Unpredictable, Uncertain and Uncomfortable Transport Planning

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Abstract:

It is being asserted, and many will accept, that life for individuals within our increasingly globalised and technology driven society is less comfortable than in the past. Gone are certainties, predictability, stability and clear career paths spanning decades if not a lifetime. Life has become uncertain and unpredictable, with constant and stressful changes. Yet the uncertainties faced by individuals and the changes to basic structure of society do not appear to be reflected in the medium and longer term transport planning processes. Transport planning remains welded to an extrapolation of predictable trends or an examination of a limited number of scenarios that are based on a high comfort level. The paper argues that an important characteristic of the present is the high degree unpredictability. It argues that unpredictability can be accommodated within scenario analysis, but the scenarios must incorporate uncomfortable futures. Several uncomfortable futures for South Australia are given as examples, and the implications for transport described. The transport outcomes of the uncomfortable scenarios for South Australia differ significantly from those predicted using established techniques.

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Introduction

"The future ain't what it used to be" - Arthur C. Clarke.

Even from the earliest time of nomadic hunters and gatherers, life has always been unpredictable. Flood, famine, pestilence, dangers from the natural and animal environment are all unpredictable in intensity and effect. For the majority of mankind's existence this was at the best an irritation, and the worst a fatal danger, and it could be argued that for hundreds of thousands of years it was accepted stoically as an uncontrollable inconvenience of living and of dying

The unpredictability of the unpredictable is a significant concern when time, effort and resources need to be invested now in serving the needs of the future. This is of course one reason why people plan, both in their personal and public life, for the future. Typical examples of public planning for the future from earlier civilisations are the construction of sanitation systems and securing reliable water supplies.

In today's environment, transport planning is a classic example of the public planning process where data is collected and analysed to guide actions now that impact on the future. As in all cases of long term planning, there is the need to get the answer correct or almost correct, otherwise valuable resources are squandered. And, as in several other endeavours, in transport planning the future horizon spans decades or, for fixed infrastructure like ports and railroads, even centuries.

When the pace of change is slow, predicting the future environment within which the consequences of today's decisions will exist is relatively painless. If the correct data is collected, correctly interpreted, and actions based upon correctly calibrated models, planning can proceed with a fair degree of certainty that the result will be not be totally irrelevant. However, in times of significant change, unpredictability and uncertainty can produce plans and infrastructure that can become at the best unnecessary and at worst a waste of time and money

The earlier years of the Industrial Revolution are classic examples of step function periods of rapid and continuous change. As well as rapid technological changes, there were significant social, economic and political changes. In Europe and North America one outcome of this era was an extensive and expensively constructed canal system that never achieved its full potential because of the development of alternative and more efficient transport technologies

Many will now argue that the changes taking place on the cusp of the Twentieth and Twenty First Centuries are just as significant and just as tumultuous as those of the Industrial Revolution. Developed Nations are moving from the Industrial Age to the so called "Post Industrial" or "Information Society". Many of the changes we are witnessing are being forced by developments and improvements in science and technology, particularly computer based technologies, although the importance of others such as materials and manufacturing technologies must also be acknowledged.

However, changes of a non-technical nature may be of equal if not greater importance than technological changes. They may also be harder to predict. Consider, for example, the social changes that have taken place in the last two decades, ranging from the rapid increase in the number of single parent families as a proportion of total families to the point where the "normal" two parent family is becoming atypical, to almost mass tertiary education of school leavers coupled with chronic structural unemployment and underemployment amongst youth

Significant changes have also taken place in the political institutions, including the growth of small single issue political parties whose political power over represents their constituent base, the convergence in policies between the major parties to the point where real alternatives are not available, and the almost universal distrust, even contempt, of those who have turned politics into a career path

The changes in the economic sector have been equally radical. Without wishing to argue the merits, within Australia free trade philosophies reign supreme, public sector ownership is seen as equating with inefficiencies, deregulation and self regulation is seen as a better substitute for Government control, and the threat of international monetary flows by those individuals and organisations with no particular interest in Australia except monetary gains has become an unseen but important driving force behind Government policies.

In this increasingly globalised and technological driven [but also potentially highly stimulating] society, one certainty is that the rate of change will not decrease. Many will assert and accept that life for individuals is less comfortable than in the past. The past is seen to offer stability, predictability and clear career paths that spanned decades, if not a lifetime. For those now in employment, life has become uncertain, unpredictable, slightly threatening, with constant and stressful change. And there is the fear that society is also fragmenting, creating an underclass, [and a potentially threatening group] of those who never have and perhaps never will have gainful employment in society. Never before has one part of society been subjected to increasingly high levels of stress in an increasingly competitive employment market, while the other part of society appears doomed to living a perpetual vacation

And yet the uncertainties faced by individuals and the very fundamental changes taking place in society do not appear to be reflected in the medium and longer term transport planning process. Transport planning remains welded to an extrapolation of predictable trends or an examination of a limited number of scenarios that are based on a high comfort level.

Current transport studies in Australia

The recent transport planning studies to have emerged in Queensland (Queensland Government (1996)), New South Wales (NSW Department of Transport (1995)),

Victoria (Victorian Department of Transport (1996)) and Western Australia (Western Australian Department of Transport (1996?)) are based on a close to straight line extrapolation of present parameters. In these studies, a degree of uncertainty is accommodated by sensitivity testing, but the limitations of this are that the parameters used must fit the calibration constraints of the model. Despite highlighting the already known problems with congestion, financing, community involvement and environmental issues, the results from these studies are generally predictable. They appear comfortable to those who prepared the reports, those who are required to act upon the findings of the reports, and to the community in general. No one is going to be disadvantaged or hurt by the predicted future, and investment in transport facilities is expected to continue.

South Australian planners may be more adventurous, or alternatively the adventurous initial output elsewhere may have been buried by the bureaucratic and the political machinery because it creates a level of unease in the future that must not be communicated to the general community.

Two South Australian studies examine a range of possible alternative futures for the State. The Department of Transport (Tibbs (1996)) study looks at five futures entitled "Foot to the Floor" [strong economic growth in South Australia], "Infobahn" [strong growth in information and other technologies], "Running on Empty" [economic stagnation, but little change in governance or society], "Throttle Back" [increasing environmental concern] and "Off the Grid" [an emphasis on sustainability].

The Adelaide 21 (Adelaide Capital City Strategy (1996)) study considers three scenarios, "Adelaide: Pipeline to Asia" [Adelaide as a vibrant economic hub], "Adelaide: the Creative Crucible" [a focus of innovation], and "Adelaide: Lifestyle Capital" [the city as an urban village].

All eight scenarios in these two studies are instantly recognisable, understandable, relatively comfortable and predictable. Even so, choosing the most likely futures is still a complex process.

But what if our system of governance changes? What if minority parties flourish and force frequent and unsettling elections? What if technological changes make possible a true democracy where individuals are consulted on all significant issues [see, for example, The Economist (1996)]?

What happens if the Murray River fails as a supply of water for agricultural, industrial and domestic consumption and the whole of the South Australian economy fails as a consequence? What if Adelaide becomes a tranquil, if not stagnant, rust belt backwater compared to the rest of Australia? What if Government policies and misplaced subsidies leave the State in such a high level of indebtedness that few options remain open?

What happens if the divisions between the stressed and employed haves and the relaxed and satisfied unemployed they support reach breaking point.

All these possibilities may be uncomfortable, some are very uncomfortable, but they are not inconceivable. Indeed the seeds for some of the options are visible in the present environment in South Australia. If these uncomfortable seeds are visible, there are probably also a multitude of other thorns that remain unseen at present, but have the potential to create discomfort, perhaps even considerable pain and anguish, in the future. Does this mean that they should be ignored? For transport professionals involved in long term planning the answer should be "yes" only if it can be demonstrated that the less comfortable futures have only a minor impact on transport planning.

The Transport Futures Study - "South Australia into the Twenty First Century"

With these thoughts in mind, the need for a framework within which longer term transport planning and policy advice could be evaluated in a turbulent external environment led to the decision to undertake the Transport Policy Unit's Transport Futures Study "South Australia into the Twenty First Century" (Transport Policy Unit (1997)). A draft version of "South Australia into the Twenty First Century" was completed some years ago and used as an internal working document to test and analyse transport policies. However, and for the reasons outlined above, it become clear that there is value in sharing the futures contained in the Study, some of which are very uncomfortable, with a wider audience. Thus "South Australia into the Twenty First Century" was revisited and revised to reflect the changes that have occurred in the years since the first draft report was prepared.

There are many futures and there are almost as many ways of trying to predict them, but basically, future prediction methods can be divided into two types - deterministic and normative.

The deterministic view holds that the future is determined by the past and so can, in principle, be forecast given sufficient data and the ability to interpret it. The transport examples referred to above from Queensland, New South Wales, Victoria and Western Australia all fit the deterministic model. On the other hand, the normative view holds that the future does not exist and cannot be forecast, but it can be created by making decisions now or at critical points in time.

Both approaches only work satisfactorily in a closed environment. Neither adequately copes with interactions between the environment and life within it, while external interference by God or man plays havoc with the forecasts and predictions

A method that combines the advantages of both views [and some of their disadvantages] is to generate scenarios of the future from past and present events. This has been attempted in South Australia in the Department of Transport and Adelaide 21 studies referred to above. Because there is an infinite number of scenarios to describe the future, in any scenario based study it is necessary to select a more limited and manageable number of futures; however, the scenarios should still cover a broad range of alternative economic, technical, social and political environments. If there is a deficiency in the

Department of Transport and Adelaide 21 process it is that only the more comfortable futures have been considered. It is possible that in these two studies the choice has been influenced by acceptability; that is, a preference has been given to positive and comfortable futures.

In the Transport Policy Unit's "South Australia into the Twenty First Century", and for the reasons outlined above, the decision was taken very early in the study process that the scenario selection process should result in a set of futures that if considered as the vertices of a polygon in the target year, will bound all of the futures thought to be possible, both comforting and distressing

The approach adopted in the Study has been to regard the assumption that tomorrow will be similar to today, next year similar to this year and the coming decade like this decade as only one possibility for the future of South Australia. There is a scenario based on this surprise free future, the "Eight Percent of Australia" scenario, although when this was originally written it was called "Ten Percent of Australia" because many then considered that South Australia was an approximately 10% slice of Australia [though on reflection this may have also been an unduly optimistic view of the then present] Most indices show that South Australia has declined both in relative importance and in the State's contribution to the Australian economy.

The remaining seven scenarios represent futures which, while being significantly different from a straight line extrapolation of existing trends, are not inconceivable. All the scenarios refer specifically to the State of South Australia, except "The Corporate Community" which relates to changes in the whole of Australia and "Voluntary Simplicity" in which the State and National boundaries effectively disappear. The target year for each scenario is the year sufficiently far enough in the future that allows the scenario to evolve to its steady end state [though, of course, there is no end state as such].

Methodology

The Study proceeded in four distinct phases, as illustrated in Figure 1

In **Phase One** of the Study, an extremely broad range of possible futures were considered However, the number [more than forty] was unmanageable, and attention was focused on eight futures that seemed to have a reasonable possibility of occurrence but which still encompassed a diverse range of outcomes.

The eight scenarios that were finally selected form a polygon bounding futures with a reasonable probability of occurrence. To highlight the important characteristics of the scenarios and for ease of comparison between the scenarios, they have been located with reference to a vertical axis representing the degree of freedoms of individuals within the society described by the scenario, and a horizontal axis representing the economic success of the scenario This is shown in Figure 2 Using this graphical representation,

scenarios in the top right quadrant are futures where individuals have autonomy and high levels of personal freedoms, and the economy performs well The scenarios in the lower left quadrant represent futures in which the economy struggles and individual freedoms are restricted

Based on the assumption that technological changes would be mainly driven by events overseas and that it would be the non-technological [that is the economic, social and political] environment in South Australia that would influence the rate at which new technologies were adopted, draft scenarios that were technology independent were written for the eight selected futures The draft scenarios described the social, economic and political environment without regard of technological changes. The result, after considerable debate, creative effort, agonising, discussion, checking for internal consistency and re-working, was eight draft scenarios

Phase Two concentrated on the technological changes that could be reasonably anticipated. Fourteen technologies were identified as relevant to South Australia or to transport system development: energy, communications, construction techniques, materials, computing, water, agriculture, minerals, medicine, pipelines, air transport, sea transport, road vehicles and guideway transit. Position papers were drafted, evaluated, and re-written several times for each

In **Phase Three**, the scenarios and technologies were combined. Each technology was examined within the confines of each scenario, and the way in which all the technologies interact within the confines of each scenario was evaluated The result, in updated form, are the eight scenarios described in "South Australia into the Twenty First Century".

Phase Four has seen a re-evaluation of the eight scenarios in the light of developments Sections of the scenarios have been re-written as needed

Each scenario is presented in two different but complementary ways. The first is a description of the essential elements and components of that future. The second is in narrative in form, depicting how the various aspects are related in the life of an individual - as an example, in the "Route 128 with Drama" scenario, the story is a day in the life of Lina Selby, a corporate psychiatrist with Iten Australia

The final section of the Study describes the transport implications of each scenario

Value neutral

It is important to appreciate that the scenarios are value neutral, that is, they should not be seen as a statement of desirable futures for South Australia. Indeed, different individuals may have different views about what constitutes a desirable or an undesirable future. Nor has any attempt been made to quantify the probability of occurrence of any of the scenarios Such a task was considered both too difficult and too dependent upon the immediate environment in which the evaluation was made; for example, the authors'

personal perception of the most likely future has fluctuated with the passage of time and changing current events. What can be said with certainty, however, is that the future will incorporate many elements of one or several of these scenarios.

A crystal ball exercise such as that represented by the "South Australia into the Twenty First Century" forces an evaluation of the interactions that take place between all elements in society - the political environment, social structures, economic development, and technological innovations. While the Study has been a useful tool for its original purpose of transport planning and policy evaluation, the scenarios also have broader application for policy development in other areas. The intention of finally completing and publishing the Study is to encourage thought about the future and the consequences of present day decisions and actions.

Probabilities

Under present day conditions and trends, one of the futures will seem more likely than the others. The alternative less likely futures enable us to ask systematically how policies appropriate for the most likely future would work for other futures. If a policy appears suitable for all the futures, it can be applied with increased assurance. If, however, it appears that a policy would not be suitable for some alternative future there are two options:

- Withdrawal or revision of the policy so that it is suitable for all futures, or

- Preparation of contingency plans to be put into effect if it appears that we are heading for a future for which the policy is inappropriate.

By understanding the interactions within society and between society and technology it is also possible that policy decisions can be made now with the aim of influencing and guiding future events.

Scenarios of varying degrees of comfort

Eight scenarios are examined in "South Australia into the Twenty First Century". All contain some uncomfortable elements; some scenarios are particularly uncomfortable.

"Eight Percent of Australia" represents the straight line extrapolation future for South Australia, but this should not be taken as an indication that changes do not occur. In this future Australia is polarised in approaches to government and lifestyle. Queensland has a totally resources and development oriented economy with rigid anti-welfare attitudes and complete segregation of minorities. Tasmania has developed communal living and an increasing number of immigrants from Europe are attracted by this lifestyle. Adelaide steers a middle course, its tradition of intellectual and cultural achievements has been

maintained and the South Australian middle class has tended to adopt a philosophy which is moving towards that of voluntary simplicity.

The community is tolerant of individuals with a common philosophy of ethical work performance and self esteem. The incidence of stress related diseases is low and the environment is somewhat tranquil and rather satisfying. South Australia remains an attractive place to live.

In "**Route 128 with Drama**" South Australia is internationally recognised as the unique example of world leadership in technological research combined with the nourishment of excellence in the creative and performing arts. However, while South Australians themselves are intellectually and culturally stimulated and affluent, they are also fearful that their achievements and possessions will not give meaning to their lives. Life in South Australia is rational, secular, humanist and very materialistic. Family and spiritual life is unpopular and discriminated against in employment selection. In fact, it exists only as a subculture among tour hosts, farmers and other low status, though essential, support workers. Among the intellectuals, artists and research workers, long lasting marriages are exceptional and child raising is usually arranged.

Therefore, despite its apparent affluence and confidence, society is brittle because of the high level of competition, the low levels of personal interaction and because of the uncritical acceptance of technologies, most of which have proved invasive of the human psyche.

South Australia becomes Australia's "Wild West" in the "**Resources**" scenario. In this future, the streets of Adelaide are full of large, garish cars with platinum plated, luminous boxing kangaroos and other motifs on the bonnet and their owners names written in fluorescent paint on the side - for example, "O-Bahn Oxland says have a Wonderful Day". There is nobody in this particular car because it is in a holding patterns waiting for Oxland to leave his lunch at the Yellowcake Hilton. South Australia is a highly transient frontier State. The more affluent tend to move on from the State to other resource frontiers in Antarctica, in the oceans and in other regions of the world following the resource industries in which they are skilled. Their lives are dominated by the short term nature of each appointment, the competition for recognition as skilled development managers or operators, and by the perpetual fear of market failure and sudden loss of income.

Although there is a mosaic of lifestyles between the extremes of great affluence and crushing poverty, South Australians in general are tough, individualistic and self reliant. A high priority is placed on economic and industrial development and there is great intolerance of those who have different priorities.

Under a government committed to minimising the involvement of government in the community, Australia has returned to the laissez-faire attitudes expounded in Adam Smith's "An Inquiry Into The Nature And Causes Of Wealth Of Nations" in the "**The Corporate Community**" future. The Government leaves individuals free to pursue their

own specific interests, arguing that individuals know best their own interests and that the competitive social interaction of the selfishly motivated economic activities of each individual will result in economic progress. This is working well

Government involvement in the economy is almost non-existent, the Government being only concerned with regulating conditions of work and safety, environmental impact and ensuring that the burden of the aged, the unemployed and the unemployable are spread evenly throughout the community. This has resulted in three developments: the decline in size of the public service to a fraction of the size that it was at the turn of the century; the almost complete abolition of taxes; and the assumption of public responsibilities by the larger companies and corporations.

"1984" represents the totalitarian state. Australia has become a totalitarian regime, and all activity and life is subject to military and security imperatives. Little personal freedom is allowed, either physically or intellectually, and academic debate is discouraged. Movement is restricted within zones. South Australia has been allocated the responsibility for research, development testing and manufacture of military armaments, police weapons and internal security systems. All work in South Australia is State controlled. All economic activity is centrally planned by a monolithic, hierarchical and bureaucratic organisation with a strong focus towards the military effort. Nearly all transport requirements are in some way connected with the military. The only employer is the State.

Australia, despite its benevolent climate and natural resources, is no longer the lucky country in **"Social and Economic Disarray"**. In this future, most South Australians are thoroughly disillusioned with governments, industry, unions and pressure groups. It is obvious that neither those in political and economic power nor those who wish to gain power can cope effectively with the problems that are facing South Australia. Society seems to be slowly falling apart, divisions are growing and living standards are dropping further each year. Although what is happening is obvious, the problems seem to be intractable. In fact, the multiplicity of conflicting solutions offered by the media, by experts and by politicians make people wonder if it is the problems or the proposers of solutions which are the real source of their trouble

The inconveniences caused by frequent strikes and lockouts, by shortages and by poor living conditions are accepted with resignation but there is a sense of bitterness and lack of trust directed towards technologists, social planners and, most particularly, politicians because their promises of a bright and gleaming future have not been realised

In **"Quiet Dignity"**, South Australians are at peace with themselves and although real incomes are low relative to the other Australian States, people live in quiet dignity. There is some poverty, but people live in South Australia by choice, not by necessity. The South Australian society is very quiet, its habits retiring and the tone is subdued and low-key. People like to manage their lives with the resources immediately to hand, and there are few perceived needs that are not readily available. Do-it-yourself, even make-do, are prevailing themes. There has been a spiritual renewal and out of this flows much

of the peaceful spirit and quiet dignity. The institutional churches have grown in strength and all Christian denominations cooperate freely without the formality of union. Clergy numbers, however, have not recovered from the dramatic decline of the turn of the century and lay people lead many liturgical celebrations.

Despite the rich diversity of life, five fundamental values are common throughout the world in "**Voluntary Simplicity**" - a commitment to material simplicity, the recognition of the importance of the human scale, a belief in self determination, the necessity of ecological awareness, and the importance of human growth.

In this future, Adelaide exists as a cultural centre of considerable renown with a population of 200,000 enjoying a stimulating and satisfying life. But most of the population prefers to live on the land in compact villages and towns ranging in size from about 500 to 5,000 people with the majority having about 1,000 inhabitants. It has been found, both in theory and in practice, that a village of this size is roughly the optimum to provide adequate social interaction and stimulation but yet still generate a sense of belonging and the feeling that a valuable contribution can be made by the individual to the larger unit. Adelaide and the few other larger towns in the south-central region of Australia achieve this by being formed from a number of very compact and almost self-contained suburbs or communities surrounded by parklands.

Transport implications

The point was made earlier in this paper that if futures are deliberately ignored because they feel uncomfortable then it needs to be demonstrated that the transport differences between comfortable and uncomfortable futures are minimal. However, the Transport Policy Unit's analysis of the eight scenarios in "South Australia into the Twenty First Century" indicate that the transport implications are uniquely and widely different - there are significant differences in transport demand, supply, regulation, ownership and technologies. For example, "Route 128 with Drama" sees widespread adoption of robotic road vehicles: the private sector assumes total responsibilities for all aspects of transport in "The Corporate Community": in "1984" all transport resources are government owned and directed: while the quantity and adequacy of transport resources decline significantly in "Social and Economic Disarray". Greater detail is given in the Study.

One conclusion is that any transport study that concentrates only on comfortable or convergent futures will ignore the rich mosaic of transport outcomes that are possible. Many will prefer to never confront the distressing or the uncomfortable; but one only has to look to recent events in Australia's northern neighbours, in the Baltic region, in South America, in the USA and UK, or to the momentous changes that have occurred in South Africa, in the states of the former USSR and Europe to realise that major changes can occur in a short time frame. In addition, the environmental changes that are being forecast, the evident changes taking place in our society, and the ongoing march of

technology cannot be ignored. The melting pot of the present has the potential to cast some very different futures

As the old Chinese proverb advises *"Think positive, but plan for the worst".*

Acknowledgements

Phase 1

Phase 2

Phase 3

Phase 4

Possible futures [40+

Select futures [8]

8 scenarios
[independent of technological changes

Technological prospects papers [14]
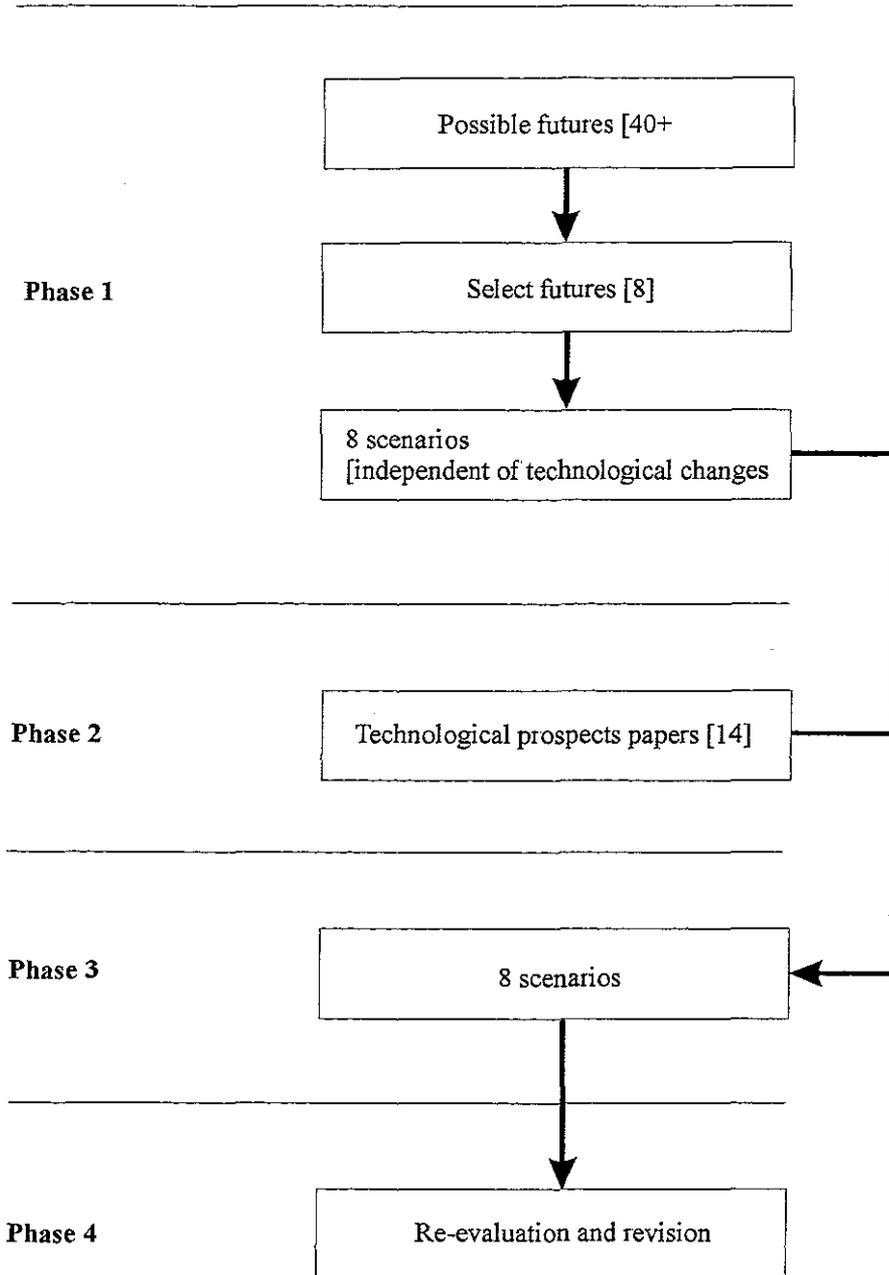
8 scenarios

Re-evaluation and revision

Figure 1   Methodology used in "South Australia into the Twenty First Century"
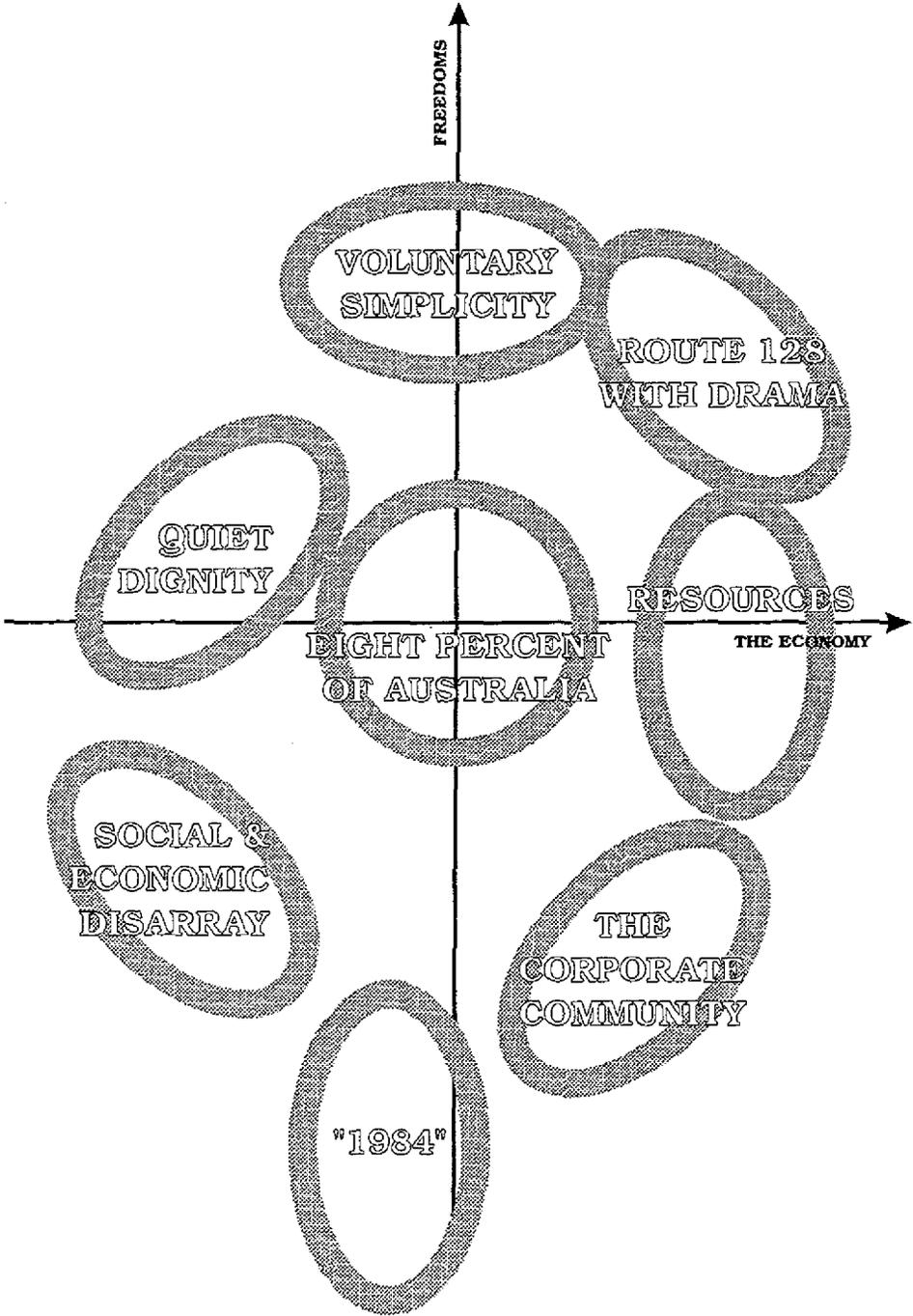
Figure 2   The eight scenarios

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