa was almost perfect until recently. It raises the issue as to whether the views collected in the workshop were really a vision for the future – or were they merely an expression of nostalgia? With the continuing growth of the area’s population, the winemaking industry and its less picturesque concomitants such as large trucks and “tank farms,” the agreed vision seems unlikely to be achieved unless the local government authorities take a very strong regulatory line, and are not overridden by statewide authorities.

Perhaps the inclusion of less-advantaged stakeholders might have made the vision less harmonious. Before the workshop, to gather background information, I interviewed a young mother who lived in the Barossa. Though opposed to city-scale development, her vision centred around better availability of services for young families, such as child-care, shopping, and schools. Her views may or may not have been typical, but they were quite different from those expressed at the workshop.

The following two pages show the 18 most preferred and the 18 least preferred images (ranked in reading sequence, with the most preferred at top left), followed by tables showing numbers of votes and locations. The “not now present” categories, poorly represented in the images, are not reproduced.
FIGURE A4.7.2 THE 18 MOST PREFERRED IMAGES OF THE BAROSSA VALLEY LANDSCAPE
Figure A4.7.3  The 18 least preferred images of the Barossa Valley landscape
### Table A4.7.2 The 18 Most Preferred Images of the Barossa Valley Landscape

<table>
<thead>
<tr>
<th>Image</th>
<th>Votes</th>
<th>Description</th>
<th>Location (if known)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>8</td>
<td>Rural scene with vineyard and church</td>
<td>Keyneton</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>Victorian mansion</td>
<td>Fullarton, Adelaide</td>
</tr>
<tr>
<td>165</td>
<td>7</td>
<td>Traditional stone buildings</td>
<td>Rockford winery</td>
</tr>
<tr>
<td>167</td>
<td>7</td>
<td>Urban street scene</td>
<td>Murray St, central Tanunda</td>
</tr>
<tr>
<td>178</td>
<td>6</td>
<td>Native vegetation on hilltop</td>
<td>Central Eden Valley</td>
</tr>
<tr>
<td>23</td>
<td>5</td>
<td>Looking down across Angaston</td>
<td>from hill above Angaston</td>
</tr>
<tr>
<td>28</td>
<td>5</td>
<td>Cyclists on bike trail</td>
<td>Mt Crawford reserve</td>
</tr>
<tr>
<td>32</td>
<td>5</td>
<td>old homestead, with ivy-covered wall</td>
<td>Collingrove</td>
</tr>
<tr>
<td>70</td>
<td>5</td>
<td>Traditional stone wall</td>
<td>Angaston</td>
</tr>
<tr>
<td>99</td>
<td>5+</td>
<td>Rocky outcrop</td>
<td>Trig Point Rd</td>
</tr>
<tr>
<td>101</td>
<td>5</td>
<td>Stand of peppermint gums</td>
<td>Gravel Pit Rd</td>
</tr>
<tr>
<td>170</td>
<td>5</td>
<td>Gum trees arching over road</td>
<td>Eden Valley</td>
</tr>
<tr>
<td>171</td>
<td>5</td>
<td>Native vegetation at roadside</td>
<td></td>
</tr>
<tr>
<td>175</td>
<td>5</td>
<td>Tanunda Creek – no.1 asset</td>
<td>near source</td>
</tr>
<tr>
<td>214</td>
<td>5</td>
<td>Wheat, vines, grassed hills</td>
<td></td>
</tr>
<tr>
<td>216</td>
<td>5</td>
<td>View over Barossa</td>
<td>from Mengler’s Hill</td>
</tr>
<tr>
<td>281</td>
<td>5</td>
<td>Revegetating non-arable land</td>
<td>[cartoon]</td>
</tr>
<tr>
<td>95</td>
<td>4+</td>
<td>Gum trees lining dirt road</td>
<td>Trig Point Rd</td>
</tr>
</tbody>
</table>

### Table A4.7.3 The 18 Least Preferred Images of the Barossa Valley Landscape

<table>
<thead>
<tr>
<th>Image</th>
<th>Votes</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>10</td>
<td>Amcor bottle factory</td>
<td>Sturt Highway</td>
</tr>
<tr>
<td>228</td>
<td>9</td>
<td>High-voltage electricity pylons</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>8</td>
<td>Inappropriate building design</td>
<td>Post Office, Murray St, Tanunda</td>
</tr>
<tr>
<td>247</td>
<td>8</td>
<td>Car wrecks on farm</td>
<td>Gomersal Rd, 2 km west of Tanunda</td>
</tr>
<tr>
<td>248</td>
<td>8</td>
<td>Industrial machinery dump</td>
<td>2km east of Tanunda</td>
</tr>
<tr>
<td>231</td>
<td>7</td>
<td>Bare hillside</td>
<td></td>
</tr>
<tr>
<td>249</td>
<td>7</td>
<td>Creek erosion</td>
<td></td>
</tr>
<tr>
<td>234</td>
<td>7</td>
<td>Overgrazing</td>
<td></td>
</tr>
<tr>
<td>235</td>
<td>7</td>
<td>Large tank farm</td>
<td>Chateau Dorrien</td>
</tr>
<tr>
<td>241</td>
<td>6+</td>
<td>Hillside monoculture</td>
<td></td>
</tr>
<tr>
<td>136</td>
<td>6</td>
<td>Polluted water coming from pipe</td>
<td>near Chateau Yaldara</td>
</tr>
<tr>
<td>229</td>
<td>6</td>
<td>Sick palm trees</td>
<td>Gomersal Rd</td>
</tr>
<tr>
<td>232</td>
<td>6</td>
<td>“Moss rocks” in car sales yard</td>
<td>Tanunda</td>
</tr>
<tr>
<td>240</td>
<td>6</td>
<td>Dirt and wheel tracks in vineyard</td>
<td></td>
</tr>
<tr>
<td>245</td>
<td>6</td>
<td>Poor roadside edges</td>
<td></td>
</tr>
<tr>
<td>233</td>
<td>5</td>
<td>Cream brick house</td>
<td></td>
</tr>
<tr>
<td>183</td>
<td>5</td>
<td>Creek erosion</td>
<td></td>
</tr>
<tr>
<td>118</td>
<td>4+</td>
<td>Penfolds factory</td>
<td>South of Nuriootpa</td>
</tr>
</tbody>
</table>

A + sign after the number of votes shows that there was another image, very similar to that one, but which received fewer votes.

474 Appendix 4
Appendix 5


Dennis List

Version 1: July 2005

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This is the first edition of this manual, so it is likely to be changed: increasingly at first (over the next few years) but then in more minor ways. Version 2 will be expanded to include some examples.
1.1 Why would you use scenario planning?

Mainly because you want to look further into the future than methods such as forecasting allow. Forecasting often produces accurate results for a year or two ahead. But if you want to look 5 or 10 years ahead, forecasting is often not helpful, because too much is uncertain.

Scenario planning takes a different approach to the same need: instead of measuring a few variables, you look at a lot of variables and try to assess their likely interactions. Instead of a single forecast, you produce a set of alternative (or multiple) futures.

1.2 How is SNM different from other methods of scenario planning?

SNM is a comprehensive way of anticipating the future. It has its origins in scenario planning, but differs in many ways from standard scenarios. There are many variations of scenario planning, but the commonest method works like this:

- Emerging trends are noted.
- Two or three critical uncertainties are found (factors that are both uncertain and critical for the future being studied).
- Scenarios are developed around extreme combinations of those critical uncertainties. There are most commonly 3 or 4 scenarios, but seldom more than 7. Each of these is a description of a possible future world (or relevant part of the world). Each scenario describes a future state, usually with at least several pages of detail. Finally, the way in which that state could be reached is described.

One problem is that all this is very time-consuming. For Shell Oil (the organization best known for using scenarios) it takes more than a year's work to create a set of scenarios, involving both professional futurists and a wide range of senior managers in Shell. That makes sense for a business as large as Shell, but most small organizations can't afford the cost and can't spare the time - and even if enough time was available, the situation might change before the scenarios were finished. So the question arises: is there something that small organizations could do - and that could easily be varied as circumstances changed? To solve this problem, I developed the concept of a scenario network, which has three main differences from standard scenario planning.

The first difference is that a scenario map looks rather like a road map. The "towns" are events and trends. The "roads" show the connections between the events and trends. If the standard type of scenarios were drawn like this (with the present at the left, and the future on the right)...

![Fig. 1](image1)

...a scenario map would look more like this...

![Fig. 2](image2)
Compared with the standard method, the scenario map looks more complex, but that's a little misleading: the complexity that's concealed by the standard method is brought out into the open with SNM. Its scenarios are much smaller - instead of filling several pages with description (as with standard scenarios), each of these mini-scenarios could be described in one paragraph. Instead of about 3 big scenarios, there are often about 40 little ones.

The second difference with SNM is that the links between scenarios (the "roads") are as important as the scenarios themselves: the journey is as important as the destination. Though Shell-style scenarios can also include transition paths, less attention is paid to these than with SNM, and the Shell-style paths don't interlink.

The third difference between SNM and standard scenarios is that the latter don't cover decisions that might be made by the organization whose future is being studied. Standard scenarios include only external influences. The implication is "If the world becomes like this scenario, how could we react?" But SNM acknowledges that an entity's future is a mixture of its own intentions and outside forces, so a scenario map includes both kinds of factor. So SNM shows how an organization (or other group of people) could manoeuvre to better reach its goals in a world that's changing around it.

1.3 When would you use SNM?

Some typical questions that could be the starting point of an SNM exercise are:

- "Our membership numbers have been slowly falling for years. What could be done about this? Is it inevitable, or can we turn it around? What could happen if we don't get those numbers to grow? Do we need to change in some major way?"
- "We are going to be combined with another department. What might result from that, and how can we make the best of the situation?"
- "Our business has expanded about as much as it can - recently we've been finding it harder and harder to grow. What could we do next?"
- "How can we preserve what's most valuable about this community, in the face of encroaching growth from the nearby city?"
- "For many years we've been involved in endless conflict among ourselves. Can there be some way out of this?"

If those are the types of question that concern you, SNM could be a useful exercise. The answers to these questions are never Yes or No, nor can they be converted into numbers: they are sets of possibilities.

1.4 Who are the intended users?

SNM is designed to be used by a social entity - a general term that includes businesses, industry groups, government agencies, voluntary organizations and NGOs, communities and local areas, parts of larger organizations, and any other definable social group.

It's also possible to use SNM for the future of a concept or idea - by a diverse group of people, interested enough to explore that future in detail.

The principle is that nobody can determine your own future better than you can - so SNM is a do-it-yourself process. But since people who are fully involved with an organization sometimes can't see it as clearly as outsiders do, you need to include some well-informed outsiders.
1.5 What would you not use SNM for?

SNM is not designed for studying the future of an entire country, an industry on a worldwide scale, a multinational business, or some aspect of the entire world, (such as global warming). That's because SNM involves the people whose futures are being anticipated. In those examples, so many people would be involved that the focus would probably be lost.

SNM is a method of perceiving futures, not a method of doing something about them. An action plan is not part of the process, but, using SNM should make it much simpler to later create an action plan or strategic plan.

Though SNM is not designed to solve any specific problem, its use should make you much better informed about that issue and the possibilities that might arise from it. And as plans are often reviewed, you can use SNM at any appropriate time - and then review your plans.

SNM is an appropriate method for studying futures that are mainly influenced by human decisions. In fact, that's most types of future. However SNM is not appropriate for the study of something like an Antarctic penguin colony - because it needs the opinions of those directly involved.

Nor does SNM lead toward a single desirable outcome. It can be used to find a range of possible outcomes. You can then decide which of them are desirable, and make plans to work towards them. Notice that word "them" - one principle of SNM is that there are always multiple ways of achieving a goal. Returning to the roadmap analogy, if you are driving along a road and find it blocked at one point, as long as you have a roadmap you can find an alternative route to your destination - or the next best place to go.

1.6 What principles underlie SNM?

SNM begins with a number of assumptions. It's not possible to "prove" that these are true, but most of them are fairly obvious. Here are the main assumptions:

- The future of any organization is rooted in its past. Without understanding where it has come from, you can't hope to understand where it will go next.
- Events in the human world are mostly determined by people's motives and intentions. Though the outcomes are often unpredictable, the intentions are more predictable.
- The future of any human group is partly due to the intentions of people in that group, and partly due to others who impact on the group.
- The future of any human group is largely determined by the groups that communicate with it. (If a social trend affects your future, it's because it impacts on you, through some person or group you deal with.)
- The future of any human group depends on the relative power of the other groups it communicates with - and the sustained application of that power.
- Just about every event or situation has more than one cause - and more than one effect.
- There are always multiple ways of achieving a goal. So there is always an alternative (even if you don't like it).
- Specific intentions can change quickly, but the underlying visions, hopes, values, and expectations change
much more slowly.

So if you want to know what people are going to do, you need to understand their visions (etc), which will determine their motives and intentions. This can help provide early warning of changes.

But where do hopes, values, visions, and expectations come from? According to the theory behind SNM, they arise from people's worldviews or cultures. If people seem to react illogically, it can probably be traced back to their worldview.

So if you can identify groups of people who could affect your organization's future, but have a different culture or worldview, you should involve some of them in the scenario mapping.

Put all those assumptions together, and you'll begin to understand where SNM is coming from.

1.7 What resources are needed?

A quick summary of resources needed: money (not much), people (10 to 20 is best), a suitable space, and a little stationery and equipment. What you need most is a willingness among the people involved to explore the group's future. Without that, the findings won't be comprehensive, and the output probably won't be used - because the main input is people's time.

The ideal duration is four half-day sessions - up to about four hours. Longer sessions day tire participants, and are not recommended. As participants take a while to get into a suitable frame of mind for thinking about the future, nor should sessions be too short. If you scheduled, say, 15 one-hour sessions instead of four half-day sessions, a lot of time would be wasted in picking up lost threads, so it would end up taking more like 30 one-hour sessions - and that's not including any time taken travelling to the venue.

Sessions should be at least several days apart. This allows participants time to think about questions arising from the previous session, and gives the organizers time to analyse the previous results and prepare the next session. A week apart is fine. If it's longer than that, people tend to forget the previous session.

Four workshop sessions, a week apart, will occupy a month, but the entire project will take longer, because:

- Before the workshop sessions begin, they need to be planned. This usually takes at least two meetings, a few hours each.
- After the workshops finish, you'll probably want at a follow-up meeting to decide how to use the findings.
- A report or recording may need to be compiled, to distribute to other people who could not attend.

To be on the safe side, allow two months from start to finish. It can all be done in less than one month, if no time is wasted, but the risk is that thoroughness and quality are likely to suffer.

1.8 What steps are involved?

The sequence of an SNM project is:
1. Plan the workshops
2. Hold the workshops
3. Consider the findings.

We now consider these stages in detail.
Part 2. How to do SNM: a step by step guide

The SNM process has three main stages, each subdivided into smaller stages.

1. Plan the workshops, including venue/s and dates
   - Decide the entity and the focus: "the future of what, in what context?"
   - Find resources: money, time, people, space, and equipment.
   - Decide on the facilitation and the agenda
   - Collect background data needed for the workshops

2. Hold the workshops
   - The standard method has four workshops, held about a week apart.
   - The output is a detailed scenario map, which can be used like a road map of the entity's future.

3. Deal with the findings
   - Disseminate the scenario map
   - Decide what actions to take
   - Evaluate the success of the project

2.1 Define the entity and the focus

"The future of what?" This is the first question to ask. Even if all participants are clear about the entity as it is now, consider how its boundaries might change over the next 10 or 20 years. Few social entities stay the same. They merge with others, they split, and sometimes they are redefined by an external agency or forces. Usually everybody takes the definition of the social entity for granted, but it's important to define what's in and what's out. Having a large sheet of paper with items under these two headings can help to ensure that everybody is talking about the same future entity.

Unless the entity is a tiny one, it's also useful to define a focus or context for the study: the future of the entity "in relation to X." Even if discussion drifts away from that focus, and even if (as often happens) it's later broadened, this can help to avoid the discussion drifting aimlessly.

2.2 Find resources

When the entity and focus have been settled, the next stage is to organize the workshops. These need four types of resources: time (and maybe a little money), people (above all), a suitable space, and a little equipment.

Resource 1: Enough time, a little money
SNM costs very little money (unless you pay an external facilitator) but it does take time. If you want to study your organization's future, and you are a key decision-maker, that means your time. It can't easily be delegated, and will probably take about a week in total, spread over about a month.

Resource 2: People

Participants. There's no fixed number of participants, but...

- If there are too many people (more than about 25), the whole process takes much longer, and workshops can become somewhat chaotic unless there's very firm or very skilled facilitation. But if the facilitation is too firm, some ideas may not emerge, and highly skilled facilitators are rare.
- With too few people (less than about 10), there won't be enough diversity.
Balancing between those two extremes, the ideal number of participants is about 15. The more complex the situation, the more participants are needed. Section 2.3 below has more detail on participants.

**Facilitator/s.** The main roles of the facilitator are to make sure that everybody’s voice is heard, and that everything happens more or less on time. If a few people get carried away on one task, everybody else has to wait for them, they feel that their time is being wasted, and they get disgruntled. So the facilitator needs to be fairly firm about timing – but must also be able to see when something interesting is happening, and to let it continue.

Assistant facilitators are useful when there are many participants, or a high level of conflict. Their main role is to visit the break-out groups, trying to make sure that they stay on task, and that all groups finish a session at the same time.

**Resource 3: Space**

**A large enough room.** With about 15 participants, a room around 10 metres square (about the size of a school classroom) is usually fine: large enough for four break-out groups, each working in one corner of the room. Too small a room can be chaotic - but if the room is too large, you don’t need to use it all.

**Just one room.** What is not a good idea is to have separate rooms for break-out groups. Participants then tend to forget the time limits, keeping everybody else waiting, and slowing the proceedings right down. If everything happens in the same room, participants can see when their group is last to finish.

**Furniture.** A chair for everybody, a smallish table for each break-out group, and perhaps a long narrow table for storing supplies and assembling components of the scenario map. If the room is on the small side, remove all unnecessary furniture - it gets in people’s way when they are working in small groups. In parts of Asia, chairs are not necessary - people prefer to sit on the floor, if it’s carpeted. This is much more flexible than using chairs, but for spoiled Westerners not accustomed to sitting on the floor, doing without chairs gets uncomfortable after a few hours.

**Plenty of wall space.** So that all participants can see and comment on the scenario map as it’s being formed, it’s best to put it on a wall. The ideal wall space is long (at least 10 metres), without doors and windows in the way. It doesn’t need to be a single wall: two adjoining walls are fine. The wall doesn’t need to be high, because the most convenient height for writing and reading is between 1 and 2 metres from the floor.

**Freedom from interruptions.** It’s hard to think about the future when phones are ringing, people are coming in and out, and other distractions keep happening. Therefore a venue away from the workplace (if the entity is a business organization) is preferable.

**Resource 4: Equipment**

The basic supplies for SNM are very simple, and can often be found in an office stationery cupboard:

- Sheets of blank paper, for putting on the wall. A3 (30 x 42 cm) is a good size. Larger sheets are difficult to handle and to modify. If the sheets are too small, it’s more work to organize them.
After the workshops: somebody (it could be you!) is going to take them down and transcribe them — that’s when the size of paper matters.

- Marker pens, that make a line about 2 mm to 3 mm wide (so people can read the words from the back of the room). Whiteboard markers are fine, but they don’t last long, so you’ll need plenty. Multiple colours are useful, for tracing who wrote what when queries arise.

- Pads of small sticky notes, such as “post-it” notes. These are often 76 mm (3 inches) square. They need to be large enough to write a short sentence on with the marker pens. It’s helpful to have several different colours. SNM uses lots of sticky notes - so allow one pad per person. (The pads often have 100 pages.)

- Ribbon of some sort. This is used to connect the statements on sticky notes, and it’s preferable to have several different colours. (You can manage without ribbon, by drawing arrows, but a lot of re-drawing is often needed, and that makes the connections hard to follow.)

- Sticky tape, to put the large sheets of paper on the wall. It needs to be firm enough to hold the paper in place (in case of strong wind), but not so sticky that you can’t take the sheets down and move them around. Painters’ masking tape is perfect.

- A timer for break-out sessions: anything from a wall clock to a computerized slide show (“X minutes left”). It needs to be large enough that everybody can see it, from anywhere in the room.

That covers the most essential pieces of equipment. Optional extras are...

- Name badges for participants — because they should not all know each other beforehand. (Otherwise, there won’t be enough diversity in the group).

- Coloured sticky dots, about 1 to 2 cm diameter. These come in rolls, and are used for voting by placing them next to written statements. (The technical name for this is “dotmocracy.”)

- Recording equipment: audio recorders, video recorders, and/or cameras can be used to record parts or all of the sessions, perhaps for later transcription.

- An overhead projector, or a data projector with laptop computer. But be very careful about how this is used — it can allow one person to dominate. Paper is more democratic: it’s so cheap that everybody can have equal access.

- Not recommended: a computer for each participant, because (a) software often misbehaves, wasting much time, and (b) the shared focus on the big map on the wall is replaced by a lot of individual maps. People do their own thing, and others don’t get to question it - then you have the problem of combining incompatible scenario maps.
2.3 Select participants

How many participants?
About 15 people is a good number. With 25 or more, proceedings can get out of hand and are slower. With less than 10, not enough viewpoints will be represented.

However, if you invite 15 people, and you don't chase them up, it may be that only 5 will come to the first workshop. You can always expect that a few won't be able to make it, but if the majority don't turn up this can disrupt the plan. To make sure that people turn up, these steps are necessary:

- Invite people personally (or by phone), not in a printed form (mail, email, fax) that doesn't produce an instant reply. Often, about half the people invited will agree to come.
- Everybody who agrees to come should be sent a confirmation letter, with a map showing how to reach the venue. You can't assume everybody knows that.
- Have a few people on standby, to replace original participants who can't make it.
- A day or two before the first workshop, telephone each participant to confirm that they are still coming.
- For each participant who drops out at that stage (often 10% to 20% of those who originally agreed to come), ask a standby person to come instead.
- Sometimes a participant will offer to bring a friend. Don't count on that friend coming! Get the friend's name so you can follow up with the confirmation letter and the phone call a day or two before the workshop.

All that encouragement is only needed for the first workshop. The process is interesting, and people who come once are usually keen to continue. It's not essential for all participants to come to all workshops. If somebody can't make it to a later workshop, they can be asked to send somebody else, as long as that other person is connected in some way with the inquiring entity.

The importance of diversity
It's absolutely vital to have as many different stakeholder groups as possible represented at the workshops. Omitting some groups will mean that some possible futures are not foreseen.

If the futures being studied are of a geographical area, some participants should be residents, some should be people who work in the area, some should be from local government, some could represent community groups, some could represent employers - and so on. Every group likely to have some power to affect the future of the area should have at least a few participants.

If the futures of a business are being studied, participants should include senior management, ordinary staff, suppliers, customers, perhaps the spouses of staff, people from regulatory agencies, subsidiary companies, and even competitors.

Competitors are a problem. They may not come along, and if they do they may find out things that the business doesn't want them to. But if they don't come, valuable insights will be lost. One solution to this dilemma is to study the future of an entire industry in an area - as well as (or instead of) just one business. For one industry, in one area, most elements of the future are shared between competitors. This study can then be followed up with a few sessions for only the people involved with that business.
The danger when choosing participants is to not invite some types of people, because you think they won’t be interested. So cast the net more broadly than you think should be necessary at first. Consider all the types of stakeholder in Figure 4, on page 13 below.

2.4 Outline of workshops

The standard program for SNM uses four half-day workshops, each focusing on some aspect of the future.

Workshop 1: Influences on the future
Workshop 2: Generating possibilities
Workshop 3: Mapping paths to the future
Workshop 4: The future as layers

The output from each workshop becomes the input for the next, like this:

- From workshop 1:
  (a) A time chart of the recent past, showing “unfinished business”
  (b) A stakeholder map, showing all groups that interact with the entity.
  (c) A Leaf of Goals for each key stakeholder.

- From workshop 2: A collection of event groups (mini-scenarios)

- From workshop 3: The top layer of the scenario map: a linked set of possible events

- From workshop 4: The lower layers of the scenario map, derived from the top layer.

Each workshop has several sessions, alternating plenary and small-group work:

1. Plenary – introduction: the facilitator explains the next task, how many small groups are needed, and who should be in each group. Participants’ questions about this task are answered. (About 5-10 minutes)

2. Small groups: each works on the current task. Sometimes all groups do the same task; at other times, each group does a slightly different task. (About 20-30 minutes)

3. Plenary – findings: Somebody from each group presents the group’s findings - either verbally or on a wall chart. (About 10-15 minutes)

Each three-part cycle takes between 40 minutes and an hour, so each half-day workshop can include about five cycles. This use of cycles is deliberately structured to include a lot of opportunities for review, addition, and correction. The first draft of a scenario map is probably going to be incomplete and perhaps ill-considered. The four-workshop format, with multiple cycles in each workshop, allows for corrections and improvements as you go.

To prevent workshops from running well over time, the facilitator needs to ensure that everything finishes on time. As everything produced ends up on the wall, there are always later opportunities for commenting on and correcting the output of each session.

A lot of people think it’s not possible to foresee the future at all. The principle behind SNM is that - though exact prediction is obviously impossible - some level of foresight is highly achievable. But think of the future as being like a distant star: to see it clearly needs good conditions, such as no extraneous light, clear weather, and a large telescope. This series of workshops, encouraging multiple viewpoints and minimum distractions, is a futurist’s equivalent of an observatory.

10 Initial SNM Manual
**Variations**

To get through the full agenda in four sessions, workshops need to be well organized and skilfully facilitated. It may take five workshops – or even six, if there are a lot of participants and some unresolved conflict between them.

If there are not many participants, and you are very, very well organized, you might just manage to do it with three workshops. But you couldn't possibly do it all in two workshops: there would be so much rushing that some likely futures would be overlooked.

Though it's possible to do the workshops in a more concentrated way (two full days, instead of four half-days) this is not recommended. Participants need thinking time between workshops, and organizers need time to distribute the output of each workshop to participants before the next workshop. One week between workshops is fine. Two workshops per week would be pushing it, and more than that would be too much for most participants.

It's possible to vary the agenda a little. As participants cover the same ground in several different ways, cutting out a session or two is not going to make a huge difference, specially if a session is replaced with a relevant new activity.

The detailed program below is designed for Westerners, who are used to working at a rapid pace. In developing countries, and for some cultures in Western countries, the pace will need to be calmed, by having fewer sessions in each workshop, and spending more time on each session.

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3. Details of the workshops

3.1 Workshop 1: Influences on the future

**1a. Introduction**  
*Plenary, about 15 minutes*  
Everybody is introduced to everybody else, and the purpose of the workshops is explained again. The facilitator introduces the venue, explains what will happen during the workshops, checks that everybody has any background documents that were sent out, and gives spare copies to anybody who hasn't received them. It's also necessary to explain that this is scenario work, and does not automatically culminate in an action plan.

If some key stakeholder groups aren't represented among the participants, assign some participants the role (for all workshops) of representing that group. For example, if no competitors are present when the future of a business is being studied, several participants who have worked for competitors could be assigned to represent competitors.

**1b. Unfinished business**  
*About 45 minutes*  
Participants are divided into stakeholder groups. Each group is asked to produce a time line of major events over the last few decades, that are relevant to the entity's future. Events that almost happened (but didn't, and still might) are also shown. This is done by writing a label for each event on a sticky note.

Plenary: A large piece of paper - about 1 metre high and 3 metres wide, is put on the wall - laid out as in the following diagram, but varying the years and...
stakeholder groups in the diagram as appropriate.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mgmt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppl</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Members of each group are asked to place on this chart sticky notes for the events that were important for them in relation to the entity. The exact year isn't vital: the sequence is more important. This exercise helps build understanding between the different categories of participant: each group can see what each other thinks is important.

1c. Scenarios of the recent past
About 45 minutes
The next step is to link those important events together. Which events influenced which others, and how did they link together? Participants are introduced to the event tree: the basis of a scenario in SNM. In session 1C, these are scenarios of the past, but the principle is identical for scenarios of the future.

An event tree looks like this (with time flowing from left to right - the standard convention in SNM):

![Event Tree Diagram]

Figure 3. An event tree

(If you don’t understand why it’s called an event tree, turn your head to the left, then you can see it as roots, trunk, and branches.)

The word “event” is used broadly in SNM - it includes situations and processes. (For example, was World War II an event, a situation, or a process? Answer, all three, depending on your viewpoint. From 2005, it seems like an event. In 1942 it would have been a situation for those involved in it, and a process for military planners.)

The A boxes are influences that led up to the event. The B boxes are effects - what followed from the event. There can be any number of A and B boxes, but it's rare to have only one, and there are seldom more than about 10 direct links. By viewing each A or B as the trunk of its own event tree, the diagram can be extended. Conversely, each A or B can be seen as a whole event tree in itself.

It's also possible to have other events flowing into the A boxes, and still others flowing out of the B boxes, extending the event tree. This will happen later, when all the event trees are linked up.

Because this particular exercise is about recent events, the B boxes may not have happened yet. But because the whole project is about futures, it's acceptable to show consequences that have not yet happened, but are expected. To help distinguish the past from the future, use sticky notes of a different colour - or put a question mark (or other symbol) on items that have not yet happened.

To create these event trees, participants are divided into small groups, based on their knowledge of the issues involved. The best group size for generating ideas is usually about three or four people. Each small group is given a sheet of paper about A3 size and a pad or two of blank sticky notes. Each box (in the above diagram) is a sticky note, and these are laid out as in the above diagram.
on the sheet of A3 (or similar sized) paper. The wording on each sticky note should be a clear explanation. Don't let participants write just one or two words - even they know exactly what's meant, others won't. Misinterpretation becomes a problem if labels are too short. So write a whole sentence - 5 or 6 words, in newspaper headline style, is often enough.

When each group has produced a few event trees, these are put up on the main display wall. Everybody reads everybody else's event trees, and comments on them. This often leads to a few more causes and effects being added to some event trees. The causes (the A boxes above) in some event trees may be the effects in others - enabling the trees to be linked together. There will be a lot more of this linking in later workshops.

1c. Stakeholder map
About 45 minutes
The facilitator now displays a generic stakeholder map, for any entity:

![Stakeholder Map Diagram]

Figure 4. Generic stakeholder map

The task now is to list all the stakeholders who communicate with the entity, mostly as groups with shared characteristics. The most important stakeholders are shown as individuals - either people or organizations. Any customers or suppliers accounting for more than about 10% of the business should be listed individually - specially if that proportion is growing, or the stakeholder would be difficult to replace. Each of the above stakeholder categories can be subdivided further. All the terms should be interpreted very broadly. For example, "peers" includes competitors, and "neighbours" can be close in other ways than geographically.

In this task, participants are divided into small groups, of three or four people each. These groups can be formed partly on the basis of expertise. For example, if one of the participants is in the purchasing department of the entity, that person is well placed to list the suppliers. Each group is given the task of listing all the stakeholders in several of the nine types. Some stakeholders, with multiple roles, may be listed by several different groups, but that doesn't matter, because the focus is on roles, not people or organizations. This process typically produces a list of 20 to 50 main stakeholders, but of that number, usually fewer than 10 are of crucial importance.

This process produces a ring of stakeholders around the entity (as in Figure 4). As the entity's future will be largely determined by the future of its stakeholders, by examining the influences stakeholders are likely to exert, the entity's future should become clearer. Therefore the meaning of the lines between the group and the entity should be explored. A line means communication: how frequent is it? What form does it take? How might the mutual demands of the entity and the stakeholder interact?

Within each category, possible new stakeholders should be considered. For a business entity, questions arise relating to suppliers, customers, regulators, and competitors. For example, what if the two
largest suppliers merge? Will this increase the price of inputs to the entity? What if the largest customer goes out of business? What if a new government agency was set up, regulating some aspect of the entity's activity? Finally, what if a new kind of competitor were to emerge? (Michael Porter's well-known "five forces" model can be used here.) After considering relationships with direct stakeholders of the entity, this can be repeated for an outer ring of secondary stakeholders.

Stakeholders who mediate between the entity and other stakeholders are best shown inside the inner ring. For example, an industry-wide association can be shown between the entity and its competitors, and a trade union between the entity and its staff.

For a large entity it's also worthwhile to list internal stakeholders, such as divisions and area offices. Again, what needs to be considered is the pressures they put on each other, and the communication channels through which they do this.

### 1d. Leaf of Goals

**About 45 minutes**

A Leaf of Goals shows all a group's goals in a leaf-shaped hierarchy. At the far extreme (on the right) is usually a single long-term goal, such as "to survive well." That may be accomplished in a number of ways. Each of these in turn can be done in a number of ways, and so on. At some point the number of possible actions will begin to fall. Right now (the left point of the leaf) only a few actions are feasible. A detailed Leaf of Goals can be drawn for the entity under study - at the present time. Goals on the right change slowly, those on the left much more often.

If there's enough time, it's also useful to try to create a Leaf of Goals for each of the entity's main stakeholders - either as individuals (people or organizations) or as groups. Some of these goals will be known well, but others can only be guessed at.

### 3.2 Workshop 2: Generating possibilities

This workshop has four main components. Participants first produce a futures wheel, then morphological paths, then backcasting, and finally midcasting. Each of these will shortly be explained. In terms of time scale, the four methods fit together like this...

![Figure 5. Format of the events layer](image-url)
2a. Futures wheel
About 45 minutes
The futures wheel is a way of considering things that could happen in the entity’s future - starting now. The principle is to create some event trees, all beginning at the present time. Some of these trees should be obvious, and others should be far-fetched and unlikely. The idea is not to look for what you expect to happen, but what could happen. Predictions are probably going to be wrong anyway, so instead of predicting whatever you think is most likely, try to cover the range of possibilities. Having done one set of event trees, take each of those and build a few more trees growing from its branches. If the present is at the centre, before long you have a wheel-shaped diagram - hence the name.

For this exercise, participants are again divided into small groups of three or four people each. These can be based on people’s relationships with the inquiring entity. If it’s a business, there might be groups of customers, suppliers, management, and general staff. Individuals in each group are then asked to think of a few things that could happen in the near future that would affect the inquiring organization. Having thought of those things, they write them on sticky notes, then (after about 5 minutes’ writing) the group reviews each of them. Any duplicated events (mentioned by more than one participant) can be combined.

The whole group then considers each event in turn, and builds a small event tree around it. What would have to lead up to it? What would follow from it? If there’s enough time, try to extend each tree into the future, by again asking “What would follow from that?”

If there’s time, two questions can be asked about each event: (1) How likely is this to happen (assuming everything that came before it occurs)? and (2) How much difference would this make to the entity if it did happen? Such estimates cannot be very accurate, so they’re best shown by writing symbols on the relevant sticky notes, with a key like this:

<table>
<thead>
<tr>
<th>(1) How likely is this to happen to us?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not very likely at all %</td>
</tr>
<tr>
<td>Moderately likely %%</td>
</tr>
<tr>
<td>Very likely indeed %%%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(2) How much would it affect us?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not much at all !</td>
</tr>
<tr>
<td>A moderate effect !!</td>
</tr>
<tr>
<td>A very large effect !!!</td>
</tr>
</tbody>
</table>

If one person thinks something would make a large difference and another thinks it would make only a small difference, the chances are that they are assuming different preconditions. As SNM works by comparing a wide range of ideas, not averaging them out, the solution to this is to use a range, e.g. I-III. If the issue seems important, and if there’s enough time, you can try to define the meaning more closely. This usually helps to tighten the range of estimates.

2b. Defining paths
All plenary, about 30 minutes
For the entity’s future 20 years ahead, the possibilities are almost infinite. There are so many choices that participants find it difficult to think of anything. It’s as if you had a road map with no roads. Because you can go anywhere at all, you don’t know where to go.

Therefore, drawing a few broad paths makes it easier to fill in the spaces. These paths can be defined in several different ways: based on the Leaf of Goals, on a
set of activities, or using morphological method, considering all logical possibilities. The choice depends on the entity’s situation.

**Paths based on the Leaf of Goals**
Following the Leaf of Goals developed in workshop 1, each route to the final goal can be chosen as a path. Each path will represent a different strategic goal as a route to the permanent goal. This is easy, because the paths have already been identified.

As well as your own goals, you may need to consider the goals of more powerful actors that affect your entity. Every organization and community is embedded in a context. For example, if your entity is a small business, your future probably will not be very different from the futures of others in the same industry, in the same area, because you will be subject to the same influences and industry changes. To allow for these possibilities, you should include a few paths that you may not want, but that more powerful entities may impose on you - unless your Leaf of Goals already covers such possibilities.

**Paths based on a set of activities**
Social entities often engage in a number of different activities: a path can be set out for each activity. For example, a teenager contemplating his or her personal future could define the activities as education, employment, marriage, and parenthood.

**Morphological paths**
To make sure that nothing is missed, the paths can be created morphologically - defining all logically possible combinations. For example, if you’re looking 20 years ahead, you can begin by asking whether or not this organization will exist in 20 years. This produces two sets of paths: existence and non-existence.

- The non-existence path could be split into whether or not the entity’s functions will still exist, but be done by some other entity. Might the entity be split into several components [1], or merged with another [2], or would its functions no longer be performed [3]?
- The existence path could be split in terms of size. Will the entity be much larger than now [4], much smaller [5], or about the same size [6]?

So 6 mutually exclusive paths have been defined, on the basis of the entity’s form and existence. For a business, that type of division might be important, but for a government department (where it can be taken for granted that the work will be done anyway, and departments are often reshuffled) that type of division may not be relevant - specially if the reason for doing the scenario mapping is to look at activities and service delivery, not organizational form.

There are other ways of dividing paths morphologically: for example, in terms of change, such as...

1. Much the same activities as now
2. Continuing to change at the rate experienced during the last 20 years
3. Radically different activities from now
4. Very different activities in some aspects, but much the same in others

Another set of morphological paths looks beyond the entity, considering its context.

**How many paths?**
The most useful number of paths is 4 to 8. Less than 4 is often too few for clear separation of alternatives. With more than 8, it becomes hard to distinguish between them.
Think of these paths as temporary ways of organizing a lot of small scenarios, to help participants place event trees on the scenario map. Paths should ease the process, not control it. If they turn out to be awkward, they can easily be changed.

2c. Backcasting
About 45 minutes
This is the opposite of the futures wheel worked on in the first part of this workshop. But instead of starting at the present, you start at a “milestone” well into the future, and work back to find out how the entity might have arrived at that point - working back along the paths decided in the previous session. Participants again write possible events on sticky notes, one event per note, then work in a small group to create a backward event tree.

Milestones should be defined clearly enough that there will be no doubt if and when the organization reaches it. A milestone is not the ultimate future - just a clear indicator that the entity is on a certain path. It is an event, rather than a situation.

A practical limitation of backcasting is that you need one small group to work on each path, and groups of 3 or 4 are best. Groups of two are often less creative - either they agree too readily, or they don't agree at all. So if you have say 15 participants, that would be 4 or 5 groups. If you come up with 6 main paths, you have to juggle the group size, perhaps giving each group two sets of paths to backcast along.

2d. Midcasting
About 45 minutes
Some events flow forward from the present. The futures wheel helps to identify those. Other events are steps towards some outcome. Backcasting covers those. But there's also a third type of event: those that come out of the blue - seemingly, totally unpredictable.

Certainly, whether or not one of these unlikely events will happen is unpredictable, and when it will happen is even more unpredictable. But what would follow from such events is more predictable. These events are often bad news, disasters of one kind or another - financial collapses, or climatic destruction. Others are good news (winning a major award), and still others are neither bad nor good in themselves, but are likely to affect the entity.

Midcasting is a method for anticipating these fairly unpredictable events. It aids imagination by creating a structure in which you can imagine possibilities. The anagram FARTHINGS covers nine types of events and situations:

F = financial, economic
A = artistic, cultural, imaginative
R = religious, moral, ethical
T = technological, mechanical, electronic
H = health, biological
I = information, communication, media
N = natural, macro-environmental
G = governmental, political, legal
S = social - anything to do with people in groups.

Those are general categories: they are only a starting point, and can be divided, combined, or supplemented as necessary. Try to think of an example of each, in the context of the entity being studied. Bear in mind that within each of the FAR-THINGS categories, an event could occur on any scale. There can be local events, national events, and world-scale events.
Avoid ignoring some FARTHINGS categories in the belief that they won't apply. Try to come up with at least one plausible item in each category. For example, in a study with a credit union, it seemed at first that the religious category was irrelevant - until one participant thought of Islamic banking. That example illustrates the purpose of using the FARTHINGS categories: to aid imagination.

After conceiving of an event in each FARTHINGS group, consider how it would affect this entity if it happened - through which stakeholders would change occur?

At the end of Workshop 2
The components of the scenario map will now be done in rough form, but there will be a lot of disconnected event trees. There will probably be some duplication and overlapping. And some major possibilities are very likely to have been overlooked. So participants can be given homework: before the next workshop, try and think of something that’s been missed. This will be much easier for them if they can get a copy of all the event trees created so far.

Therefore, straight after this workshop, somebody should either photocopy all the pages done so far (if A3 pages are reduced to A4, they should be quite readable, because of the thick pens used), or transcribe them into a computer file and email them to all participants before the next session. See the Appendix for software that can be used for transcribing the diagrams.

Each of these small event trees becomes a small scenario. But don’t stop there! The main focus in SNM is not so much on what might happen, but more on how events are linked together.

3.3 Workshop 3: Mapping paths to the future
At this stage there will be a lot of mini-scenarios, in the form of event trees. To recap, these trees were produced in four sessions in the two previous workshops:

- Unfinished business (workshop 1): Sequences of past and current events - things that have already happened, or are happening now.
- Futures wheel (workshop 2): trees of possibilities, starting from the present.
- Midcasting (workshop 2): event trees constructed around unexpected events.
- Backcasting (workshop 2): trees of possibilities, working back from the future.

These possibilities can never be complete; events that nobody thought of are likely to happen. So this exercise will never produce all possible scenarios, but because of the combined thought that’s gone into it, it has a good chance of identifying most major possibilities. Most of the event trees will have been produced by now, but a few more are likely to surface from now onwards.

3a. Facilitator's introduction and review of last week
Plenary, about 10 minutes
The focus of today’s workshop is to assemble the event trees together. Some of these events logically must happen before specific other events. Some other events can happen at any point. Each event tree is written on some sticky notes, which are placed on a sheet of paper about A3 size (large enough for about 10 small sticky notes - trees are seldom bigger than that). Figure 6 below shows how event trees can look at this stage.
3b. Grouping the event trees

Plenary, about 40 minutes

This session is best done in a plenary session. The facilitator describes each event tree in turn, and gets participants to vote on how soon that main event could begin. Divide the sheets into three rough groups: (a) event trees that can happen soon (b) trees that can't happen soon, and (c) all the rest.

As this is done, stick the sheets on the wall. Group (a) goes on the left, (b) on the right, and (c) in the centre (high up, to get them out of the way).

3c. Linking the event trees

Plenary, about 40 minutes

At this point, it's useful to number the event trees, by writing a number on each sheet - as in Figure 6, which shows sheets 23 to 31. Numbers are arbitrary - just a quick way to refer to a problem used later for quick reference.

Now take each of the three groups of event trees, one at a time, and look for inter-connections within the group - and from the previous group. Is any group a prerequisite for another? Taking each sheet in turn, the facilitator asks "What would have to come before this one?" (Participants might call out "Number 23"). When most people agree on a prerequisite, put that sheet to the left of the other. If that's not possible, join the sheets with a piece of coloured ribbon. If an event tree can go in several places, place it so as to minimize the total length of links.

In this way, the scenario map is built. Following later thought, the arrangement is likely to be improved a little.

3d. Reviewing the scenario map

Plenary, about 30 minutes

Everybody should now stand back and study this preliminary scenario map. Look for problems, inconsistencies, omissions, and duplication. Some new event trees will probably be added, and probably some connecting lines will be moved. (At this point, be thankful for using ribbon!) Resist any temptation that comes from somebody saying "That one will never happen - why not take it down and save some space." Some rewording may also be useful at this point. (Be thankful for sticky notes - easily replaced!)

It may be useful to reorder some event trees, so that the sequence makes more sense. (Using a standard paper size makes this easier - be thankful for A3 paper.) Keep arguing either till everybody is satisfied, or you run out of time. You now have a scenario map of events.

If some of the midcast event trees can not be logically connected to any part of the map, try inserting them between critical links on the map - wherever they could cause most trouble. How would the entity deal with that type of disaster, at that critical time? Are there alternative paths at that point?
Transferring the map from the wall to a computer file

At the end, the organizers number every event tree and replace each ribbon by writing at each end of the ribbon the numbers of the other event trees that it leads to. Everything can now be taken down from the wall, entered on a computer file, and circulated to all participants before the next session. If they receive it on paper, it doesn’t matter what software you use, but if you circulate the maps as email attachments, you need to use software that everybody has. Of commonly available software types, spreadsheets (such as Excel and Lotus) are the best able to handle scenario maps. Concept-mapping software (such as Inspiration) is better still, but most computers don’t have it. (The Appendix below covers this.)

Optional extras

1. You can try to estimate the time lags between successive points within event trees. How soon could A lead to B? This is easy to underestimate. While some people estimate times, others should be skeptical. ("So soon? Really? What stages have you left out?") After such questioning, you often need to add more links between events in the sequence.

2. Estimates of probabilities - how likely each event tree is likely to occur. A suitable scale to use here is %, %%, and %%%%, as described above. More detailed figures would be misleading.

3. Estimates of how much difference that event would make to the entity - again using a three-point scale of !, !!, and !!!, as above.

3.4 Workshop 4:
The future as layers

Reducing gigantic maps

During the earlier workshops, the whole map will have been gradually assembled, usually on a long wall: a mosaic with many sheets of paper. Before going any further, the scenario map may need to be grouped. Workshop 2 probably generated several hundred mini-scenarios (in the form of event trees), but it’s very difficult to make sense of all of these at once.

To be comprehensible, the map of events needs to be reduced to no more than about 40 to 50 scenarios, which can be printed on a single page for normal reading, or blown up for wall display.

4a. From event trees to scenarios

Plenary, 30 minutes

By now some overlapping of event trees will probably be obvious, so the numbers are reduced by combining related event trees. These grouped trees become SNM’s scenarios. Begin by finding the two most similar trees, and combine them by joining their large sheets of paper. Keep going till there are no more than about 50 of these scenarios. Each should be given a label, in the style of a newspaper headline. Combined event trees will have one number for each original sheet of paper. It’s best to use the first sheet number for each scenario. If they are renumbered at this point, great confusion can arise!

4b. Finding the influences

Small groups, about 45 minutes

A scenario map usually has about twice as many linking arrows as scenarios. Each link can be labelled with the numbers of the two scenarios it links - for example, 15-23 would be the label of the link between scenarios 15 and 23.
Now work through each of the links. List the main stakeholders involved (including possible new groups that do not yet exist), and the reasons why the second scenario would flow from the first. This is best done in small groups, of about three people, with everybody focusing on one link at a time, thinking of reasons that apply to various stakeholders, briefly discussing them, and one person writing them down.

For each link, use a separate piece of paper for each stakeholder group. Larger sticky notes are fine for this. A completed one could look like this:

| Link 15-23 |
| Group: suppliers |
| Intention: continue to do business with us |

4c. Grouping the stakeholders

Plenary, 15 minutes

After combining all the intentions that underlie the links, you will have lots of intentions - probably at least 200. Because motives tend to be stable for each stakeholder, sort all the sticky notes produced in the previous session into one heap for each stakeholder. The easiest way to do this is to allocate some wall space for each stakeholder group, on which the output from the next three sessions can be posted.

Small groups, 30 minutes

Each group gets the list of intentions for one or more stakeholders (depending on how many there are, and how many small groups) and looks for consistencies. The same intentions tend to come up again and again, often with several stakeholders sharing intentions. Sort these into more practical/immediate and longer-term intentions, and you'll begin to see each stakeholder's Leaf of Goals emerge.

4d. Finding the visions

About 45 minutes

Again, each small group takes the sheets for one stakeholder, but this time tries to re-create that stakeholder's visions for the others involved. To get more diverse viewpoints, small groups for this session should consider different stakeholders from the previous session.

Think of these visions as broad hopes: situations or events that the stakeholders would like to see in the future. Visions (as usually defined in management) are situations that the organizations want to be in - but visions are not only self-oriented. So instead of having one big vision for each group, this vision-finding method looks for a lot of smaller visions. Each group can have a vision for its relationship with the inquiring entity, and vice versa. Some of these visions may be merely vague hopes, with no reason for action by the stakeholder involved, so needn't be investigated in detail.

If some stakeholder groups aren't represented at the workshop, it's not easy to determine their hopes and visions. Some follow-up work may need to be done.

The output of this session is one sheet of paper for each stakeholder, summarizing its vision (in the above sense) for each of the other relevant stakeholders. In doing this, consider the relative power of the stakeholders to each other, and their relevance to the inquiring entity. Less attention should be paid to stakeholders likely to be neither relevant nor influential.
Finding the worldviews
About 45 minutes
This is more difficult, because worldviews are hard to see - specially your own. Again, one small group considers each group: what is it about that stakeholder that is almost impossible to change? For example, a business will always be seeking profit. At a deeper level, it will just be trying to survive. If you consider the Leaf of Goals for that stakeholder, you may get a clearer idea of its worldview. The reason for being interested in stakeholders' worldviews is that a change in worldview will drive a change in visions, which in turn will drive a change in motives, which may impact on the events that could affect your group's future.

Each group of three or four people focuses on one main stakeholder type, so it helps if some people in each group have often dealt with that type - they'll have a better chance of identifying its worldviews. If the stakeholder is an organization, consider how it may change in 5 or 10 years, with different managers, or new technologies.

A worldview can't be summarized in a few words. The focus here is "What is likely to drive any long-term changes in visions for this stakeholder?" For each stakeholder type, this session should produce a short list of such driving factors.

The output from this session is a list of assumptions and worldviews: one sheet of paper for each stakeholder type.

Review
Plenary, 15 minutes
With each stakeholder group given a space on the wall, the intentions, visions, and worldviews of each stakeholder are now reviewed, in relation to the scenario map produced earlier.

For each link between scenarios, there will now be a lot of data about the stakeholders involved and their motives, visions, and worldviews. This will help in assessing how one scenario might flow from another.

Now that the scenario map is finished, it's a good time for participants to stand back and take a look at it as a whole. Are some corrections needed, in view of the sessions in this workshop? Do any obvious implications flow from it?

At this stage, participants are usually feeling full of energy, and pleased with what they've accomplished - but wondering what will happen next. They are likely to have a clear idea of where their entity might go, but maybe not such a clear idea of how to reach that situation.

Often, they want action - but that's another story. Scenario maps are not action plans or strategic plans. It takes time to create a workable action plan, so the end of a half-day workshop is not a good time to begin. So instead of rushing into action, a useful option for finishing the final workshop is to hold a brief plenary discussion about what to do next.

Though SNM finishes at this point, the participants generally don't feel that they've finished. Now they want something to happen. Follow-up actions can include...
- Disseminating the scenario map
- Deciding what actions to take
- Evaluating the success of the project
- Producing an action plan.

If most participants want to continue, the best option at this point is to set a date for the follow-up planning meeting - not too far in the future that impetus is lost, but not so soon that people don't get time.
to think. A week or two is fine, and different participants may be needed. External stakeholders probably won’t be willing to spend time on action planning for an entity, and if the entity is a business, it may not want to include outsiders.

3.5 What happens next?

**Dissemination of the scenario map**

With only around 15 to 20 people at a set of scenario workshops, there will often be a lot of others who are interested in the outcome. So it’s usually necessary to copy and distribute the scenario map.

After the final workshop, all the sheets of paper can be taken down from the wall, and each sheet can become a separate small map. Commonly available software (a spreadsheet, for example: see the Appendix) can then be used to transcribe the map, sheet by sheet, into a more portable format.

If the entity is a workplace - or an organization with several workplaces - a good use of the scenario map is to print out a final copy, and put it on a wall in a place where people will often see it. Over a year or two, the path that the organization is on will become clear. Ideally, people can point out a scenario or two and say “This is where we are now.” After that time, some possible paths will now be clearly irrelevant. And probably some new paths will have become obvious. If much has changed, it’s time to renew the scenario map, by holding a supplementary workshop or two, with some of the same people.

If the entity doesn’t have a central location, one alternative to putting the map on a wall where everybody can see it is to put the map on the organization’s website. However, it’s even harder to see

a whole scenario map on a computer screen than it is on a small sheet of paper. So instead of putting the map on a normal web page, using some variant of HTML, it’s better to produce a multi-sheet map to be printed out on a number of separate pages.

**A different style of action planning**

SNM can be a partial substitute for strategic planning, which normally answers three broad questions:

1. Where are we now?
2. Where do we want to be?
3. How can we get there from here?

All of these are covered in SNM workshops, but in a different way from normal strategic planning. To answer question 3, strategic planning derives a single path, but SNM produces multiple paths: often more realistic.

A strategic plan normally concludes in an action plan: specific actions to be taken, by particular groups, with specified budgets, by specified dates. This follows logically from SNM, but is not part of it, so must be done as a follow-up exercise - beyond the scope of this manual.

The type of action plan that arises out of SNM is different from the usual type. A normal action plan says “We’ll do A, then we’ll do B, then we’ll do C.” Instead of producing one big action plan, SNM generally produces a linked set of contingency plans – one for each broad path, and one for each scenario on the path, to be swung into action if that scenario occurs. When a contingency approaches, its action plan can be fleshed out in more detail.
Appendix: Software for scenario maps

Scenario maps can be distributed in three ways (a) on paper - in which one person prints copies of the maps and sends them to other participants. If you are going to distribute scenario maps electronically, you need to either (b) use software that everybody will have access to, or (c) provide the maps in a standard format that a wide range of software can read.

With option (b), participants will be able to read the maps, but not change them. With either option, there can be problems if participants want to print the maps, because they're often too large to print legibly, on most desktop printers (usually no larger than A4 or US letter size). So people need either an extra-large printer, or software that can produce multiple-sheet printouts.

A practical solution is to use software that can break one large map down into a number of smaller ones - which can be printed separately, then joined back together to see the entire map.

A wide range of software can be used to create scenario maps, including:
- Word processing software
- Spreadsheets
- Software for business presentations
- Graphics software for drawing
- Project management software
- Concept mapping software - including Inspiration, CMap, Omnigraffie, Visio, and Decision Explorer.

...but none of the above was designed specifically for this purpose, so none is perfect. If you expect to use SNM often, Inspiration (www.inspiration.com) has much to recommend it (easily learned, quick to use, versatile, low cost), but for one-off projects, spreadsheets are more convenient, because they are so widely available and well-known.

Spreadsheets for scenario mapping

Though spreadsheets were designed for calculation, they are surprisingly good at scenario mapping. The secret is to set up a grid of alternating large and small cells, like this...

![Figure 7. Grid shape for use in spreadsheets](image)

The large squares are used for boxes, and the narrow rectangles for the connecting links. When an event tree is being transcribed from paper, the words on each sticky note are copied into a large square, and the connecting arrows go in the adjacent rectangles. When the worksheet is printed out, the gridlines are not shown, but the boxes are given borders. The small square cells can be used at the heads or tails of arrows to hyperlink to an upper or lower layer (which can be a separate workbook in the same directory).

Each event tree is shown on a separate worksheet, and hyperlinks can be set up to connect relevant worksheets. In fact, the first worksheet can be a map of all the other worksheets, and clicking on a labelled cell on it can take the user to the relevant worksheet. Most worksheets, (with a single event tree) can be printed on one A4 or US-letter-size page, in landscape format.