STRATHCLYDE BUSINESS SCHOOL DEPARTMENT OF MANAGEMENT

Doctoral Thesis

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Scenario success criteria: the process and design factors affecting its attainment

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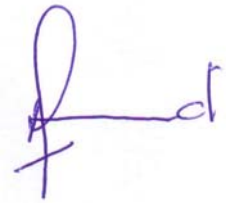
Signed: 

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ABSTRACT

Scenario techniques have been used in companies such as Royal Dutch Shell for more than 40 years and there are numerous attestations in the literature as to the benefits scenarios bring to organsations. Despite this little rigorous research has been undertaken of the scenario development process. This research aims to make a start on rectifying this by examining the scenario process in detail in a longitudinal case study of groups of MBA students undertaking a scenario development exercise using the most commonly cited scenario methodology.

The aim of the research is structured around three main research questions these being to distil from the literature the success criteria of scenario planning; to establish the fundamental elements of effective scenarios necessary in order achieve the success criteria; and to identify factors impacting the scenario development process which affect the accomplishment of effective scenarios and ultimately the achievement of the success criteria.

The central argument of the thesis is that while numerous scenario development models are proposed in the literature, they are largely based on anecdotal evidence, lack empirical underpinning or validation, and significantly underestimate the complexity of the scenario development process. At the same time there are large bodies of research on cognitive processes and group facilitation in the domains of psychology and group decision support systems respectively, both of which have an impact on the scenario development process, but the findings in these areas has not yet migrated to the scenario literature to any depth.

The contribution this thesis makes to theory is threefold. Firstly, it synthesises and links the literature on cognitive processes to the literature on scenarios and additionally, points to the literature on facilitation of similar group processes and the relevance of this to scenarios; secondly it establishes three interrelated organisational objectives which combine to form the success criteria of scenarios, and identifies the fundamentals of effective scenarios necessary to achieve the success criteria. Thirdly it identifies a range of cognitive processes, heuristics and biases which impact the scenario process and significantly influence the ability of groups to develop effective scenarios.

CHAPTER 1

THESIS INTRODUCTION

1.0 INTRODUCTION

This thesis documents observations of MBA students who working in preselected groups, followed a structured process to develop a set of scenarios for a theoretical client. Although the process was an artificial one in that the students were developing scenarios as part of a MBA course rather than working in an organizational setting developing scenarios for a real client to be used in the real-world, the process used followed a well-known scenario development methodology which developed out of the work of the Royal Dutch Shell Company, SRI and Global Business Network more than 45 years ago, and is widely used in the real-world.

1.1 RATIONALE FOR UNDERTAKING THE RESEARCH

Eden (1980) suggests that the researcher's interest in a particular occurrence and the desire to understand its deeper meaning and structure is at the centre of the research activity. This clearly describes my position. I had spent my early career years working my way up organizational ladders, progressing ultimately to senior positions in accounting and finance with multinational companies. Several years later I became bored with work, and decided to take a year out to do a MBA and selected to undertake the Strathclyde programme. During the course of the programme I came across the concept of scenario planning and was intrigued by it, having spent much of my career developing extrapolative-based forecasts, the majority of which in the long term, proved to be of little value as they inevitably missed some significant but usually unforeseen event. Even though I understood that this was the norm in business, certainly in the companies which I had worked for, I knew there had to be a better way of thinking about and trying to anticipate the future. At Strathclyde it dawned on me that there was in fact a better way of doing this, scenario planning, which is not meant as a substitute for forecasts which are necessary in many spheres of business, but as a tool to compliment them by developing a range of futures to be considered.

Six months after completing the full-time Strathclyde MBA programme, I returned to the Business School to learn more about scenario techniques. I decided to engage in an 'apprenticeship' with Professor Kees van der Heijden, an experienced practitioner, with the intention of becoming a scenario planning practitioner myself, and an integral part of the apprenticeship was to carry out research in some designated area of scenario planning.

Prior to beginning the research project I had a broad knowledge and understanding of the scenario planning process having undertaken a scenario course on the MBA, but I lacked an in-depth understanding of why and how the process worked, as do many practitioners as I subsequently discovered. The notion of exploring the subject area for deeper meaning and structure in terms of process which would hopefully lead to understanding, interested me and this became the focus of my research.

1.2 AIMS OF THE RESEARCH PROJECT

In undertaking this research I set out to fulfill two equally important aims. The first was that the research output documented in this thesis would meet the academic criteria required of doctoral research in terms of an original contribution to knowledge in the area of theory. The second was that the understanding gained through the research project would enable me to make some practical and useful contribution to the practice of scenario planning. I do not claim that this research results in replicable empirical-theory building in the traditional sense, but it is an authentic and plausible description of the scenario process from which I have drawn theoretical generalisations.

1.3 THE RESEARCH QUESTIONS

In developing the research proposal I went through much iteration trying to pinpoint precisely what it was that I was setting out to achieve, what specific questions I would be looking to answer. Miles and Huberman (1984) contend that empirical research is often a matter of progressively lowering your aspirations. You begin by wanting to study everything about an important problem or fascinating phenomenon, but it soon becomes apparent that this is not possible and clear choices have to be made. This certainly applied in my case, but it is probably common to most doctoral students in the social sciences. I initially started the project by attempting to formulate explicit, over complicated hypothesis which could be tested via the empirical data. However after a number of false starts I determined not to advance any hypotheses as these generally require some form of measurement, instead I developed a series of research questions which reworded, could become hypotheses.

In my initial readings I discovered that there were numerous attestations in the literature as to the value of scenario planning and claims as to what scenarios purportedly achieved, but I found no single definition which put the success criteria into a useable framework. At the same time, while the literature is replete with suggestions as what constitutes ‘good’ scenarios, along with snapshots of the scenario process, I found no articles which detailed the fundamentals of the process required to achieve good scenarios. Over time these

observations consolidated in my mind, into three questions which subsequently guided this research, the questions being:

- What are the success criteria of scenario planning?
- What are the fundamental requirements, in terms of the scenario process, necessary to achieve these criteria?
- What factors impact the scenario development process, ultimately affecting the achievement of the success criteria?

To answer these questions I determined that a comprehensive but focused review of the literature was required from which I could distill the overall success criteria of scenarios and map the fundamentals of process requirements to achieve the criteria. This alone was however insufficient, I would then have to observe a scenario development process in action in order to determine what factors were likely to impact the development of good scenarios. The combination of these actions would hopefully allow me to arrive at defendable answers to the three research questions.

In establishing these questions as the basis of my research, I accept Watson's (2003) contention that interpretive research can never fully answer all questions; it can only ever claim to tell an incomplete story as analysis is never complete and data is inexorably open to an array of interpretations.

1.4 SCOPE OF THE RESEARCH

There are many aspects of scenario planning which I could have researched, but I chose to look into the actual process of scenario development because as a then nascent academic and relatively inexperienced practitioner who had had the good fortune to meet and observe some the best known practitioners (Pierre Wack, Kees van der Heijden and Peter Schwartz) at work, it was something that I felt needed to be better understood. I could have attempted to undertake this process research in a real-world situation, but for practical and financial reasons discussed in Chapter 4, I determined that the most effective way of doing this would be in a laboratory setting using resources at hand i.e. MBA students. At the same time while there are at least three distinct schools of scenario planning within which there are multiple process variations, this research is narrowly focused on one particular development process within one school, albeit this is probably the best known and most widely used process. Within the process that I observed, I chose to take a wider perspective of the process of

scenario construction, but there are many detailed aspects of the process that require further research as discussed in the section on areas of potential future research in Chapter 7.

While the aspects above establish the boundaries and scope of this research, they also inevitably limit the generalisability of the findings.

1.5 KEY FINDINGS

In terms of an original contribution to theory, in summary they key findings of this research are that from the many definitions of scenario planning, the purpose of scenario planning can be distilled into three interrelated outcome variables representing success criteria, namely to understand the causal processes, connections and logical sequences underlying events and how they move, which determine how a future state may evolve; to challenge conventional thinking, reframe perceptions and change the mindsets of leaders in organisations; and to improve decision making and strategy development in organisations. To achieve these outcome variables in a set of scenarios is considerably more complex than the literature suggests, and represents an extraordinary challenge in intellectual and methodological terms, given the cognitive processes and heuristics and biases that impact thinking about uncertainty, complexity and the future in general, and ultimately determine the ability to create a set of effective scenarios. This is best summed up by Kahn and Wiener (1967) who some 45 years ago, noted that “History is likely to write scenarios that most observers would find implausible not only prospectively but sometimes, even in retrospect. Most sequences of events only seem plausible now because they have actually occurred; a man who knew no history might not believe any” (p.264).

In terms of contribution to practice, the findings indicate that the scenario development process, and delivering the outcome variables requires a well-designed and executed process. Continual facilitation of the process by an experienced facilitator, who understands the debilitating effects of cognitive processes and heuristics and biases on the production of effective scenarios, and is able to mitigate their effects, is crucial. Equally, attempting to complete the process in a condensed time period is likely to result in superficial thinking leading to the production of scenarios comprising little more than combinations of factors already well known, and which will fail to meet the success criteria of scenario planning.

1.6 STRUCTURE OF THE THESIS

Following this introductory chapter, the next two chapters review the literature on the subject of scenarios. The literature review has been written up as two separate chapters because in initially reviewing the literature, it became apparent that there is a distinct divide in the literature. There is a large body of literature, much of which has been authored by practitioners and is essentially anecdotal and practitioner oriented in nature, and which may therefore be described as the 'experience-based' literature. The conclusion of this review is that although there has been much anecdotal literature on scenarios, very little of it attempts to explain the 'how' and 'why' of scenario techniques. Some serious issues associated with techniques are raised, but are either accepted without questioning or are superficially explored, principally because this literature is written by practitioners for practitioners.

There is then a second smaller body of literature, best described as the 'research-based literature' in that it relates to empirical research in the subject area of scenarios, or research findings which are generalisable to scenarios. The conclusion of this review is that what research has been done has some potentially troubling implications for scenarios in terms of cognitive processes and heuristics and biases, which appear to be either unknown or ignored by practitioners. The overall conclusion of the literature review is that there has been little critical academic attention focused on the subject of scenarios; consequently there is no coherent body of research on scenarios with few empirical studies of scenario planning projects to validate its purported benefits and achievements. However this has not dampened the enthusiasm for scenarios.

The two literature survey chapters are then followed by a discussion on research methodology, which again, has been subdivided into two halves. The first half begins with a general discussion on the philosophy of research design and methods, and then attempts to make explicit the rationale underlying the particular methodologies used in this research project. The line of argument here is that while positivism has traditionally dominated research methodology, I take a more subjectivist view of the world and therefore am inclined toward phenomenological approaches. I am interested in exploring the process individuals engage in when constructing scenarios, and understanding and explanation of this cannot be achieved through quantitative techniques, as they will not capture the richness which comes from observation and anecdotal data. The second half of the chapter comprises a detailed account of the research in terms of data collection and analysis techniques used, the key participants in the research, activities and significant events in the research process.

The findings of the research project are recorded and discussed in Chapters 5 and 6. Chapter 5 presents the findings related to the process of scenario development arising from the analysis of observations of the students undertaking the scenario process. In summary,

the observation here were that the students exhibited a process similar to that described by Tuckman and Jensen (1977), but with some modification by the inclusion of the concept of punctuated equilibrium (Gerisck 1990), and that there are a range of cognitive processes, heuristics and biases which impact the development process constraining and limiting the thinking of the participants. Chapter 6 is concerned with the findings related to the design of the overall scenario development process, and a deeper analysis of scenario definitions in an attempt to determine the success criteria of scenario planning in terms of outcome variables, and the essential ingredients required to create effective scenarios in order to achieve these outcome variables.

In Chapter 7, the final chapter in the thesis, the findings and conclusions of the research are drawn; the limitations surrounding the research and a potential future research agenda which could usefully build on this research are discussed. The chapter concludes with what I argue are the contributions to theory and practice arising from the research, and my reflections on the experience of undertaking the research.

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CHAPTER 2

SCENARIO PLANNING: THE EXPERIENCE-BASED LITERATURE

2.0 INTRODUCTION

Schnaars (1987) states that most of what is known about scenario techniques comes from three distinct sources, the first of which comprises articles written largely by corporate planners which describe how scenario planning is undertaken in large organisations and offer experience-based advice on how to construct scenarios. The second source encompasses articles from the 'futures research' literature which offers numerous models for constructing scenarios, some of which Schnaars (1987) suggests are reasonable, but many are difficult to understand and impractical, and few have ever been subjected to any form of testing. The final and smallest source is a fragmented body of empirical studies on related topics from a range of disciplines, which attest to the value of scenarios as a forecasting tool. Along similar lines, Wright (2004) suggests that the literature can also be grouped into three broad categories based on the publication source, level of critical analysis and the degree of reflection by the authors, the resultant categories being articles aimed at: practitioners; practitioners and academics; and academics. Combining the first two groupings of both Schnaars and Wright, the literature can be neatly divided into two broad categories: (a) scenario focused, largely practitioner oriented experience-based articles; and (b) articles based on empirical research findings particularly from the cognitive sciences, which while not specifically about scenarios, have relevance in terms of the generalisability of their findings to scenarios. Accordingly this thesis will examine the literature in two halves, this chapter which focuses on the first literature category, the ‘practice’, and Chapter 3 which concentrates on the second category, the ‘theory’.

This chapter, which reviews the practitioner audience oriented literature on scenarios, does not attempt to chronicle all of the articles and books on the subject, there are far too many of them. Neither does the chapter attempt to cover all aspects of scenarios but focuses instead on the area of primary interest in this dissertation, namely the purpose and process of scenario development. The chapter is organized as follows: the first part establishes the context of scenario planning by tracing its origins and evolution as a business planning tool, its growth since its adoption in the corporate world in the early 1970s, and a summary of the debate as to which disciplinary framework scenarios fit into. The chapter then moves to an examination of the various definitions and typologies of scenarios, and progresses to discuss aspects of the scenario development process, the criteria commonly used in evaluating

scenarios and the espoused benefits of scenarios, and the chapter concludes with some criticisms of scenarios.

2.1 THE ORIGINS OF SCENARIO TECHNIQUES

The concept of scenarios is an old one, since earliest recorded time people have been interested in the future and have used scenarios as a tool for indirectly exploring the future of society and its institutions. As has been commonly noted, in this context scenarios can be traced back to the writings of the early philosophers and visionaries and their treatises on utopias (Plato's *Republic*, 380 BC; More's *Utopia*, 1516; Bacon's *New Atlantis*, 1627) and dystopias (Huxley's *Brave New World*, 1932; Orwell's *Nineteen Eighty-Four*, 1949.) However, as a strategic planning tool, scenario techniques are firmly rooted in the military and have been employed by military strategists throughout history, generally in the form of war game simulations (Brown 1968). Despite their long history in the military the first documented outlines of what today might be regarded as scenarios, do not appear until the 19th century in the writings of von Clausewitz (1832) and von Moltke (1840), Prussian military strategists also credited with having been the first to articulate the principles of strategic planning (von Reibnitz 1988). Modern day scenario techniques however, only emerged in the post-war period, and the1960s saw the emergence of two geographical centres in the development of scenario techniques, the USA and France.

2.1.1 Foundations of 'The USA Centre'

After World War II, the US Department of Defense was faced with the task of deciding what projects should be funded for the development of new weapons systems, a difficult undertaking given the increasing complexity of weapons systems arising from advances made in the sciences during the war years. Adding to the difficulty of the assignment was the significant uncertainty faced on three fronts by the decision makers. Firstly the end result of the development of new weapons systems which generally require long lead-times was itself uncertain. Secondly with the lowering of the 'iron curtain' there was a high degree of uncertainty as to the future political environment under which the systems being developed might be deployed; and finally uncertainty as to the effectiveness of the systems ultimately developed as this would be largely dependent upon what weapons systems other nations were developing (Raubitschek 1988).

The decision making in this situation gave rise to two specific needs:

- the need for a methodology to capture the reliable consensus of opinion of a large and diverse group of experts; and
- the need to develop simulation models of future environments which would permit various policy alternatives and their consequences to be investigated.

The need to elicit and synthesize expert opinion inspired the development of the Delphi technique, and the need for simulation models led to the development of an approach known as ‘systems analysis’, from which emerged scenario techniques (Raubitschek 1988). Both these techniques were developed in the 1950s by The Rand Corporation, a research group which evolved out of a joint project between the US Airforce and the Douglas Aircraft Company in 1946, and which up until the 1960s, was engaged in Defense Management studies for the US Airforce (Cooke 1991).

It was the combination of the development of computers (delivering the data processing capability required for simulating solutions), game theory (providing the theoretical structure for the investigation of social interaction) and the US military's need for war game simulation models, which delivered the platform for the emergence of scenario techniques at the Rand Corporation (Schoemaker 1993). Using this platform Herman Kahn, the ranking authority on Civil Defense and strategic planning at the Rand Corporation in the 1950s, began developing scenarios for the Air Defense System Missile Command, a large scale early warning system. Credited with having coined the phrase ‘thinking about the unthinkable’, Kahn established that military planning tended to be based on wishful thinking rather than ‘reasonable expectations’; the existing doctrine he contended was disastrous, and he demonstrated this by developing scenarios of an accidental nuclear war (Millett 2003). The objective of using scenarios as a vehicle to think about the unthinkable was to search for alternatives to mass annihilation, and Kahn’s work had a major impact on the Pentagon's thinking in the 1950's. However, due to the classified nature of this work, the content and methodology of this modern day pioneering scenario work were not widely publicised until 1960 when Kahn published a book entitled *On Thermonuclear War*.

In 1961 Kahn left the Rand Corporation and established the Hudson Institute where he began to apply his scenario methodology to social forecasting and public policy; he authored numerous articles and books incorporating ‘futuristic’ scenarios, the most controversial of which was *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years*, a book co-authored with Wiener and published in 1967 (Godet 1987; Schoemaker 1993). This book has since come to be regarded as a landmark in the field of scenario planning because according to Raubitschek (1988):

- it provided one of the earliest definitions of scenarios and introduced the word into the planning literature;
- it demonstrated the use of scenarios as a methodological tool for policy planning in complex and uncertain environments, and strongly influenced the subsequent development and diffusion of scenario techniques in the US by providing a methodological foundation for similar future studies; and
- it generated much controversy which led to numerous counter studies, for example, the Club of Rome Report, *The Limits to Growth* (Meadows et al. 1972) which developed out of Forrester's earlier work, *World Dynamics* (1971), and *Mankind at the Turning Point* (Mesarovic and Pestel 1974), which were just as controversial and served to heighten the focus of attention on scenarios and scenario techniques.

As a consequence of the above, Kahn is often referred to in the literature as the 'father' of modern-day scenario planning (Cooke 1991). Encouraged by the publicity and controversy caused by Khan's books, Helmer, Gordon and several individuals at the SRI Futures Group and the California Institute of Technology, began to experiment with scenarios as a planning tool and became the pioneers in the field of future studies in the US. Although initially concerned with scenarios in public policy planning, their work soon migrated to the business community and the first widely documented use of scenarios in the context of business was the experience of the Royal Dutch Shell Company (RDS) (Lorenz 1980). This along with the work of SRI and Global Business Network (GBN), gave rise to what Godet (2000) for obvious reasons describes as the Anglo-American School of scenario planning, although it is better known in the literature as the 'Intuitive Logics' (ILS) school of scenario planning (Huss and Honton 1987).

2.1.1.1 The 'Intuitive Logics' school

In 1967 RDS initiated 'Year 2000', a project to study the business environment that would exist in 2000. The study concluded that a discontinuity in the oil industry was inevitable as the historical trajectory of year-on-year expansion of the industry could not continue to 1985, let alone 2000. As a consequence of this revelation, a number of RDS companies were tasked in 1969 to look ahead to the year 1985 in an initiative known as the 'Horizon Planning' exercise. Pierre Wack, a planner at RDS Francaise, was familiar with the scenario approach developed by Kahn, and decided to experiment with the technique using France as the testing ground. The initial attempt at scenarios was not a success in that it resulted in what Wack (1985a) labeled 'first generation scenarios' which were useful in gaining a better

understanding of situations, but provided no insights beyond what was already known; it did however, result in the realisation that they had discovered a potentially useful and promising technique. The fact that the Horizon Planning initiative had confirmed the findings of the Year 2000 study, prompted the decision in RDS to experiment with scenario planning at the corporate level as a potentially better framework for thinking about the future rather than continuing to rely on conventional forecasts likely to be wrong in the face of a discontinuity (Kleiner 1996; Wack 1985a; 1985b). The scenarios developed in 1971 on an experimental basis and presented to senior management in 1972, proved extraordinarily successful in that they identified an impending scarcity of oil and an ensuing 'shock' increase in prices, which occurred in 1973; shortly thereafter scenario planning was extended throughout the company and is reputed to have been instrumental in RDS's rise from a minor amongst the oil majors to the second largest (Schwartz 1996).

Coincidently GE began to experiment with scenarios at about the same time as RDS and in 1971 produced four scenarios of global and US economic and socio-political conditions in 1980 (Millet 2003). However unlike RDS, there is little in the public domain regarding GE and scenarios, and RDS has become the best known corporate exponent of scenarios, its definition of scenarios and process methods have become the de facto "gold standard of corporate scenario generation" (Millett 2003, p.18), which explains why the ILS methodology is often referred to as the 'Shell approach' to scenarios.

Numerous variations of the ILS model have since been published, each identifying a number of discrete process steps varying from five (Foster 1993), to twelve or more (Vanston et al. 1977), depending on what features of scenarios are highlighted or ignored. Some practitioners have elaborated and branded proprietary scenario developmental models, examples of which are *Future Mapping* ® developed by Northeast Consulting Resources Inc. in Massachusetts (Mason 1994); *TAIDA*™ (an acronym for 'Tracking, Analysing, Imaging, Deciding, Acting') developed at Kairos Future in Sweden (Lindgren and Bandhold 2003); and *Idon Scenario Thinking*, an approach using visual tools developed by the Idon Group in the UK (Galt et al. 1997). At the same time, there have been efforts to develop simpler and less resource intensive models which focus on scenario planning as a process of learning, as demonstrated in the work of Mercer (1997) and van der Heijden et al. (2002) with MBA students in UK Business Schools.

While acknowledging that the RDS/GBN technique is a good one, Bishop et al. (2007) bemoan the fact that it has come to dominate the field to the point that most practitioners are unaware that there are "more than two dozen techniques for developing scenarios" (Bishop et all 2007, p.5). In fact as far as the IL model is concerned, Martelli (2001, p.5) suggests

there are almost as many ways of developing scenarios as there are practitioners, the result being “methodological chaos which will not fade away in the foreseeable future.”

While the ILS methodology has received most of the attention in the literature, in parallel with it two further techniques involving the probabilistic extrapolation of historic trends evolved out of the work of Gordon, Helmer and others and which for convenience can be labeled as the ‘Probabilistic Modified Trends’ (PMT) school.

2.1.1.2 The ‘Probabilistic Modified Trends’ school

The PMT School of scenario planning incorporates two distinct but related methodologies, Trend-Impact Analysis and Cross-Impact Analysis. Although standalone techniques they share a common foundation which is the mathematical amelioration of extrapolated time series data and can therefore be viewed as a coherent group of techniques.

- Trend-Impact Analysis (TIA)

  The TIA model developed in the early 1970’s in the field of futures research, and is usually associated with the Futures Group based in Connecticut. According to Gordon (1994), TIA evolved out of the fact that traditional forecasting methods relied on the extrapolation of historic data without considering the effects of unprecedented future events. The concept of TIA is a relatively simple one designed to modify naive extrapolations and involves four steps:

  - historical data relating to the issue being examined is collected;
  - an algorithm is used to select specific curve-fitting historical data which is then extrapolated to generate predictable future trends;
  - a list of unprecedented future events which could cause deviations from the extrapolated trend is developed; and
  - expert judgments are then used to identify the probability of occurrence of these unprecedented events as a function of time and their expected impact, to produce adjusted extrapolations (Gordon 1994).

  Although Gordon states that “the TIA method is used frequently”, references to TIA in context of scenarios, are relatively few in the literature.

- Cross-Impact Analysis (CIA)

  The CIA model was developed by Gordon and Helmer in 1966 at the RAND Corporation as a forecasting game for Kaiser-Aluminium. A range of causal and correlation cross-impact variants have since been developed, along with a number of proprietary methodologies including IFS (Interactive Future Simulations) developed by the Battelle Memorial Institute (Millett 2003), INTERAX (Interactive Cross-Impact Simulation) developed by Enzer at the University of California, and SMIC (French acronym for Cross Impact Systems and Matrices) developed by Duperrin and Gabus (Gordon 1994).

As with TIA, the CIA methodology attempts to evaluate changes in the probability of occurrence of events which might cause deviations in the naïve extrapolations of historical data. The processes underlying the two methodologies are similar but CIA incorporates an additional layer of complexity in that it attempts to determine the conditional or proportional probabilities of pairs of future events given that various events have or have not occurred, through cross impact calculations.

Although both these techniques began life as standalone probabilistic forecasting tools, they generate a range of alternative futures rather than a single point extrapolation of historical data, and when combined with judgments and narratives about the events in these futures, they in effect, constitute scenarios.

2.1.2 Foundations of 'The French Centre'

In Europe the French are purportedly the first to have systematically studied the possible evolutionary paths of the future from the present using scenario techniques, and as in the USA the pioneering work was initially associated with public policy and planning (Millet 2003).

2.1.2.1 Origins of the 'La Prospective' school

At the same time that Kahn was developing scenarios for the military in the 1950s, Gaston Berger a French philosopher founded the Centre d'Etudes Prospectives where he developed a scenario approach to long-term planning, which he named *La Prospective* or 'prospective

thinking'. This approach reportedly emerged as a consequence of the repeated failure of traditional forecasting approaches in France (Godet 1987).

Berger was concerned with the long-term political and social future of France and the underlying premise of his work was that the future was not a predetermined continuity but rather something which could be created for the betterment of mankind. The objective of the Prospectives centre was to formulate an acceptable scenario-based methodology for developing positive images or 'normative scenarios' of the future and introduce them into the political arena where they could serve as a guiding vision to policy makers and provide a basis for action (Huber 1978; van Vught 1987). The Prospective centre flourished and by the mid 1960s had begun to apply the *La Prospective* methodology to a range of public issues (education, the environment, urbanisation and regional planning), the first reported application being the study of regional futures by a government entity known as DATAR (Office for Regional Planning and Development) (Godet 2001).

The pioneering work of Berger was continued on through the 1970s by two individuals, Pierre Masse and Bertrand de Jouvenel. As the Director of national economic planning in France in the 1960s, Masse introduced the use of the prospective scenario approach in the development of the 4th French National Plan (1960-1965) and subsequent national economic plans have purportedly continued to use prospective scenario techniques (Huber 1978). Meanwhile de Jouvenel who coined the term *futuribles* (a contraction of *futures possibles*) and founded the Futuribles Group (Association Internationale de Futuribles) which became a catalyst in the development of the international futures movement, joined the Prospectives centre in 1966. The thrust of de Jouvenel's work was in using scenarios to construct positive images of the future or 'scientific utopias' and then propose how these could be brought about to improve the life of ordinary people (de Jouvenel 1967).

2.1.2.2 Development of the 'La Prospective' school

In the mid-1970s Godet, the head of the Department of Future Studies at SEMA (a firm active in the defense sector), began to develop scenarios for French national institutions such EDF and Elf. Although rooted in the *La Prospective* methodology, Godet developed his own largely mathematical, computer-based probabilistic approach to scenario development which incorporates analytical tools and procedures including 'morphological analysis' for scenario building, 'Micmac' for identifying key variables, 'Mactor' for analysis of actors' strategies and 'Smic-Prob-Expert' for determining the probability of scenarios (Micmac, Mactor and Smic being acronyms for computer programmes developed by Godet). Despite these differences, the systems developed by the Futuribles Group and Godet have come to

be known collectively as the French school of *La Prospective*; however the term covers a range of concepts, and Godet (2001) suggests that as used by him, the term is best translated as 'strategic scenario building'.

The principal differentiating feature between the USA and French centres is that whereas the early scenario work in the USA tended to be of a global nature, scenario development in France was more narrowly focused on the socio-political foundations of the future of France itself (van Vlught 1987). There has since been a diffusion of scenarios into the business community, however scenario work in France continues to have an important role in public sector planning. Although the *La Prospective* approach to scenarios incorporates certain features of the ILS methodology, it is a more elaborate and mechanistic rather than an openly intuitive approach to scenarios development relying heavily on computer-based mathematical models which have their roots in TIA and CIA, and is fundamentally a blending of the ILS and PMT methodologies.

While the *La Prospective* school has been in existence for almost as long as the ILS and PMT schools, it has received much less attention in the literature on scenario planning, despite its impressive growth since its founding in the 1950s and development of methods "which are both rigorous and participative" (Durance and Godet 2010, p.1489). This Godet (2000) asserts, is a consequence of the Anglo-American domination in the strategy arena. In a widely cited paper Huss and Honton (1987) identify three major categories of scenario development approaches, namely ILS, TIA and CIA; there is no discussion on the *La Prospective* methodology, testimony perhaps to Godet's assertion. More importantly combining TIA and CIA as one school of related techniques and adding the French school, results in three distinct scenario schools as Huss and Honton suggest, but they are the Intuitive Logics, the Probabilistic Modified Trends and the *La Prospective* schools.

Significant differences exist between the three schools in terms of their methodological orientation and approach to developing scenarios, nature of scenario team participants, the role of experts in the process, and the range and sophistication of tools used, and for reference purposes, a comparison of the salient features of each of the three schools is detailed in Table 2.1 below.

Table 2.1: Comparison of the Salient Features of the Three Schools of Scenario Techniques

(Source: Bradfield et al., 2005, p.807-8)

	Intuitive-Logics Models	***La Prospective* Models**	**Probabilistic Modified Trend Models**
Purpose of the scenario work:	Multiple, from a once-off activity making sense of situations and developing strategy, to an ongoing activity associated with anticipation and adaptive organisational learning.	Usually a once-off activity associated with developing more effective policy and strategic decisions and tactical plans of action.	A once-off activity to enhance extrapolative prediction and policy evaluation.
Scenario perspective:	Descriptive or normative.	Usually descriptive, can be normative.	Descriptive.
Scope of the scenario exercise:	Can be either broad or narrow scope ranging from global, regional, country, industry to an issue specific focus.	Generally a narrow scope but examination of a broad range of factors within the scope.	Narrow scope focused on the probability and impact of specific events on historic trends.
Scenario horizon year:	Varies: 3-20 years.	Varies: 3-20 years.	Varies: 3-20 years.
Methodological orientation:	Process orientation - inductive or deductive, essentially subjective and qualitative in approach relying on disciplined intuition.	Outcome orientation - directed and objective, quantitative and analytical approaches (with some subjectivity) relying on complex computer-based analysis and mathematical modeling.	Outcome orientation - directed and objective, quantitative and analytical approaches (with some subjectivity) using computer-based extrapolative forecasting and simulation models.
Nature of scenario team participants:	Internal - scenarios developed by a facilitated team from within the organization.	Combination of some key individuals from within the organization led by an expert external consultant.	External - scenario exercise undertaken by expert external consultants.
Role of external Experts:	Experienced scenario practitioner to design and facilitate the process; periodic use of remarkable people as catalysts of new ideas.	Dominant - expert-led process using an array of proprietary tools to undertake comprehensive analysis and expert judgments to determine scenario probabilities.	Dominant - expert-led process using proprietary tools and expert judgments to identify high impact unprecedented future events and their probability of occurrence.

Tools commonly used:	Generic - brainstorming, STEEP analysis, clustering, matrices, system dynamics and stakeholder analysis	Proprietary - structural (Micmac) and actor (Mactor) analysis, morphological analysis, Delphi, SMIC Prob-Expert, Multipol and Multicriteria evaluation.	Proprietary - Trend Impact and Cross Impact Analysis, Monte Carlo simulations.
Scenario starting point:	A particular management decision, issue or area of general concern.	A specific phenomenon of concern.	Decisions/issues for which detailed and reliable time series data exists.
Identification/selection of key driving forces:	Intuition - brainstorming techniques, analysis of STEEP factors, research, and discussion with remarkable people.	Interviews with actors involved in the phenomenon being studied and comprehensive structural analysis using sophisticated computer tools.	Fitting curves to historical time series data to identify trends and use of expert judgment to create database of potential high impact unprecedented future events.
Establishing the scenario set:	Defining the scenario logics as organizing themes or principles (often in the form of matrices).	Matrices of sets of probable assumptions based on key variables for the future.	Monte Carlo simulations to create an envelope of uncertainty around base forecasts of key indicators.
Scenario Exercise Output:	Qualitative - set of equally plausible scenarios in discursive narrative form supported by graphics, some limited quantification. Implications, strategic options and early warning signals increasingly a part of scenario output.	Quantitative and qualitative - multiple scenarios of alternative futures supported by comprehensive analysis incorporating possible actions and their consequences.	Quantitative - baseline case plus upper and lower quartiles of adjusted time series forecasts. May be embellished by short storylines.
Probabilities attached to scenarios:	No, all scenarios must be equally probable.	Yes, probability of the evolution of variables under assumption sets of actors' behaviour.	Yes, conditional probability of occurrence of unprecedented and disruptive future events.
Number of Scenarios generated:	Generally 2-4.	Multiple.	Usually 3-6 dependent on the number of simulations.
Scenario evaluation criteria:	Coherence, comprehensiveness, internal consistency, novelty - underpinned by rigorous structural analysis and logics. All scenarios equally plausible.	Coherence, comprehensiveness, internal consistency - underpinned by rigorous structural and mathematical analysis; plausible and verifiable in retrospect.	Plausible and verifiable in retrospect.

2.2 THE GROWTH OF SCENARIOS IN THE CONTEXT OF BUSINESS

Studies by Linneman and Klein (1983; 1979) in the US report that while there were was limited use of scenario planning prior to 1974, there was a surge in the two year period following the first oil crisis in 1973 in which the number of adopters doubled, and then more than doubled again in the period between 1977 and 1981. They estimate that in the early 1980s, almost half of all US Fortune 1000 industrial firms, Fortune Foreign 500 industrial firms and US Fortune 300 non-industrial firms were actively using scenario techniques in their planning process. The pattern of scenario adoption was similar in Europe where studies by Malaska (Malaska et al.1984; Malaska 1985) and Meristo (1989) report that scenario planning was not widely used until after the first oil crises in Europe, following which the number of adopters of scenario planning almost doubled, with a further surge of adoption between 1976 and 1978. Both Linneman and Klein and Malaska et al. posit that the findings suggest a correlation between the adoption of scenario planning and the environmental discontinuities and resultant instability of the 1970s.

As to who the users of scenarios were, again the survey evidence from Linneman and Klein in the US and Malaska et al. in Europe, revealed a similar picture; companies using scenarios, while not uniform across industry groupings, could be characterized by their large size (by 1981, 46% of the Fortune 1000 industrials reportedly used scenarios while among the Fortune 100, the usage was in excess of 75%), their length of planning horizons (users tended to have planning horizons of 10 or more years), and their capital intensiveness (users tended to be in capital intensive industries such as aerospace, chemicals, oil, power generation and transportation). These findings are not surprising and can be logically explained on the basis that it is generally large companies in capital intensive industries with long lead-times, which have the resources and the inclination to experiment with new planning models.

Although it is clear from the above that scenarios enjoyed a substantial growth in the 1970s, the popularity of scenarios in the 1980s and 1990s appears to have declined, albeit there are contradicting views as to the cause of the decline. van Doorn and van Vught (1983) state that by 1980 the preference for scenarios in the US moved from ‘high’ to ‘medium’ (Table 5, page 510), and attribute this decline to the fact that from simple beginnings, scenario methods had morphed into complex and time-consuming techniques which were difficult to implement. Chermack (2001) meanwhile credits the decline in scenario use in the 1980s to a combination of the recession, and the fact that scenario planners had over-simplified the use of scenarios. Martelli (2001) however, argues that the use of scenarios moved in waves, while it had grown, the growth was not what one might have expected. One of the reasons

for this he suggests is that scenario practitioners had not managed to strike an appropriate balance between an excess of technicality and superficiality in the scenarios.

In the last decade there is some evidence that scenarios have grown in use. For example, in their survey in the UK addressing the role of strategy workshops, Hodgkinson et al. (2006, Exhibit A3, p 493) report that 28.5% of those polled indicated having used scenarios as an analytical tool in the most recent workshop they had attended. Meanwhile Rigby and Bilodeau (2008) provide survey evidence from the Bain & Co surveys of management tools indicating that while scenario planning had lagged behind other management tools prior to 2001, following the 2001 terrorist attacks scenario use in the USA rose steeply, as did reported satisfaction with the tool. The robustness of the data in both of the above is, however, questionable because there is no universally accepted definition as to what scenarios are in the context of planning. Thus it is not clear from the survey evidence of Hodgkinson et al. (2006) for example, that the respondents all had the same conception of scenario planning in mind when answering the questionnaire. Nevertheless the contention that scenarios have grown in popularity in the last decade as a result of environmental turbulence alongside the increasing recognition of the inadequacy of systems modeling to address complex intractable issues, is a plausible one. Ramirez et al. (2007) and Wilkinson and Eidinow (2008) suggest that an additional reason for the growth in popularity of scenarios in the last decade revolves around a change in management styles; while it is acceptable today for managers to admit to unpredictability in decision making and an inability to control key uncertainties, such an admission was not possible in previous decades.

Despite the absence of dependable quantitative survey data confirming the growth and popularity of scenarios in business over the last decade, there is evidence of a significant increase in articles on scenarios. For example, Ramirez et al. (2008) report that a search of the EBSCO database in 2008 of peer reviewed articles in English using the keyword ‘scenarios’ covering the period 1970 though to 2007, revealed that “while the number of articles published rose steadily throughout the 1970s and 1980s, a more pronounced increase is evidenced in the early 1990s, with an almost vertical increase occurring in 2002 and continuing through 2007” Ramirez et al. (2007, p.11). Similarly the comprehensive ‘bibliometric study’ on the scenario literature by Varum and Melo (2010) revealed a surge in publications in the 1990s and 2000s alongside an increasing acceptance for publication of papers on scenarios in international academic journals. Given all of the above, it is reasonable to conclude that scenario planning has enjoyed a revival but whether or not scenarios are “here to stay” as Martelli (2001) suggests, is another matter.

2.3 SCENARIOS WITHIN A DISCIPLINARY FRAMEWORK

At the highest level of abstraction, scenario techniques are categorised as being in what is broadly described as the field of 'futures', 'futures studies', 'futures research' or 'foresight' (Allen 1978; Ducot and Lubben 1980; McHale and McHale 1976; Riner 1987; Slaughter 1989), although there are those such as Durance and Godet (2010) who maintain that foresight and scenarios are not the same thing. The problem is that this field which emerged as a quasi-formal discipline in the post-war period, does not have a universally accepted generic name and is also variously known as *futuristics* (Gabor 1964), *futurology* (Fletcher 1966; Kahn 1967), f*uturibles* (de Jouvenel 1967), and *futurism* (Toffler 1970). The distinction between these terms is often ambiguous. Compounding this is that it is also "a very fuzzy multi-field" (Marien 2002, p.261) encompassing an assortment of cross-disciplinary approaches, and dealing with complex, interconnected societal problems and speculation about their possible developments. However, in a comprehensive review of the literature, Varum and Melo (2010) conclude that while there are subtle differences in these names, they are used interchangeably.

Regardless of the name used for this field, the predominant view in the literature is that it does not have a sufficiently strong scientific basis to be regarded as an academic discipline as all the methodologies used fall short of the exactitudes demanded of scientific theory construction, empirical data collection and controlled experimentation (Helmer 1978). This is endorsed by van Vught (1987) who in discussing forecasting in its widest sense, argues that there are a number of fundamental shortcomings which from the perspective of the philosophy of science, question the scientific character of the discipline. This according to Helmer (1978) is partly attributable to the fact that the field of futures studies is 'pre-scientific' i.e. the demands for pragmatic results have been such that there has been insufficient time to develop 'neat scientific theories' through systematic field research. De Jouvenel (1967) argues that futures research can never be scientific anyway as there can be no science of the future and accordingly, labels futures research as "the art of conjecture." Allen (1978) however maintains that the field is a science, but not in the traditional view of science; as with science futures studies seek to build theory, they use the 'scientific method' (empirical observation) and their objective of enabling informed choice through prediction, is an objective worthy of science.

At one level of abstraction below the above, there is confusion in the literature as to how scenario techniques themselves are categorized, evidenced by the fact that the terms 'forecasting', 'planning', thinking' and 'analysis' are commonly attached to the word scenario

in the literature and often used interchangeably. Slaughter (1989) defines the futures field as comprising three activities, *futures research* (major knowledge seeking focus), *future studies* (synthesis, criticism and communication) and *futures movement* (stimulating and re conceptualising). Scenarios he submits fall into the field of future studies. Bishop et al. (2007) support this, stating that scenario planning is at the heart of future studies and scenarios are the "archetypical product of future studies" embodying "the central principles of the discipline" (Bishop et al. 2007, p.5). Georgoff and Murdick (1986) explicitly include scenarios within the broad framework of forecasting as one of three judgmental, qualitative methodologies. This is consistent with the views of Allen (1978), Fischhoff (1988), and McHale and McHale (1976), who distinguish between forecasting and planning on the basis of the activities of practitioners. However within the forecasting camp there are writers who have been dismissive of scenario techniques. For example Chambers et al. (1971) describe scenarios as 'visionary forecasts' and Makridakis and Wheelwright, probably the most widely known writers on the subject of forecasting, did not include any mention of scenario techniques in their seminal textbook *Forecasting Methods for Management* until the fifth edition, published in 1985. Even then scenarios are only discussed in the context of a tool used in the *La Prospective* approach to forecasting, and are viewed as an exploratory approach to forecasting similar to science fiction, although less speculative. Bunn and Salo (1993) meanwhile contend that it is becoming increasingly difficult to distinguish between developing scenarios and producing forecasts, and that the aim should be to establishing the "plurality of scenario uses in forecasting" rather than attempting to distinguish scenarios as a separate forecasting methodology.

There is a second camp of opinion which considers scenario techniques as part of the ensemble of strategic planning tools (Malaska et al. 1984; Ringland 1998; van der Heijden 1996), testimony to which is that the topic of scenarios is included in several generalist strategy texts (de Wit and Myers 2004; Eden and Ackermann 1998; Johnson et al. 2010; Mintzberg et al. 1998), albeit coverage of the topic is limited. A recent development in this camp with respect to linking scenarios with strategy is the work of Bodwell and Chermack (2010) related to 'ambidexterity', a metaphor developed by Tushman and O'Reilly (1996) to describe 'deliberate emergent' strategy. They contend that scenario planning is "a critical tool for balancing the deliberate and emergent aspects of organizational strategy" (Bodwell and Chermack 2010, p.198). The three requirements of ambidexterity are the ability to *sense* opportunities and threats, to *seize* opportunities, and to *reconfigure* organizational resources and structures in response to changes in the environment. However, the key element is *sensing* as *seizing* is dependent upon first sensing opportunities and threats, and scenario planning with its focus on identifying and understanding developments in the contextual environment, represents an appropriate tool for this sensing; by providing scenarios

depicting different futures, it also prepares organisations for both seizing and reconfiguring. At this point the work of Bodwell and Chermack (2010) is theoretical, there is currently no body of literature linking ambidexterity and scenarios, and no empirical evidence that linking the two would work.

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There are, however, those who contend that although scenarios, forecasting and planning may be related concepts they are not the same thing. Examples of this include Jungermann (1985a: 1985b) who states that it is the 'hypotheticality' aspect of scenarios which distinguish it from forecasting and planning; Schoemaker's (1993) who suggests that it is their underlying philosophical premise which distinguishes scenarios from conventional planning techniques: scenarios are Hegelian and constructivist because they invite contradiction and provide multiple futures; traditional planning approaches meanwhile are forecast-based and Leibnizian/positivist, as they seek a single truth of reality; and Holloway (1978) who differentiates scenarios from planning by using the analogy of pure and applied research i.e. scenarios are research, planning is the application of the research. In Godet's (1986) opinion, scenarios are neither forecasting nor planning, but a way of thinking whereas Merkhof and Keeney (1987) view scenarios as decision analysis tool for structuring problems.

Finally, there is a growing camp of opinion which positions scenarios as a devise for structuring organisational learning (Burt and Chermack 2010; De Geus 1988; Senge 1990; Thomas 1994; van der Heijden 1996) or adaptive organizational learning. While these camps of opinion represent an evolution in the scenario planning literature as to the views of the role of scenario planning, they have Burt (2010) contends, created confusion in the literature.

Much of the apparent confusion discussed above stems from two factors. The first is that scenarios can be categorised in one of two ways; (a) as a futures forecasting approach in which the scenario technique is itself the forecasting technique; or (b) as an approach in which any forecasting technique can be used and scenarios are inputs to the forecasting model. The second factor is that scenarios are multidisciplinary and depending on their objectives, can fall within one of three theoretical frameworks, these being strategic planning and decision analysis, risk and sensitivity analysis or organisational learning (Bunn and Salo 1993). This appears to justify the different camps of opinion with respect to scenarios on the basis that each camp refers to a distinct, but related approach to the use of scenarios.

Although it may be useful to situate scenarios within a distinct framework of academic activity, the difficulty in doing this is the fact that scenario planning is not yet based on a solid

conceptual foundation (Helmer 1978), it is not axiom based (van der Heijden 1994) and practice rather than research has led the literature (Helmer 1978; Linneman and Klein 1983).

2.4 SCENARIO DEFINITIONS

One of the earliest, most comprehensive definitions in the literature is that put forward by Kahn and Wiener (1967) who defined scenarios as "hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points. They answer two kinds of questions: (1) precisely how might some hypothetical situation come about, step by step?" (Kahn and Wiener 1967, p.32); (2) what alternatives exist, for each actor, at each step, for preventing, diverting, or facilitating the process?" Since then many new definitions of scenarios have appeared in the literature, and even though many of them are similar in content, there is as yet no unanimously accepted definition of what scenarios are, and in the context of forecasting, there is apparently no good definition of the term (Bunn and Salo 1993; MacNaulty 1977).

The reason that there is no single best definition of the term scenario is that it means different things to different people and accordingly, is defined and applied in widely divergent ways (Millet 1988). For example, in the context of game theory the term scenario refers to the operating environment within which the simulation is played out (Brown 1968). In the area of financial analysis scenarios are regarded as a form of judgmental forecasting (Fischhoff 1988), as evidenced by the fact the multiple forecasts generated by changing assumptions regarding the future values of key variables, are routinely referred to as scenarios.

Aside from the different meanings ascribed to scenarios, many of the definitions indicate a somewhat different conceptualisation of the term. An example of this is the temporal nature of scenarios - a number of writers (DuMoulin and Eyre 1979; Georgoff and Murdick 1986; Gershuny 1976; Goldfarb and Huss 1988; MacNulty 1977; Mandel 1982; Mitchell et al. 1979; Porter 1985) appear to place the emphasis in their definitions on the depiction of the situation being examined at a given point in the future i.e. the focus of the scenarios is on the so called 'end-state'. Meanwhile definitions provided by Kahn (1967) and others (Allen 1978; Becker and Van Houten 1984; Brauers and Weber 1988; Godet 1987; Millett and Randles 1986; Millet 1988; Raubitschek 1988; Wilson 1978) accentuate understanding of the evolution of the chains of events and their causal processes that lead to the end-state. Jungermann and Thuring (1987) describe these two different conceptual approaches as 'snapshot' and 'chain' scenarios respectively, while Godet (1987) refers to them as 'situational' and 'developmental' scenarios and Schnaars (1987) describes them as 'cross-

sectional' and 'longitudinal'. In either case the futures delineated by the scenarios may be 'possible' and or 'desirable' states suggest Becker and Van Houten (1984) and Jungermann (1985a; 1985b).

At the same time, writers such as Huss (1988) clearly indicates that the focus of scenarios should be on future business environments whereas writers such as Becker and Van Houten (1984) take a more social perspective and circumscribe scenarios in terms of the state of society. Other writers (Bunn and Salo 1993; Jungermann 1985a; Kahn 1967; Schoemaker and van der Heijden 1992; Wilson 1978) incorporate the concept of decision-making in their definitions which few others appear to although this may be implied in their definitions, or is discussed in terms of the objectives of scenarios e.g. Beck, 1982. Similarly aside from Mobasheri et al. (1989), Ringland (1998) and van der Heijden (1996), none of the other writers specifically reference scenarios to business strategy in their definitions, although again this may be implied or is addressed elsewhere in their discussions.

Despite the many definitions in the literature, Jungermann (1985a), Jungermann and Thuring (1987) contend that the term scenario is not a very precisely defined concept. This view is endorsed by Godet (Durance and Godet 2010; Godet 1990; and Godet and Roubelat 1996) who suggests that the term scenario is increasingly misused and abused, and Simpson (1992) who states that the term elicits an array of imprecise, ambiguously defined concepts. The result concludes Mason (1994) is that the term scenario has become as ill-defined as the term 'strategy' while Vlek and Otten (1987) question whether it is actually possible to define the scenario concept "with sufficient operational precision." Accepting that the term scenario lacks a precise, universally accepted definition, Jungermann (1985a) declares that there are five attributes common to most of the definitions and interpretations of the term scenario, these being that a scenario:

- is hypothetical in nature in that it describes some possible future state, but it is selective in that it represents only one possible state;
- describes a process representing a sequence of specific events over a period of time;
- is bounded in that it consists of a limited number of states, events, actions and consequences which are conditionally or causally related;
- is assessable in that the scenario elements can be judged in terms of their importance, desirability and or probability; and
- it includes the depiction of an initial state which usually but not necessarily lies in the present, and of a final state at a fixed time horizon.

It is Jungermann (1985a) argues, these five common features which in effect constitute the term scenario and differentiate it from other terms.

2.5 SCENARIO TYPOLOGIES

While the review of the historical development of scenario techniques in section 2.1 proposes three broad scenario 'schools' (ILS, PMT and La Prospective) based on their conceptual and methodological foundations, there are other classifications of scenario types, one of the earliest, most widely referred to in the literature being that of Ducot and Lubben (1980) which categorises scenarios according to the perspective adopted in their development, resulting in three pairs of polar opposite scenario types:

2.5.1 Exploratory-anticipatory

The difference between these two scenario types is the starting point in scenario development which the authors illustrate using the concept of a funnel. In developing 'exploratory' scenarios the starting point is the present time, the consequences or effects of which are then unfolded into the future towards the designated horizon year in the future in a sequence of forward inferences linked by causality. The opposite, 'anticipatory' scenario development assumes a starting point at the designated horizon year and the development approach is concerned with effectuality and searching via backward inferences for the possible causes which led to the state depicted in the horizon year. A third scenario type is possible in which the events of interest occur in the middle of the scenario time period, necessitating the consideration of both causality and effectuality resulting in what Ducot and Lubben describe as a 'mixed scenario'.

Godet (1987), Raynaud (1976), and Schnaars (1987) make a similar distinction between scenario types based on their anchor point, but use the terms 'forward' and 'backward, 'situational' and 'developmental' and 'inductive' and 'deductive' respectively, to describe the two approaches. The Nuclear Energy Authority (OECD 1992) which uses both scenario types, categorise them simply as 'bottom-up' and 'top-down' scenarios. Under the bottom-up approach key variables and their possible outcomes are generated and the relationships between these variables are developed, combined and elaborated into scenarios; under the top-down approach, a scenario end state is created by establishing the overall theme of the scenario and clusters of interrelated variables are used as input to achieve the end state.

2.5.2 Descriptive-normative

The descriptive approach to scenario development is one of describing future trends and events, but which remains neutral as to their desirability. Conversely, normative scenarios are value laden in that they explicitly incorporate the motivations and interests of the scenario developer, the result of which is that the scenarios portray an idealistic picture of the future, although Durance and Godet (2010) suggest that they can also depict undesirable futures. Again Ducot and Lubin (1980) note that along the descriptive-normative continuum, intermediate forms of scenario which combine both descriptive and normative elements are possible, which they label as 'dynamic' scenarios.

Descriptive and normative scenarios represent conceptually different uses of scenarios. The objective of descriptive scenarios is to give an organisation ideas as to what the future environment may look like in order that it may plan accordingly; the objective of normative scenarios on the other hand is to portray a vision of what the organisation could look like at some future point, allowing it to then work backwards to identify actions and conditions required to achieve the vision. Mason (1994) categorizes these two scenario types as 'risk-reduction' and 'revolutionary'.

2.5.3 Trend-peripheral

The differences between trend and peripheral scenarios relates to the likelihood of occurrence of the trends and events described in the scenarios. In trend scenarios, development of the scenarios takes the form of 'downhill' thinking whereby existing trends are extended into the future in likely, conformist paths. Hence the scenarios developed are devoid of unexpected elements and are commonly termed 'surprise-free' or 'business-as-usual' scenarios. Peripheral scenarios on the other hand are developed on the basis of 'uphill' thinking, deliberately allowing variables in the scenarios to take on extreme, unlikely 'determinations'. Godet (1987) provides a similar classification of scenario types which he labels 'trend-based' and 'contrasted' scenarios. The term 'trend-based' does not imply an extrapolation of existing trends, but refers to scenarios which depict most probable courses of events, whereas 'contrasted scenarios' deliberately depict extreme, unlikely courses of events. Both scenario types can be exploratory or anticipatory in nature.

In arriving at their topology, Ducot and Lubben suggest that the distinctions between exploratory-anticipatory and descriptive-normative scenarios can be represented by two axes lying in a two dimensional plane. The trend-peripheral distinction lies at right angles to this plane. Allowing for the fact that scenarios can be developed at intermediate points along the various axes as well as at the polar extremes, this typology indicates that there are 27

possible scenario types, which can be amalgamated in various combinations to form ‘compound’ scenarios.

There are numerous other dimensions along which scenarios can be classified aside from the framework used by Ducot and Lubben. For example typologies proposed in the 1970s, 1980s and 1990s, which are still quoted today, include:

- Linneman and Klein (1985) provide a typology of five basic types of scenarios based on scope and objectives, these being:

    - ‘global’ external scenarios which are wide-ranging, open-ended scenarios incorporating macro-economic variables, usually generated at the corporate level and used for corporate resource allocation;
    - ‘industry specific’ scenarios generated at the corporate or business unit level, and which focus on a particular business or industry;
    - ‘exploration’ scenarios which are more focused than global scenarios but extend beyond the existing business or industry, are used for identifying new business opportunities and are purportedly the most difficult to develop;
    - ‘issue-oriented’ or ‘themed’ scenarios which relate to a specific and dominant issue which affects corporate viability e.g. energy; and
    - ‘external assumption’ scenarios which are more sensitivity analysis than true scenarios, and are designed to examine the internal dynamics of the company in the context of assumed environments.

- Along the same vein as the above, Foster (1993) describes three scenario types, ‘global’, ‘industry’ and ‘local market’ scenarios, while Porter (1985) and von Reibnitz (1988) use the polar extremes of the market scope continuum to differentiate between ‘macro-global’ and ‘micro-industry’ scenarios.
- Amara and Lipinski (1983) categorise scenarios on the basis of complexity and probability estimates which results in three scenario types: ‘simple probabilistic static’, ‘simple probabilistic dynamic’, and ‘complex deterministic dynamic, mutually consistent’ scenarios. They also introduce the concept of ‘metascenarios’ which are defined as the averages or aggregations of numerous scenarios of one or more of the three scenario types.

- DuMoulin and Eyre (1979) and Wack distinguish between three scenario types; ‘archetype’ scenarios which describe important scenario aspects in black and white terms, ‘phantom’ or ‘Devil’s Advocate’ scenarios which have a low probability of occurrence but the impact on the future would be very high in the event they occur, and ‘exploratory’ scenarios which combine important variables from both archetype and phantom scenarios. Wack (1985a) also makes a fundamental distinction between ‘first-generation’ scenarios which are exploratory in nature and quantify outcomes of obvious uncertainties, but are not useful to decision makers as they provide no basis for strategic action, and ‘second-generation’ or decision focused scenarios.

- Mannermaa (1999) whose three dimensional classification is based on the nature of the empirical data employed (quantitative versus qualitative), the process used to produce forecasts (mathematical, repeatable versus subjective, non-repeatable), and the purpose of the work (explorative versus normative).

More recently three new typologies have appeared in the literature. The first is by van Notten et al. (2003) who suggest that given that typologies represent the state of play of a field at a particular point in time, existing classifications while a reasonable starting point, are neither detailed nor broad enough to capture the diversity of scenario approaches which have evolved over the past five decades. They propose a typology differentiating scenarios according to “three overarching themes which comprise the key aspects of scenario development”, namely: the project goal (*the why*, ranging from simple awareness raising to decision support); the process used to create them (*the how*, extending from intuitive art form to a formal rational and analytic process); and the scenario content (*the what*, from simple at one end to complex at the other end) (van Notten et al. 2003, p.425). Based on this, they developed a two–tiered topology in which one tier describes three general distinctions or macro-characteristics, and the second describing nine distinguishing or micro-characteristics grouped according to the overarching theme (detailed in Table 1, p.426). They tested the typology’s robustness using 18 scenario case studies and developed a ‘scenario cartwheel’ of the overarching dimensions on which case studies could be plotted according to their main features. While accepting that it is not always easy to categorise scenarios in practical applications, they conclude that “comparative analysis proved that the typology is both broad and detailed enough to analyse and compare the diversity in today’s scenarios” (van Notten et al. 2003, p.427).

The second recent typology is that proposed by Borjeson et al. (2007). Adopting a user’s perspective they contend that scenarios generally revolve around one of three categories of

user ‘need-to-knows’ i.e. and what will happen (*the probable*), what might happen (*the possible*) and how a predetermined target could be achieved (*the preferred*), and propose a typology with corresponding categories of scenarios: ‘predictive’, ‘explorative’ and ‘normative’. Within each of the three categories, there are two possible scenario types: ‘Forecasts’ and ‘What-if’, ‘External’ and ‘Strategic’, and ‘Preserving’ and ‘Transforming’ respectively.

The third and most recent typology comes from Wilkinson and Eidnow (2008) and is aimed specifically at policy makers involved in global warming and environmental related scenario work. Three types of scenario approaches are proposed the first being ‘Problem-focused’ scenarios which assume the contextual environment is objective, quantifiable and continuous, and the scenarios developed focus on causality and extrapolation of existing environmental trends. The second, ‘Actor-centric’ scenarios presuppose a causal, discontinuous environment, and the scenarios developed focus on the actors involved and their relationship to the environment. The third type, ‘Reflexive Interventionist/multi agent based’ (RIMA) adds a new dimension to existing typologies in that it is specific to ‘wicked problems' and has the objective of “mobilizing and sustaining collaboration in the public interest to enable institutional innovation and/or renewal” (Wilkinson and Eidnow 2008, Table 1, p.7). According to the authors, the RIMA approach is intended to “recognize and work with high systems uncertainties, epistemological and ethical, as well as methodological and technical. It is aimed at highly difficult decision-making contexts that involve conflicting perspectives and purposes” (Wilkinson and Eidnow 2008, p.9)

The contribution to the scenario field that all of the typologies have made is that they may be useful as a tool for classifying scenarios (Wilkinson and Eidnow 2008), and they provide a common language allowing researchers to communicate, understand, compare, and develop methods (Borjeson et al. 2007). However Bishop et al. (2007) argue that rather than focusing on the classification of the actual scenario construction methods, most topologies are based on high-level attributes and none have classified the actual techniques in use, and therefore while useful, they do nothing “to diminish the confusion over scenario techniques” (Bishop et al. 2007, p.7) In a research project surveying scenario development, they identified eight general categories of scenario techniques ranging from ‘Judgment’ to ‘Modeling’, each with a number of variations, resulting in a total of twenty four plus techniques. Acknowledging that this will not end the confusion over scenario techniques, it is they suggest a step forward in bringing some clarity to the issue.

In reviewing the literature on typologies it is evident that the boundaries established in these typologies are not all clear cut, and as Jungermann and Thuring (1987) have noted, most

scenarios represent a combination of the various scenario types rather than one specific type, and despite all the classifications available, scenario users seldom appear to explicitly consider what scenario type they should use and why.

The section which follows shifts the focus of discussion from scenario definitions and typologies, to an overview of specific elements of scenario development methodologies.

2.6 THE SCENARIO DEVELOPMENT PROCESS

As has already been noted, there are numerous scenario development methods and the literature is replete with descriptions of prototypical models for generating scenarios ranging from the simple to elaborate, highly structured recipe type techniques, many of which according to Varum and Melo (2010) contradict each other, are impractical and have not been adequately tested. Scenario development has become “a Swiss pocket knife of multiple users, or a magic wand that is often waved by inexperienced and unskilled consultants and professionals” contend Masini and Vasquez (2000, p.49). Most of the techniques discussed are highly prescriptive in nature and Whaley’s (2008) observation reportedly based on 40 years of experience, is that while the practitioner literature refers to process and gives “the impression of expertise”, the “hard facts of what is done to create the scenarios, what data is processed and how” is not usually discussed (Whaley 2008, p.310).

The first comprehensive model for the development of scenarios to be published in a journal was that provided by Zentner in 1975. Numerous models have since been published each identifying a number of discrete steps, varying from five (Foster 1993) to twelve or more (Vanston et al. 1977), depending on the scenario approach used and what features of scenarios are highlighted or ignored. Although as already noted the detailed specifics of the development and construction process are not generally made explicit in the literature, there are some notable exceptions. Ralston and Wilson (2007) for example describe a detailed process based on the ILS methodology as does the RDS 'Guides to Planning' (Series No. 7, 1988), and Godet (2001) provides a comprehensive explanation of the process of developing scenarios under the *La Prospective* approach. In terms of an overview of developmental methods, Huss and Honton (1987, Table 3, p.28) provide both an outline and comparison of the steps involved in a generic approach to scenario development under the ILS, TIA and CIA methodologies while Schnaars (1987, Table 1, p.110) provides a comparison of the various scenario generating procedures in summary form.

At a molar level of analysis, Linneman and Klein (1979) argue that while there is no one accepted procedure for developing scenarios, there is general agreement among scenario users on the basic steps involved in scenario development, these being:

- isolation of assumptions about the future which are deemed sure to occur within the designated scenario time frame;
- identification of key 'impact' variables;
- unearthing of environmental variables comprising events and trends which are likely to affect the behaviour of the impact variables and combine to form the structural components of scenarios;
- construction of scenarios depicting a range of behaviour of key variables;
- development of strategies which are responsive to one or more of the scenarios.

Cole and Chichilnisky (1978) suggest that most developmental models can be broken down into three stages: a 'diagnostic stage' in which data on environmental variables is collected and analysed; a 'transition stage' in which scenarios are developed and trade-offs between variables and solutions are considered; and a final 'prognosis stage' in which the likely success of various strategies are examined in light of the scenarios. With some refinement both the five basics steps outlined by Linneman and Klein and Cole and Chichilnisky's three stage process, are recognizable in most of the ILS methodologies. At the same time, in tracing the evolution of ILS scenario planning methodologies in the literature, Burt (2010) notes that although most methodological advances "cite Wack as a key reference, they have not challenge or developed his ideas" (Burt 2010, p.1478).

2.6.1 Overview of the Scenario Building Process

The following section provides a brief overview of the scenario development process using a typical RDS/GBN ILS model promulgated by van der Heijden (1996).

2.6.1.1 Setting the agenda and horizon year

Van der Heijden (1996) states that the starting point in any scenario exercise is to determine what issues are of strategic importance to the decision makers of the client organisation. This is a critical first step as the scenarios developed must address the concerns of the client decision makers if they are to be effective. Eliciting these concerns is arrived at either by group brainstorming or by interviewing the decision makers individually; the results of which are analysed and structured, from which a scenario agenda is derived identifying the decision makers' broad areas of concern regarding the business environment. This scenario agenda then forms the base for subsequent scenario development, the aim being to help the decision makers by creating scenarios which explore their areas of concern and throw new

light on them. The next step is to determine the scenario horizon year i.e. how far the scenarios will look ahead. Having established the agenda and horizon year the scenario development process is then undertaken, beginning with the examination of the contextual environment.

2.6.1.2 Examining the contextual environment

The objective of examining the contextual environment is to establish and understand what forces are currently driving it and how these might evolve in the future, and to determine what the 'critical uncertainties' are which will form the basis of the scenarios to be developed. In summary, the process is as follows:

- conventional brainstorming techniques are used by a scenario team to develop a list of individual 'driving forces' which it is assumed will have some impact in the future;
- the individual driving forces are examined and grouped into 'clusters', with each cluster representing a set of related ideas distinct from other clusters, although some driving forces may sit comfortably in more than one cluster;
- the clusters are scrutinized to determine which of them represent ''critical uncertainties' i.e. which clusters are deemed the most uncertain in terms of how the central driver representing a cluster may evolve in the future, but which will simultaneously have the greatest potential impact on the issue around which scenarios are to be constructed. This is achieved by placing each cluster in one quadrant of a two dimensional predictability/impact matrix, based on their presumed level of uncertainty and impact. Clusters in the 'low predictability/high impact' quadrant of the matrix represent the critical uncertainties;
- two of the critical uncertainties are selected, ensuring that those selected are independent of each other and do not therefore move in unison, and are used to create a scenario matrix by placing one on a horizontal axis and the other on the vertical, and determining the polar extremes of the two uncertainties. The result is a four quadrant matrix which provides the framework, also commonly referred to as the 'scenario logics', for developing a set of 4 scenarios, each quadrant on the matrix representing a unique scenario bounded by the polar extremes of the two uncertainties.

Generating the initial list of driving forces is according to van der Heijden et al. (2002), a relatively simple task but progressing to clustering the uncertainties and then reducing these

to a subset of critical uncertainties for subsequent scenario development is not only difficult, but is also one of the most controversial aspects of the scenario development for two related reasons: (1) in limiting the variables and uncertainties to be considered in the scenario development, there is the danger of disregarding variables and issues about which the scenario participants have little knowledge of; and (2) regardless of the method used, a considerable amount of subjective judgment enters the process at this point. The problem with this is that intuition and judgment are not generally reliable when dealing with complex systems which often exhibit counter-intuitive behaviour, argue writers such as Jungermann (1987). The consequence, as Vlek and Otten (1987) observe, is that this element of the scenario development process provides "ample grounds for confusion, differences of opinion and enduring controversies among the different parties involved in the construction and evaluation of scenarios" (Vlek and Otten 1987, p.273) the likely net result of which is a flawed base for the scenarios (Wright and Ayton 1986).

The approach of using the predictability/impact matrix to arrive at a scenario framework has also been criticized; for example, van't Klooster and van Asselt (2006) suggest that from their observations, "constructing the axes was not a matter of profound analysis which leads to two overwhelming driving forces, but social construction work" (p. 28) and that the resultant axes "do not function as a unifying structure fostering alignment of different perspectives in the way that scenario theorists and practitioners often suggest" (p.15). Despite this, its use as an initial starting point in framing a set of scenarios is ubiquitous, because it provides two advantages: firstly it provides a coherence linking the scenarios together; secondly, it resolves the problem of determining how many scenarios should be developed, the answer being four if using a matrix.

There is also the issue of the role of history in scenarios. The central concept underlying scenarios Wack (1985a; 1985b) suggests is that there are elements of the future environment which can be predicted with reasonable confidence. The predictable variables widely referred to in the literature as 'pre-determineds' are predictable because their outcomes in the future are more or less inevitable as a consequence of causal relationships, inertia and/or the fact that they are already in the 'pipeline'. The objective of scenario planning is therefore the exploration of both pre-determineds and uncertainties, and a considerable effort in the development process should be devoted to the examination of predeterminеds (Wack 1985a; 1985b). This accords with the views of Allen (1978), Leemhuis (1985) and van der Heijden (1994; 1996) all of who contend that scenarios cannot be constructed without first understanding how interactions have occurred historically, and this combined with the knowledge that people tend to react in identical ways when faced with comparable situations, can provide insights for the future. Burt (2010) argues that from a

theoretical perspective, the concept of predetermined is a “critical element in explaining the contribution of scenarios to future studies”, while from a practitioner standpoint, identifying predeterminеds is central to the success of scenario work and in evaluating scenario projects (Burt 2010, p.1483). However, as important as the element of history appears to be in scenario development, surprisingly little attention is paid to this aspect of the scenario development process in the literature. In the process model discussed above there is no explicit step to segregate out the predeterminеds from the uncertainties, however it is implicit that the clusters placed in the ‘high predictability’ quadrants of the predictability/impact matrix essentially represent predeterminеds.

Although van der Heijden suggests that generating the initial driving forces is relatively easy, Wright and Goodwin’s (2009) argue that the ILS step-by-step scenario development approach may actually reinforce existing ‘framing’ limiting the range of variables examined and restricting the diversity of the scenarios. This can be avoided they suggest, by including in the process, decision making techniques such as ‘frame analysis worksheets’ and adopting crisis management techniques to explore a wider range of uncertainties to reduce frame blindness.

2.6.1.3 Developing the scenarios

The next stage in the process is to develop the scenario storyline for each of the four scenarios represented by the matrix, and all scenarios should contain three elements, namely: *descriptions of a future state in a horizon year; an interpretation of current events and their propagation into the future*; and *an internally consistent account of how a future world unfolds* (Burt and Chermack 2008; Burt et al. 2006). Although there is little guidance in the literature on this, Schwartz (1992) argues that firstly, there are only a limited number of possible structures or 'plots' which can be used to describe how the various driving forces in the environment may interact and combine in the future; secondly only two or three plots are applicable in any scenario exercise; and finally, three plots in particular (*Winners and Losers, Challenge and Response* and *Evolution*) tend to dominate modern-day scenarios.

2.6.1.4 The number of scenarios to develop

Although four scenarios is a common practice, there is no empirical evidence indicating how many should be developed and Bunn and Salo (1993) suggest that the answer to this question depends on the objective of the scenario exercise. It is axiomatic that constructing only one scenario defeats the object of providing a range of futures which is the essence of

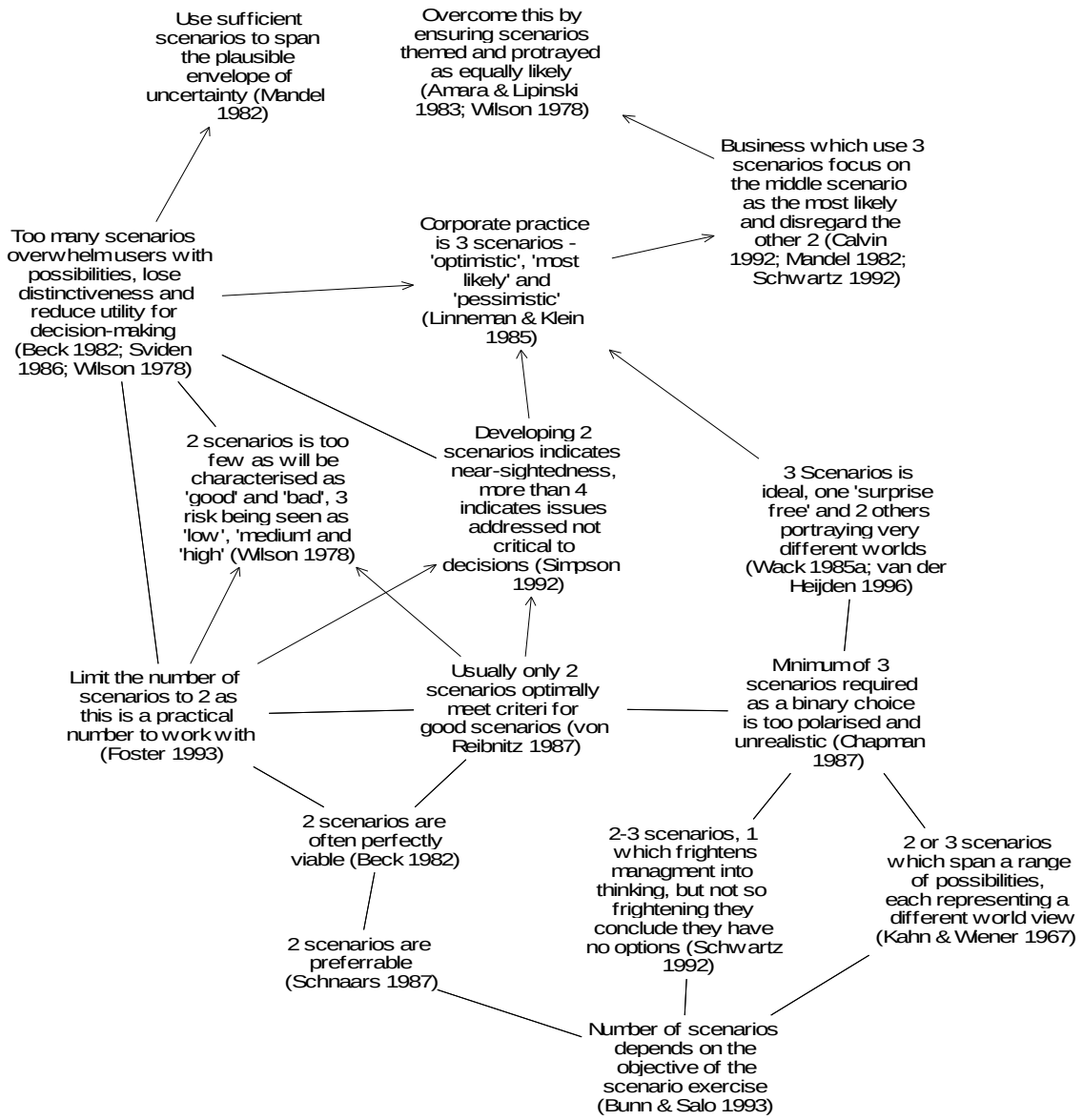
scenario planning (except in the case of normative scenarios, especially those of a national/public policy nature in which case one scenario is the norm).

Kahn and Wiener (1967) address the issue by stating that the objective of constructing scenarios is not to produce a range of closely spaced scenarios representing variations around a midpoint centered in the same world view, but to produce two or three scenarios which span a range of possibilities, the differences in each stemming from each scenario representing a different world view. Foster (1993) points out that although one should theoretically construct a lot of scenarios, he proposes limiting the number to two on the basis that this is a practical number to work with. This accords with the views of a number of authors (Beck 1982; Linneman and Klein 1985; Mandel 1982; Sviden 1986; Wilson 1978) who suggest that too many scenarios are likely to overwhelm the user with information and possibilities, and the scenarios tend to blend together losing their distinctiveness thereby reducing their utility for decision-making. Support for developing two scenarios come from Schnaars (1987) who states that his experience is that two scenarios are preferable, Beck (1982) whose experience at RDS was that two scenarios were often ‘perfectly viable’ and von Reibnitz’s (1988) observation is that there are usually only two scenarios which optimally meet the criteria for good scenarios.

Simpson (1992) however contends that generating only two scenarios is an indication that the scenario developers are suffering from near-sightedness; but developing more than four scenarios is an indication that issues are being addressed which are not critical to the decisions under consideration in the scenario exercise. Durance and Godet (2010) however, contend that constraining the number of scenarios to four is too ‘reductive’, five or six scenarios facilitate additional strategic thinking. Wack (1985b) is adamant that three is the appropriate number of scenarios i.e. a surprise free or ‘business-as-usual’ scenario and two other scenarios each one portraying a very different world view. The notion of a surprise-free scenario originates with Kahn and Wiener (1967) who defined it as a naive projection of the environment, which assumes a continuation of current trends and expectations. Van der Heijden (1996) also advocates the use of the surprise-free scenario, as this he suggests, "anchors the set of scenarios in the belief systems of the decision makers" (van der Heijden 1996, p.217). Schwartz (1992) who favours two or three scenarios, suggests that scenario developers should always design at least one scenario which frightens management sufficiently to encourage them to ‘re-think’ but not so much that they conclude that they have no options. This is echoed by Simpson (1992) and Bunn and Salo (1993) who contend that a scenario set should always include at least one scenario containing a major discontinuity.

An equally important consideration in determining the number of scenarios to construct is the problem of the link between the number of scenarios and how the scenarios are likely to be characterised. Wilson (1978) notes that two scenarios are insufficient as there is the danger that the scenarios will be characterised as ‘good’ and ‘bad’; however three scenarios run the risk of being labeled ‘low’, ‘medium’ and high’. Calvin (1992), Mandel (1982) and Schwartz (1992) echo this caveat pointing to the fact that businesses that have traditionally used three scenarios intuitively tend to focus their attention on the middle scenario usually perceived as the most likely scenario, and disregard the other two scenarios. The key to overcoming this according to Amara and Lipinski (1983) and Wilson (1978) is to ensure that all scenarios in a set are idiosyncratically themed in order to portray them as being equally likely.

Figure 2.1: The Number of Scenarios to Develop



While it is clear that there is no consensus in the literature as to what the right number of scenarios is, the advice proffered by Mandel (1982) to use "enough scenarios to span the plausible envelope of uncertainty and map the profile of the entire (uncertainty) domain" (Mandel 1982, p.4), is a common theme in the literature. In most cases this would appear to be between two and four scenarios. In terms of corporate practice, the surveys by Linneman and Klein found that on average, users constructed three scenarios differentiated on the basis of optimistic, most likely and pessimistic outcomes. A summary of the main options suggested is shown in Figure 2.1 above.

2.6.2 Attaching Probabilities to Scenarios

The question as to whether or not probability estimates should be attached to scenarios is arguably the most contentious issue in scenario development. Schnaars (1987), states that scenarios are 'possibilities' rather than 'probabilities' and Sunter (1992) argues that although probabilities sound good, they endow a false sense of numeric precision or 'spurious certainty' on what is essentially a matter of intuitive judgment. Van der Heijden (1996) is unambiguous in rejecting the notion of attaching probabilities to scenario outcomes, stating that no one particular scenario should be more likely than all others. Wack (1995a; 1995b) also rejects the notion of attaching probabilities to scenarios on the grounds that: firstly, the probabilities would be misleading and destroy the credibility of the scenarios; secondly, that probabilities focus the scenario audience on outcomes rather than on developing an understanding of the forces which lead to the outcomes. Bunn and Salo (1993) add that attaching probabilities to scenarios restricts the development of scenarios by forcing the scenario developers to quantify their understanding of qualitative factors. Linneman and Klein (1979) also point to the fact that once a scenario is identified as the most probable it is difficult thereafter to sustain interest in alternative scenarios. However, to put things into perspective Linstone (2010) notes that a scenario comprising 20 highly likely events each with a 90% probability of occurrence, has an overall probability of occurrence of $(0.9)^{20}$ or just 12%. The concept of a most probable future is therefore he suggests, a dubious one.

While most writers from the ILS reject the notion of attaching probabilities to scenario outcomes as inappropriate given that scenarios are not forecasts but depict a range of plausible future business environments, this does not preclude the use of probabilities in arriving at estimates of certain factors which may be incorporated in the scenarios (van der Heijden 1996). Mandel (1982) for example, while stating that assigning probabilities to scenarios is meaningless, condones developing subjective judgments about the relative likelihood of elements of scenarios or of a particular scenario if the client demands this, with the proviso that this does not mask any uncertainties and it is recognised that subjective judgments are likely to change over time. Gershuny (1976) takes a similar line to that of van der Heijden and Mandel in sanctioning the ranking of some variables within scenarios in terms of their likelihood of occurrence. Sviden (1986) meanwhile contends that in the end, it is up to the scenario client and not the scenario developer, to determine which of the events within the scenario, are more plausible and therefore more likely.

There is an opposing school of thought which considers that all scenario outcomes should be ranked in terms of probability in order to establish the likelihood of occurrence of each scenario. The cornerstone of the TIA, CIA and *La Prospective* methodologies is as

previously discussed, the assignment of probabilities to each event within scenarios in order to generate consistent sets of descriptor states with probability estimates of outcomes clearly identified. The justification underpinning the assignment of probability outcomes to variables and scenarios is that:

- the list of potentially important environmental trends and events in any scenario exercise is too large to allow a detailed examination of all of them individually, let alone the multiplicity of their possible combinations. The logical solution to this problem is to apply probabilities to each variable individually and conditionally to arrive at a manageable number of factors and thereafter, a manageable number of scenarios which have the highest likelihood of occurrence (Godet 2000).
- assigning probabilities to events forces individuals to carefully analyse the impacts of and interactions between events which may lead to the development of a new theory (Allen 1978).
- it is intuitively obvious that some events are more probable than others and even if probabilities are not formally assigned to scenarios, people will invariably hold an opinion as to the likelihood of each of the scenarios. Probability is a cornerstone of risk assessment and decision analysis, and scenario clients inevitably want to know the probability of occurrence of each scenario in a set (Mitchell et al. 1979); if probabilities are not attached to the scenarios they lose credibility, passing the problem of what to do back to the decision makers who will invariably use their intuition or other sources to assign probabilities to the scenarios (Kraus 1987; Linneman and Klein 1979; Malaska et al. 1984). This being the case, it is better to use an explicit and rigorous method of assigning the probabilities which allows for subsequent scrutiny (Bunn and Salo 1993; NEA 1992).

The debate on this issue continues unresolved and in the context of the debate on climate change, this along with other unresolved methodological issues has “bedeviled many scenario exercises” (Groves and Lempert 2007, p.83). However as indicated earlier, the research of Linneman and Klein identified that in practice most organisations use remarkably informal scenario development methods which do not include sophisticated mechanisms for attributing probabilities to scenarios.

2.6.3 Naming the Scenarios

Having developed a set of scenarios, the final step in the process is to name the scenarios. This topic receives sparse coverage in the literature although it appears an important

element of scenario development, given that Calvin (1992), Linneman and Klein (1985) and van der Heijden (1994) all suggest that it is an endeavour worthy of a great deal of attention. Four reasons for this are cited, but no empirical evidence is offered in support of the reasons which are:

- provocative but meaningful names create mental pictures by themselves creating a 'common idiom' around which interesting conversations develop (Simpson 1992; Sunter 1992).
- short memorable names provide a quick shorthand reminder of the content of the scenarios (Stokke et al. 1990).
- names attached to scenarios will arouse expectations because they are usually the first matter communicated about scenarios (Mandel 1982) and the names often determine how the scenarios are perceived (Linneman and Klein 1985).
- vivid and memorable names enhance the chances of the scenarios entering into the organisational decision-making process (Calvin 1992; Simpson 1992).

In addition to the above, Schoemaker (1991) pointing to the literature on hindsight bias, states that the naming of scenarios is important by virtue of the fact that whether the scenarios are labeled as fact or conjecture will affect the perceived credibility of the scenarios. In spite of this no guidelines as to how to develop the scenario names appear in the literature although van der Heijden (1994) suggests that to be effective, scenario names must meet four criteria: the names must be new i.e. not already a part of the organisation's vocabulary; the names ideally should not exceed three words; the names must express the key scenario dimensions; and the names must be memorable.

He cites the 'Mont Fleur' scenarios as an example of scenario names which were effective because they were able to evoke an immediate series of images. Mandel (1982) concludes the discussion on naming scenarios by stressing that scenario names should not imply any probability or raise misleading expectations, and the best names usually evolve from the scenario logics themselves.

2.6.4 Teams and Facilitators in Scenario Development

While scenarios can be constructed by individuals working alone, it is more effective to have scenarios developed by small teams of between four and ten people (Mandel 1982) with an

outside limit of twenty people (Raynaud 1976). Durance and Godet (2010) suggest that as many people as possible should be involved in the initial 'anticipation' phase of scenarios in order to mobilize the collective intelligence of the organisation; additionally, including a wide range stakeholders from across the organisation results in a shared organizational vision and facilitates collaborative relationships working to achieve the vision (Bezold 2010). However, there is the issue of practicality in that the larger the team the more difficult it becomes to ensure the active participation of all team members, and the longer it takes to achieve agreement on issues. The experience of von Reibnitz (1987) is that the optimum team size is twelve people as this allows the creation of sub-groups which can work independently on specific tasks within the scenario development process. In terms of selecting scenario teams Calvin (1992) considers the following to be the main considerations:

- the support and or participation of the highest levels of management in the organisation is essential. There is no disagreement on this, writers such as Mandel (1982), Millet (1988) and van der Heijden (1996) agree that senior management/key decision makers must be involved in the scenario process at the initial stages when objectives are established, and again at the end when the implications and strategic options are considered; but also they suggest that middle managers should also be involved in the process given that it is ultimately their responsibility for implementing and managing the strategies selected.
- team members should represent a broad range of functions and divisions within the organisation, and according to Simpson (1992), should include opposing views from outside the unit tasked with developing the scenarios. Mandel (1982) elaborates on this by proposing that the team members should represent by proxy at least, the different viewpoints held by senior management and key decision-makers from various parts of the organisation.
- scenario teams should comprise imaginative people with open minds in order to avoid biases in the team which may cause knowledge to be overlooked (van der Heijden 1996). Sviden's (1986) view on this is that since scenario development is more an artistic than a scientific exercise, it is more suited to individuals with a generalist background rather than specialists in particular disciplines. But Mandel (1982) contends that it is important to have a balance of qualitative perspectives, analytical skills, education and professional backgrounds, consequently both specialists and generalists have a place in scenario teams. This is endorsed by Schoemaker and van der Heijden (1992) who maintain that multidisciplinary teams are required, and von Reibnitz (1988) who asserts that diversity of specialisation and qualification of the

scenario team participants enhances the chances of developing good scenarios, generating novel ideas and strategic solutions. In addition to the skills and backgrounds, Mandel (1982) also indicates that it is essential that the scenario team members understand strategy and the decisions under consideration and are at the same time, knowledgeable about the environmental forces which affect them.

- team members should be individuals capable of working closely together as a team and it is essential therefore that team members must disregard their titles and accept one another as colleagues (Thomas 1994). Raynaud (1976) addresses this issue by indicating that there should be no hierarchical connections between the scenario participants who should all be of similar age. This is not necessarily always the case according to von Reibnitz (1988) who says that the choice is governed by the openness and style of management prevailing in the organisation, and at the same time, age and experience similarity can lead to a uniformity of outlook which may undermine the basic objective to consider a wide range of divergent futures.

The above contrasts with the view of de Brabandere and Iny (2010) who in developing a new so-called 'Expressway to Scenarios' methodology which is a considerably faster scenario development process than the conventional ILS methods, suggest that the scenario team should comprise only the senior executives of the organisation.

In terms of facilitation, most of the writers concur that it is a crucial role in scenario teams. Raynaud (1976) working with large scenario groups comprising senior bureaucrats in France suggests using three 'prompters': a 'psychologist prompter' responsible for the group dynamics, a 'method prompter' who supervises the application of the scenario methodology, and a 'technical prompter' who assembles the required information and ensures the internal consistency of the scenarios.

Simpson (1992) maintains that scenario planning is not as easy to execute as it appears and therefore it is necessary to hire an external, experienced practitioner who is able to fulfill the roles of facilitator, planner and consultant to the scenario team. The advantage of external scenario facilitators is that they provide a fresh perspective and may be able to stimulate the team to identify issues which ordinarily might not surface among teams composed entirely of employees of the organisation. While they do not specifically recommend external facilitators, both MacNulty (1977) and Mandel (1982) propose using external consultants and experts knowledgeable about the organisation's environment, to provide depth of knowledge in key areas, a fresh perspective and objectivity. Von Reibnitz (1988) while not opposing the use of external experts, warns that experts can be narrow-minded and unwilling to consider

alternative developments in their area of expertise and additionally, may attempt to dominate group thinking. As research by Tetlock (2005) reveals, experts are particularly prone to the framing bias and are reluctant to review their frames even when confronted with evidence substantiating that the forecasts generated through their frames are flawed.

In practice Linneman and Klein (1985) note once again that few companies heed the advice offered in the literature; they do not generally follow the guidelines regarding team composition and only a small number employ consultants and outside facilitators and experts to assist in the scenario development process.

In closing the discussion on the scenario development process it is evident that aside from a limited set of tools, the task is essentially a creative one and the process has been described as "a practitioner's art" and it is "therefore more a craft than a science" (van der Heijden 1996, p.133). All of the procedures described in the literature rely heavily on subjective judgments (Jungermann 1985), which is a necessary ingredient in scenario planning as there is no hard data about the future; decisions regarding the future must be highly subjective and, unlike conventional scientific research, futures research problems are "usually ill-defined, imprecisely structured and probability relationships are largely unknown" (Athey 1987, p.170). Accordingly the "modeling of developmental processes combining both uncertain factors and conditional decisions whose combined probable effects have to be assessed" is the most controversial part of scenario construction (Vlek and Otten 1987, p.273); as a consequence the basic methodological assumptions are seldom agreed upon in scenario exercises suggests Athey (1987)

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2.7 CRITERIA FOR EVALUATING SCENARIOS

According to Burt and Chermack (2008) methods to evaluate the effectiveness of scenario planning are nonexistent in the literature. Jungermann (1985a) states that no rigorous criteria for assessing the quality of scenarios or scenario processes have been developed because the issue is seldom addressed in practice, regardless of the method used to generate the scenarios. Amara (1991) however asserts that validation criteria do actually exist in the field of futures studies, but are infrequently used and incorrect criteria are often proposed, such as whether or not the forecasts produced were accurate.

In reviewing the literature, the three interrelated evaluation criteria which appear repeatedly are consistency, plausibility and relevance.

2.7.1 Consistency

Albeit a commonly cited criterion, ‘consistency’ is used with different meanings in the literature. The most common meaning relates to what is usually described as the internal consistency of the scenario i.e. the assembly and presentation of all critical elements in the scenario in a manner which ensures that they combine together to form a logical and coherent vision of the future in which the outcomes of different variables and trends do not intuitively conflict with each other. Schoemaker (1993) expands on the concept of internal consistency by suggesting that it comprises*:* ‘trend consistency’ (compatibility of trends within the scenario time frames); ‘outcome consistency*’* (correlation between the key uncertainties and the outcomes in the scenarios); and ‘actor consistency*’ (*stakeholders in the scenarios should not be cast in untenable situations). Any violation of this logic in a scenario destroys the credibility of the entire scenario set. However, focusing too intently on internal consistency may, cautions Hankinson (1986) and Bunn and Salo (1993), result in the development of unimaginative scenarios which explore minor variations around the status quo and omit the very forces which result in discontinuous change. It is these forces which are likely to be the most interesting to the scenario audience (MacKay and McKiernan 2004).

A second meaning associated with the criterion of consistency refers to consistency of beliefs i.e. to be credible, the scenarios must be consistent with the beliefs of the scenario audience, failing which they will likely to be rejected (Linneman and Klein 1985; Nair and Sarin 1979; Simpson 1992). To achieve this credibility it is essential that one of the scenarios is anchored in the audience's beliefs about the world (Wack 1985a; Porter 1985); and the vehicle for achieving this is to develop a ‘business as usual’ scenario in which current trends are developed in the scenarios in the direction which accords with the view of the scenario audience and conventional wisdom.

2.7.2 Plausibility

The criteria of ‘plausibility’ and closely related concept of ‘credibility’ are intricately associated with the consistency criteria in that in order to be accepted by management, the scenarios must be believable to a critical mass within the senior management (van der Heijden 1996); if not, the scenarios will be rejected. However there are no guidelines offered in the literature as to what constitutes plausibility because firstly, it is a subjective judgment, and secondly, what may appear plausible to one individual or group may not appear the same to another. Jungermann (1985) and Makridakis and Wheelwright (1989) contend that assessing the plausibility and consistency of scenarios is an impossible task, given they argue, that judgment on the plausibility and consistency of scenarios can only be made on

the basis of current theoretical and empirical knowledge. Hence a scenario which appears implausible or inconsistent today because the events it depicts have not been previously observed and are not therefore part of current mental models, will often appear plausible and consistent at some future point.

In addition to being plausible scenarios must be also 'trusted' by the intended audience in order to earn credibility and ownership states Selin (2006), and she provides five aspects of trust, namely: trust in sources (who is involved in the scenario process), content (veracity of the data constituting the scenarios), methodology (choice and transparency of the development process), narratives (storylines and metaphors used) and dissemination (who presents the scenarios to who, and in what context).

2.7.3 Relevance

Wack (1985a; 1985b) and others (Schoemaker and van der Heijden 1992; Simpson 1992) assert that in order to be effective the scenario audience must be convinced that it has a stake in the scenarios, otherwise the scenarios will represent nothing more than interesting stories about the future to the audience. The way of achieving this 'relevance' is to ensure that the scenarios contain sufficient 'hooks' which effectively link them to the mental models of the audience, and address the specific, key aspects of the environment which they are most concerned about (van der Heijden 1996). Equally important is that the scenarios are constructed in such a manner as to provide decision-makers with a framework on which decisions can be based; it is for example, of no value in developing a doomsday scenario in which decision-makers effectively have no choices.

In addition to the above three, a number of other evaluation criteria have been advocated. Durance and Godet (2010) and Godet and Roubelat (1996) for instance, add 'importance' and 'transparency' as criterion while accepting that these and other criteria do not guarantee the quality of the scenarios, Gershuny (1976) meanwhile, proposes comprehensiveness, comprehensibility and reliability as appropriate criteria but acknowledges that these criteria conflict and are impossible to achieve; to succeed in comprehensiveness scenarios would need to examine an infinite number of possible futures which would render them incomprehensible. Comprehensiveness according to Bunn and Salo (1993) should also be applied to both scope (number of scenarios developed) and detail (depth of coverage of variables considered in the scenarios and degree of detail of the scenario narratives) but again, they concede that comprehensiveness and comprehensibility can be conflicting and costly criteria.

In terms of accuracy or reliability, Holloway (1978) contends that it is not a relevant criterion on the basis that scenarios are an aid to thinking rather than a prediction, therefore it is meaningless to talk of their accuracy or reliability. Bunn and Salo (1993) add the criteria of 'coherence' which they describe as adherence to the rules of whatever theory is used as the basic framework for analysing variables when developing scenarios. Van der Heijden (1996) meanwhile includes 'novelty' as one of his scenario criteria on the basis that one of the main objectives of scenario planning is to bring some new thinking or insights to the decision problem faced by an organisation. This too can be a problematic criterion however, because as Khakee (1991) points out, there is a trade-off between plausibility and novelty. Finally, Wilson (1978) argues that 'good' scenarios must be multifaceted and holistic rather than focusing on isolated but attention grabbing events or particular dates about which there is some kind of attraction.

The problem with most scenario evaluation criteria is that firstly, the criteria depend largely on the initial objectives of undertaking scenario planning. Secondly, whether or not a scenario meets the criteria can only truly be evaluated on an ex-post basis and the longer out in the future the scenario horizon year is, the more difficult it becomes to carry out ex-post facto evaluation (Becker and Van Doorn 1987; Hulme and Dessai, 2008). Thirdly unlike scientific experiments scenarios can never be replicated exactly the same way even if using the same process design, as the end result is dependent upon the participants, the facilitation, and developments in the environment at the time of the process (Hulme and Dessai, 2008).

Two other issues associated with the criteria are identified in the literature: firstly, most of the criteria identified require subjective assessment and are therefore difficult to measure with any degree of precision or objectiveness; secondly, the trade-offs between criteria have not been investigated (Leemhuis 1985; Jungermann 1985a). Accordingly Makridakis and Wheelwright (1989) submit that given the difficulty of verifying and validating assumptions underlying scenarios, and assessing the plausibility of each scenario, scenarios have traditionally suffered from a lack of credibility.

Although the objective of establishing evaluative criteria for scenarios is to ensure a base for good decision-making, there is a danger in rigidly applying criteria warns Amara (1991). At the same time as Vlek and Otten (1987) observe, there are undoubtedly examples of good decisions having been based on scenarios which failed to meet the basic criteria of plausibility, consistency and relevance, and vice-versa. How then does one establish criteria for evaluating the effectiveness of scenarios? Wack (1985b) suggests that the real value of scenarios can be determined by asking two questions: (a) what significant events did the

scenarios fail to include; and (b) did the scenarios lead to action. This is echoed by van der Heijden (1996), Godet and Roubelat (1996) and Millet (1993) who suggests that the test of a good scenario is whether or not management ultimately converted what it learnt from the scenarios into better decision-making.

2.8 THE BENEFITS OF SCENARIOS

The literature contains many testimonials as to the use and organisational benefits of scenarios, most of which can be grouped under the following headings:

2.8.1 Enhanced Perception

Scenario techniques reportedly enhance corporate and individual perception as they provide a framework for managers to understand and evaluate trends and events as they happen (Stokke et al. 1990), and managers involved in scenario exercises supposedly become better observers of the business environment, more attuned to discerning changes (Schoemaker and van der Heijden1992). Porter (1985) suggests that scenarios help managers to make explicit, their implicit assumptions about the future, and to think beyond the confines of conventional wisdom. This combined with the fact that scenarios often challenge conventional wisdom and complacency by shifting the 'perceptual anchors' from which people view the future, reduces the likelihood of managers and organisations making big mistakes in the future and/or of being caught unaware (EPRI 1992; Schoemaker 1995).

2.8.2 Integration of Corporate Planning Functions

Scenario techniques provide a good middle ground between relying on informal and intuitive techniques, and being bound by the methodological constraints of more formal, quantitative techniques. As a result, a greater variety of information and wider company participation can be incorporated into the forecasting and planning process when scenario planning is used (Stokke et al. 1990). Ringland (2010) and Wack (1985b) add that scenarios are also able to combine topical intelligence and structure seemingly disparate environmental factors into a useful framework for decision making in a way that no other planning models can.

2.8.3 Organisational Learning

Although scenario planning was initially understood as a tool for 'thinking the unthinkable' (Kahn and Weiner 1967), a body of literature has subsequently developed around the value

of scenarios in terms of individual and organizational learning (Burt and Chermack 2008). This is because scenario exercises ostensibly provide a politically safe team learning environment and a rich learning process that stimulates creativity (Burt and Chermack, 2008; De Geus 1988; Millet 1988; Senge 1990; Schoemaker 1991; Tenaglia and Noonan 1992; van der Heijden 1996). As models of future business environments, scenarios provide a vehicle for pseudo-experimentation in terms of formulating strategic options and then examining the consequences of these options in a range of future environments (Becker and van Doorn 1987; Thomas 1994; van der Heijden 1994; 1996). By having to articulate their assumptions in a scenario exercise, managers can identify inconsistencies in their own thinking and that of their colleagues in a non-threatening environment (Ringland 2010; Tenaglia and Noonan 1992). At the same time, the necessity in scenario work to undertake detailed analysis of environmental driving forces and their causal relationships, forces individuals to examine their perceptions, stretch their mental models and to develop a shared view of uncertainty (van der Heijden 1994; 1996). All of the foregoing lead to an increased confidence in decision-making (Stokke et al. 1990) and move the organisation towards becoming a 'learning organisation' (van der Heijden 1996).

2.8.4 A Structure for Dealing with Uncertainty

Scenarios provide a structure for thinking aimed at attacking complexity by allowing managers to deal more openly and explicitly with acknowledged uncertainty (Allen 1978; Stokke et al. 1990), and to arrive at a deeper understanding of what is significant and needs to be dealt with, and what is transient and can be ignored (Burt and Chermack 2008; Schoemaker 1989). Bunn and Salo (1993) suggest that by emphasizing that there are a range of possible futures rather than a single-point future, scenarios reduce the bias for underestimating uncertainties. This is echoed by Docherty and McKiernan (2008) who state that "the greatest contribution of scenario planning lies in its active engagement of actors in its process and its power to enable them to think about complexity and uncertainty in external contexts, and then how they might shape the external environment to their own strategic ends" (Docherty and McKiernan 2008, p.10).

2.8.5 A Communications Tool

According to Allen (1978), the communications qualities of scenarios are overwhelming as they provide a rational and non-threatening framework for discussion, even with those outside of the organisation (DuMoulin and Eyre 1979). Durance and Godet (2010) note that scenarios are also an effective means of rallying employees and communicating strategy across the organisation, and Bezhold (2010) suggests that the scenarios should be used as

a marketing and educational campaign throughout the organisation. Ringland (2010) adds that by sharing its scenarios with the outside world, an organisation provides the context for dialogue with its stakeholders enabling it to influence its external environment. An added benefit notes Thomas (1994), is that the collegiality which emerges in scenario planning exercises does not evaporate once the scenario exercise is complete, and people involved in the exercise often have new relationships.

2.8.6 A Management Tool

van der Heijden (1994; 1996) reports that in the RDS company, scenarios emerged as a powerful management tool by which senior management were able to influence decision-making at all levels throughout the organisation, without becoming directly involved in the process or minutiae of the decisions. This was achieved by making the scenarios the context for key strategic decisions, which subsequently reinforced the interest of senior management in the scenario process and succeeded in uniting the geographically dispersed, disparate and decentralized business units in developing a common strategy (Durance and Godet 2010).

The above is not an exhaustive listing of the reported benefits, but it does represent the major benefits discussed in the literature. Van der Heijden (1994) reflects that as a pioneer in the field of scenario planning, not all the benefits discussed above were immediately visible to RDS when they first started using scenarios, they 'unfolded' over a number of years, the benefits identified becoming progressively more profound.

2.9 CRITICISMS OF SCENARIOS

Aside from the specific criticisms raised in the discussion in the preceding sections, there are several general criticisms of scenarios and scenario development techniques which appear in the literature, namely:

- the process of scenario development is usually disregarded because Jungermann (1985a) argues, there is no widely accepted scenario development methodology which is well-defined, is theoretically justified and been empirically validated, as evidenced by the fact that there are no studies that he is aware of in which the process of scenario construction is explicitly documented. Support for this view comes from Bunn and Salo (1993) who suggest that protocols for scenario development are largely improvised and are not subjected to rigorous analysis. The central problem in terms of developmental processes they suggest is that in attempting to differentiate

itself from conventional forecasting techniques, scenarios analysis sets up an uneasy compromise between the objectives of seeking to support important decisions and promoting organisational learning" (Bunn and Salo 1993, p.301) The result is that there are conflicting views as to whether scenario development processes should examine all the major variables which ordinarily would need to be evaluated for decision making, or a smaller number of unusual ones which challenge conventional wisdom.

- the use of formal techniques in scenario exercises inevitably endows scenarios with the 'illusion of reality'. While this is precisely what scenario planners intend, as Kahkee (1991) points out, this is likely to result in unwarranted confidence in the scenario representations. This criticism is however, equally applicable to forecasting techniques.

Perhaps the most serious criticism of scenario techniques is that they have been the subject of limited systematic empirical research and critical examination as a number of writers have noted (Cairns et al. 2004; Chermack 2003; Goodwin and Wright 2001; Hodgkinson and Wright 2002; Schoemaker 1995). Techniques developed by RDS appear to have been adopted as best practice and applied in a variety of settings largely without question.

The bulk of the literature on scenarios is written by practitioners, or academics periodically operating as practitioners, which may explain why firstly, the literature is largely descriptive and promotional (Politt 2000); and secondly, why there is so little critical reflection in the literature, particularly by authors in terms of their own contributions to process interventions (Cunliffe 2003). A review of the literature surfaced only one article (Hodgkinson and Wright, 2002) which discusses the failure of a scenario intervention in which the authors who designed and led the scenario process, attribute the failure of the scenario intervention to the fact that "confronting the social psychological reality of a cognitively disparate team faced with an uncertain future proved too stressful for the team members and their leader to bear" (Hodgkinson and Wright, p.974). When Whittington (2006) argued that as strategy practitioners the authors were perhaps inept "in seeking to apply practices that were ill-suited to the organizational context in which they were operating in" (Whittington 2006, p.621), they responded that his analysis was "based on a series of misconceptions and unwarranted inferences" ((Hodgkinson and Wright, p.1895). Thus the failure in this case was not one related to the process design or facilitation on the part of the authors, but that of the participants in the process.

2.10 CONCLUSIONS

The above concludes a selective review of the experienced-based literature and there are a number of observations which can be drawn from this first half of the literature review. The first and most obvious is that there appears to be no area in scenarios on which there is wide-spread consensus; the literature reveals a large number of different and at times conflicting, definitions, characteristics and methodological ideas about scenarios.

The second is that there is a plethora of scenario development models in the literature which Jungermann's (1985a) suggests conveys the impression that there is a set of well-established homogeneous techniques available for constructing scenarios from which one can choose, depending on the underlying objective of undertaking the scenario work. This impression is false he contends, because as previously indicated the techniques discussed in the literature are poorly defined, have no theoretical justification and have not been empirically validated.

The third observation is that while there appears to be a consensus in the scenario literature that facilitation plays a crucial role in scenario teams, there is surprisingly, little discussion of any substance on the topic in the literature. However as Ackermann (1996) notes, a substantial body of literature has accumulated over the years around facilitation and its impact on groups, particularly in the area of group decision support and group model building. Andersen and Richardson (1997) for example, have developed a series of specific scripted techniques within the context of group model building, for “handling the complex modeling and facilitation processes involved in group work” (Andersen and Richardson 1997, p.107). Phillips and Phillips (1993) meanwhile, discuss a number of issues specific to the role of the facilitator in work groups, suggesting that the role is one of sustaining the ‘task orientation’ in the group by minimizing distractions. Alongside understanding group processes, a critical element of facilitation they argue, is that all interventions by the facilitator should contribute to ‘process and structure’ as opposed to content, and provide a number of ways in which interventions can maintain the focus of the group on the task at hand without interfering with content. While acknowledging the contribution of facilitation to successful group processes, one of the problems Ackermann (1996) contends, is that the role of the facilitator is not an easy one, and facilitation ability is largely acquired through experience.

The consequence of the above according to Khakee (1991) is that "few techniques in futures studies have given rise to so much confusion as scenarios" (Khakee 1991, p.460). This confusion is explained by the fact that the lack of a solid conceptual foundation underpinning scenario techniques is a consequence of the fact that: (1) their application to strategic

planning in the business context is a relatively new phenomenon, and therefore there has been insufficient time to develop a sound conceptual foundation; (2) the growth in popularity of scenarios has happened for practical reasons not theoretical ones with the result that methodologies used to construct scenarios have not been well-defined as the focus has been on using them rather than empirically validating them (Vlek and Otten 1987; Godet 1990). Nonetheless Malaska et al. (1984) submit that it is unlikely that there will ever be a commonly accepted, uniform system of developing scenarios because of the intuitive nature of scenarios, coupled with the fact that the users of scenario techniques will invariably adapt methodologies to suit their needs.

According to RDS (Shell 'Guides to Planning' Series No 5, 1986) developing scenarios is a difficult task requiring a substantial investment in resources, competence and professionalism, and a wide range of knowledge. In terms of practice however, Linneman and Klein found that few companies use complex scenario generating methodologies, even amongst those experienced in sophisticated planning, largely because senior management are uncomfortable with complex approaches. The techniques which were reportedly well used tend to be simple, inexpensive, qualitative, and do not necessitate a long learning curve. Thus it would appear that in spite of what appear to be substantial shortcomings in scenario methodologies, the purportedly widespread and growing use of scenarios suggests that they are more than just a passing fad, they "have weathered the tests of practicality" (Martelli 2001, p.6).

Having reviewed the anecdotal, experience-based literature in this chapter, the next chapter continues the review of the scenario planning literature, but looks specifically at the literature in terms of the theoretical underpinnings of scenario techniques, and examines what research has been carried out in the scenario or related subject areas.

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CHAPTER 3

SCENARIO PLANNING: THE RESEARCH-BASED LITERATURE

3.0 INTRODUCTION

In the second edition of his book *Long Range Forecasting; From Crystal Ball to Computer,* Armstrong notes that "The original edition of LRF (published in 1978) stated that little research has been done on scenarios. Things have changed since then. Some relevant research has been done, and the scenario has been shown to be effective as a technique for gaining acceptance" (Armstrong 1985, p.42). He then proposes a number of techniques to heighten the impact of scenarios, each of the techniques being supported by one or more pieces of research. In reviewing this and the research literature in general, it appears that most of the research reported stems from psychological research associated with examining the quality of human judgment, in particular, the degree to which heuristics and biases affect intuitive subjective frequency and probability judgments of uncertain events.

Having reviewed the anecdotal, practitioner oriented literature in the previous chapter, this chapter reviews the 'research' literature on scenario planning. The review is in three parts. As the heuristics and biases research is so prominent in the literature, the first part of the review examines the research findings relating to various heuristics and associated biases which affect the quality of human judgment. The second part of the review begins with identifying the major criticisms of this research and then moves to discuss research findings on the cognitive processes and limitations of a more general nature, which affect human reasoning. The final part of the review looks at the implications of this research on scenarios, focusing in particular on their development processes.

3.1 COGNITIVE SIMPLIFICATION PROCESSES: HEURISTICS AND BIASES

There is very little direct research in the area of scenarios prior to the 1970s. However a large body of psychological research associated with subjective probability estimates and probability theory began to develop in the 1950s and 1960s, and pioneers in this area include Beach, Edwards, Kahneman, Phillips, Tversky, and Wheeler. These researchers appeared to be focused principally on examining the accuracy and coherence of subjective probability judgments. The rationale behind this was provided by Brunswick (1956) and was based on two assumptions. The first was that as future events are inherently uncertain and therefore largely unpredictable, individuals would out of necessity have to learn to accurately evaluate uncertainty in order to cope effectively; the second assumption was that individuals

would intuitively use the probability theory to evaluate the unpredictability of future events given that probability theory, in particular Bayes's theorem, was supposedly the normative model of characterising uncertainty.

Initially research on subjective probability focused on identifying the extent to which subjective judgments of uncertain events conformed to Bayes's theorem. However, in the early 1970s, a major line of research work by Kahneman, Tversky, Slovic and their colleagues resulted in a general set of findings which purportedly showed that as a consequence of apparent cognitive limitations, individuals tend to intuitively rely on a limited number of inferential judgmental rules, known as 'heuristics', in order to reduce the complex task of determining the likelihood of uncertain events. This behaviour may be explained by reference to assumptions about human rationality, in particular Simon's notion of "bounded rationality" (Simon 1956; 1955). Kahneman and Tversky (1973) also established that although these heuristic principles are valid in some situations and can result in reasonable judgments, they lead to biases which inevitably result in systematic errors in the intuitive judgment of probability. These findings resulted in a shift in the focus of research towards examining these biases; given that subjective judgments play such a central role in scenarios, much of the research findings associated with these heuristics and biases is generalisable to scenarios.

The following section examines the three most widely discussed heuristics and biases identified by Kahneman and Tversky, namely 'representativeness', 'availability' and 'anchoring and adjustment'.

3.1.1 The Representativeness Heuristic

In a series of studies Tversky and Kahneman (Kahneman and Tversky 1982a; 1973; 1972; Tversky and Kahneman 1982b) established that individuals intuitively evaluate the probability of an event or a sample, by the degree to which the essential properties and features of the process by which it is generated, are reflected in its parent population. For example, when asked to judge the conditional probability that event A occurs given that event B has occurred, individuals intuitively judge the probability of the event according to the degree of similarity between events A and B. By extension, individuals assign probabilities to uncertain events according to how closely the events represent their model of the world and or understanding of the processes which results in various outcomes; the greater the degree of 'representativeness', the higher the probability of occurrence assigned to the events and the higher the confidence associated with the resultant prediction. The most commonly cited examples of this are experiments in which research subjects are given

descriptions of individuals and lists of occupations, and are asked to assess the probability as to which occupations the individuals are engaged in. The findings of these experiments are that subjects generally order the occupations by assessing the degree to which the descriptions of the individuals are representative of the stereotypical image of each occupation. Thus someone described as 'quiet and intelligent with an eye for order and details, but little interest in people or sport', is more likely to be assessed as an accountant than a salesperson.

The representativeness heuristic is generally assumed to mean the degree of similarity between a particular event or situation and other events or situations, in which case the relationship of representativeness is that of the similarity between a sample and a population. However Tversky and Kahneman (1982b) contend that representativeness can also derive from other relationships such as the degree of similarity between an act and actor, an outcome and a model, an instance and a category, the perceived relative frequency of instances and events, and the degree of correspondence between cause and effect beliefs.

In terms of probability judgments, reliance on the representativeness heuristic leads to predictable errors of judgment according to Tversky and Kahneman, because "it has a logic of its own which differs from the logic of probability" (Tversky and Kahneman 1982b, p.39). They support this conviction by identifying factors or biases which impact probability judgments and therefore should, but do not appear to affect representativeness, including:

3.1.1.1 Base rate fallacy

A fundamental principle of prediction is that a base rate represents a statistical summary of the history of a particular situation and therefore regardless of what new information is subsequently gathered about the situation, the base rate remains valid. However, experiments by Kahneman and Tversky and others (Bar-Hillel 1980; Johnson 1983; Nisbett and Ross 1980; Swieringa et al. 1976) have shown that where individuals are supplied with no 'individuating' evidence, they apply base rates correctly but where base rate and/or relatively worthless information is supplied, individuals tend to ignore the base rate frequency of previous outcomes. Thus estimating probability by reference to representativeness means that prior probabilities are not taken into account. Again this is illustrated in the individual description versus occupation experiments described earlier. Even where research subjects are given information which indicates that the odds are that the individual is associated with a particular occupation, the assessment of the research subjects as to likely occupation continues to be based on stereotypical representativeness,

with no regard for base rate probabilities. This violates one of the key rules of statistical prediction and is “one of the most significant departures of intuition from the normative theory of prediction” according to Kahneman and Tversky (1982a, p.57). Support for this comes from Cooke (1991) who suggests that this fallacy is one of the most common and most damaging biases.

3.1.1.2 Sample size bias

The empirical findings of Kahneman and Tversky (1972) and others (Borgida and Nisbett 1977; Nisbett and Ross 1980; Ross et al. 1977; Schwenk 1984) are that individuals are not generally very sensitive to sample size when relying on representativeness and may not even be aware of sample bias. Accordingly samples of inadequate size are assumed to be representative of the population as a whole and judgments based on these samples are accorded an unwarranted level of confidence. This phenomenon is described by Tversky and Kahneman (1982e, p.23) as “belief in the law of small numbers”. Studies (Hamill et al. 1980; Lichtenstein et al. 1982) have also shown that when presented with vivid but single samples of unknown typicality of populations, individuals are apt to make unwarranted generalisations from these samples to populations even when made aware of the fact that the samples are highly atypical of the populations.

3.1.1.3 Predictability considerations

Kahneman and Tversky (1973; Tversky and Kahneman 1982a) also contend that statistical predictions based on representativeness leads to an insensitivity to predictability. This stems from the fact that the expected accuracy of judgments based on representativeness appear to be unaffected by the quality and reliability of the information which forms the basis of the prediction. As an example of this Tversky and Kahneman found that when given a description of a company and then asked to predict the profit of the company, the prediction was likely be dependent upon how favourable the description of the company was. Thus highly positive descriptions result in predictions of high profit levels and vice versa because this appears representative of the description of the company. In arriving at these predictions, it appears that individuals do not take into account either the reliability of the descriptions or their appropriateness, as a basis for their prediction. This violation of the so-called ‘normative theory of prediction’ happens even where individuals are aware of the limits to predictability of the information provided.

3.1.1.4 Misconceptions of random events

There are two elements to this, the first being what may be described as the 'short-run fallacy'. This fallacy arises from the fact that individuals intuitively expect that the sequence of events generated by a random process will be representative of the essential characteristics of that process even when the sequence is too short for this to be the case (Tversky and Kahneman 1982a). For example, in tossing a coin, the odds are that 50% of the time 'heads' (H) will result and 50% of the time 'tails' (T) will result. As a consequence, when tossing a coin six times, the sequence of H-T-H-T-H-T is generally perceived as being more likely than a sequence such as H-H-H-H-T-H which does not appear random, and therefore does not accord with the '50/50' rule.

The second element relates to the 'misconception of random events' phenomenon (Waagenar 1972) known colloquially as the 'gamblers fallacy'. This fallacy describes the situation in which individuals intuitively but incorrectly believe that chance is a self-correcting process whereby deviations from the expected in one direction of a sequence of randomly generated, statistically independent events will automatically induce a deviation in the opposite direction to restore any imbalance. For example having witnessed several tosses of a coin all of which result in heads, most people intuitively believe that the next toss of the coin is more likely to result in a tails in order to correct the apparent deviation from the expected sequence of H-T-H-T. Random events are not recognised as being random with the result that individuals tend to perceive patterns or trends which do not actually exist, affecting their anticipation of the future. This phenomenon is not limited to naive subjects as Tversky and Kahneman discovered when studying the statistical intuitions of experienced research psychologists (Tversky and Kahneman 1971).

3.1.1.5 Misconception of regression

'Regression towards the mean' describes the well-established phenomenon first documented by Galton (cited in Goodwin and Wright 1991) whereby successive measurement or evaluation will result in random fluctuations around the mean. This is occasioned by the fact that values initially recorded as above standard will on subsequent measurement decline, whereas values initially below standard will improve. For example in the case of repeated examinations, an initial outstanding performance will usually be followed by one which is less than outstanding, whereas an initial poor performance will generally be followed by an improved one. However Kahneman and Tversky (1973) have demonstrated empirically that that individuals do not generally anticipate the phenomenon of regression even in those situations in which it is obvious it will occur, and when faced with the phenomenon, they concoct bogus causal explanations for it. This they suggest is

because for most people the concept of regression is counterintuitive and the notion is difficult to apply.

3.1.1.6 The conjunction fallacy

Tversky and Kahneman (1982b) argue that the greatest conflict between the logics of representativeness and that of probability arises when individuals make probability judgments about compound events. A fundamental law of probability theory is that the probability of two or more events occurring simultaneously cannot be higher than the probability of each of the events occurring independently i.e. a conjunction cannot exceed the probabilities of its constituents; violation of the rule is known as the 'conjunction fallacy'.

In a wide-ranging series of experiments involving research subjects in several countries, Tversky and Kahneman (1982b; 1983) observed that although individuals accept the conjunction rule in its abstract form, in practice they intuitively and overwhelmingly consider a conjunction of events to be more representative and therefore more probable than the probability of the individual events comprising the conjunction, especially where the events are causally linked. Their research also leads Tversky and Kahneman to suggest that conjunctions involving hypothetical causes are especially prone to the conjunction fallacy because it appears that given the cause, individuals are more likely to intuitively assess the probability of the effect, than they are to assess the joint probability of cause and effect.

Although there are a balance of factors which determine when individuals are likely to apply an 'intuitive logic' which contradicts one of the laws of probability, Tversky and Kahneman assert that their evidence demonstrates that violation of the conjunction rule is pervasive and present in both naive and sophisticated subjects. They initially postulated that some probability judgments are based exclusively on the representativeness heuristic. However the question of how people evaluate the probabilities of uncertain events has attracted much research interest and in subsequently evaluating their own research and that of others (such as Einhorn and Hogart 1981; Leddo et al. 1984; Locksley and Stangor 1984; Nisbett and Ross 1980), they have since moderated their views, conceding that although probability judgments are undoubtedly significantly affected by representativeness, they are not exclusively dictated by it (Tversky and Kahneman 1982b). Given the problems with representativeness, why do people rely on it as a basis for prediction and judgment? Tversky and Kahneman suggest that one possible reason is that it intuitively appears to

correlate with probability in that probable events are more representative than are less probable events.

3.1.2 The Availability Heuristic

Tversky and Kahneman (1973; 1982a; 1982d) have also demonstrated that individuals intuitively estimate the frequency of a class or judge the probability of an event by the ease with which they can remember or imagine instances of a similar nature. Support for this comes from a study by Lichtenstein et al. (1980) which revealed that the relative frequency of highly publicised events was significantly overestimated by individuals and conversely, that of less publicised events was underestimated. This so called 'availability' heuristic is well documented in the literature and individuals apparently apply it instinctively and will attempt to justify its use even after it has been shown to be prone to error (Maier 1981). One of the most quoted instances of the availability heuristic involves the perception of individuals of the probabilities of death from various causes; dramatic and highly publicised causes such as homicide, car accidents, floods, tornadoes and fires are typically overestimated whereas unspectacular and therefore less publicised causes such as diabetes, diarrhea and emphysema are generally underestimated.

In general terms the availability heuristic suggests that: (a) instances or events which occur more frequently are more readily recalled from memory than those which occur less often; (b) instances or events which are more likely to occur are more easily imagined than those which are less likely to occur; and (c) instances of larger classes are more easily constructed in the mind than are instances of smaller classes. However a cornerstone of availability is that there are essentially only two mental operations by which things are brought to mind, *recall* (retrieval from memory) and *construction* (the process of imaging), both of which are affected by a number of factors which lead to predictable biases.

3.1.2.1 Biases due to the retrievability of instances

It is evident that when judged by the availability of instances, events which are more easily retrieved from memory will intuitively appear more numerous than will events which occur with the same frequency, but are more difficult to retrieve. Two interrelated biases are at work here, one associated with how individuals store information and a second relating to how they retrieve it, and these two aspects are themselves, affected by a number of factors:

- *salience*: numerous researchers (Abelson 1976; Anderson 1983b; Chapman and Chapman 1969; Cyert and March 1963; Hamill et al. 1980; Janis and Mann 1977;

Nisbett and Ross 1980; Parker 1981; Smith 1981; Walster 1966) have shown that firstly, vivid and concrete information is likely to be more memorable and therefore has a greater impact on theory development, even if it is contradictory and inferior to more abstract, pallid information; secondly, even when aware of it, decision makers are partial to conspicuous incidents and cannot fully suppress their effects (Russo and Schoemaker 1989).

- *recency* or *primacy*: as with salience, incidents which have occurred recently are likely to occupy a more prominent position in the memory and therefore will be more readily retrieved; because they are more readily retrieved, recent incidents are given greater weight in decision making than is warranted (Bower 1970; Montgomery and Weinberg 1973). However as Nutt (1989) observes, information gathered early on in a decision process has also been shown to have a disproportional impact on decisions, pointing therefore to a large body of information which is potentially discounted.
- *familiarity*: events or incidents with which an individual is familiar and can therefore readily recall past incidents of a similar nature, will be judged, albeit erroneously, as occurring more frequently than incidents or events which occur with the same frequency, but with which the individual is not as familiar.
- *representativeness*: research in the areas of concept formation, categorisation and pattern recognition (Mervis and Rosch 1975; Posner and Keele 1968; Rosch 1978) has demonstrated that events which are most representative are also those that are the most easily learned, stored and subsequently recalled from memory.

3.1.2.2 Biases due to imaginability

Instances or events, which are not stored in memory, need to be constructed or imagined according to established rules. In these situations, individuals tend to evaluate the frequency or probability of the instances or events according to how easy it was to imagine them. This leads to bias in that the most easily imagined instances are not necessarily the most frequent or most probable events.

The operation of imagining instances or events is, according to Kahneman and Tversky (1982b), a mental simulation process which plays a significant role in judgment. This is demonstrated in their experimental work on a particular class of mental simulation activity, that of reconstructing the past. They found that when given stories of a fatal accident resulting from extraordinary coincidences and asked to imagine the changes the surviving relatives might make to the story so as to avoid the accident, individuals exhibited a strong preference for introducing ‘downhill changes’ to the story. In this context, a downhill change

is one which removes surprising or unexpected events from the story (conversely, an 'uphill change' is one, which introduces surprising or unlikely events). The implication of this is that in imagining events, outcomes, which can only be reached by invoking uphill assumptions are likely to be difficult to imagine, and will be regarded as infrequent and improbable. The bias in favour of downhill thinking is however, dangerous, because as Kahneman and Tversky note, failure in planning is often associated with the advent of unimagined and therefore unexpected uphill changes. Factors which affect imaginability include:

- *effectiveness of the information search set*: this relates to the theory espoused by a number of researchers (Anderson and Bower 1973; Collins and Loftus 1975; Collins and Quillian 1969; Norman and Rumelhart 1975) that information is stored in human memory in the form of an 'associative network' in which various nodes representing concepts, are connected by links representing relations between the concepts. Accordingly the activation of one node in the network will activate other nodes in a path or search set according to the associative or causal links between nodes. It follows therefore that what instances/events are searched for and retrieved from memory is largely dependent upon what search set within the individual's knowledge base is elicited; and what set is elicited depends on the starting point as the starting point (which is itself, influenced by factors such as saliency) will by activating nodes in an associative pathway, determine what information is subsequently generated. Thus activation of different search sets will result in different frequency and probability judgments being assigned to the same problem, because different search sets are unlikely to contain the identical availability of instances or events.
- *incomplete information*: allied to the above is the study by Fischhoff et al. (1978), which demonstrated that once a search set is established, individuals are insensitive as to the completeness of information in the search set even when missing data that are essential to the type of decision being taken. For example in a series of experiments Fischhoff presented individuals with various fault trees for discovering why a car would not start, but some of the fault trees contained incomplete information. He found that in assigning probabilities as to the cause of the car not starting, the research subjects only considered the options which were explicitly presented to them and did not search for missing information. Further, focusing the subject's attention on what information might be missing did not significantly improve their awareness as to the incompleteness of the information presented to them. This finding extended to technical experts (in this case mechanics).
- *illusory correlation*: Identified by Chapman and Chapman (1969; 1967), illusory correlation is another common form of misconception of random events and describes

the bias whereby people over estimate the frequency of co-occurrence of two outcomes or events because of seeing patterns and/or causal links between events or variables in data where none exist. As an illustration of this, Chapman and Chapman cite the example of how extensively clinical psychologists develop an illusory correlation between personality tests and clinical symptoms.

Meanwhile in a series of experiments with students Schoemaker (1995) found that the majority of them held self-contradictory beliefs based on a presumed correlation among uncertain events, a phenomenon he labeled 'incoherent beliefs'. More significantly, research has established that people do not easily relinquish their belief in illusory correlations even when presented with data contradicting the correlation, and when a correlation is real, it is often misinterpreted as indicating a causal relationship.

The biases associated with representativeness and availability discussed above essentially concern the 'coherence properties of subjective probability' i.e. the biases are violations of the axioms of probability theory and therefore it is the *reliability* of the probability judgment which is brought into question. However the anchoring bias discussed next, relates to the calibration properties of subjective probabilities and as such, it is the *validity* rather than the reliability of the probability judgment which is brought into question.

3.1.3 Anchoring and Adjustment

The third widely discussed heuristic identified by Tversky and Kahneman (1982a) is commonly termed 'anchoring and adjustment'. When making an estimate individuals generally begin with some initial value (the anchor), and then adjust the value up or down to reflect subsequent information to arrive at a final answer. This initial or starting value is either explicit in that it is given or it exists naturally, or it is implicitly derived from the way in which the problem is framed. Regardless of what the initial anchor value is or how it is obtained, the findings of Tversky and Kahneman (1982a) indicate that having established it, people tend to make insufficient adjustments up or down in arriving at a final answer because they are usually biased towards the initial value. Examples of this phenomenon have been demonstrated by numerous researchers (Butler 1986; Joyce and Biddle 1981a/b; Slovic and Lichtenstein 1971; Smith and Kilda 1991).

In keeping with the anchoring and adjustment heuristic and the conjunction fallacy discussed earlier, Tversky and Kahneman and others (Bar-Hillel 1973; Cohen et al. 1972) have documented the fact that when dealing with compound events, individuals tend to

overestimate the probability of conjunctive events because of anchoring effects. In compound event such as a large scale construction project for example, success of the project is usually dependent upon a multitude of events happening in a conjunctive chain-like structure; in such cases when the number of events is large, the probability of the individual events occurring is higher than the overall probability of the project succeeding. Based on the estimated probability of success in a starting event, individuals fail to make adequate adjustments from this starting point, resulting in an overestimate of the probability of subsequent conjunctive events, leading to an unwarranted optimism that the project will succeed.

Although representativeness, availability and anchoring are the most frequently cited and discussed heuristics and biases in the literature, there are reportedly many other heuristics and biases which impact subjective human judgment, and the following section briefly reviews the more commonly known of these.

3.1.4 The Experience/Framing Bias

This bias, also called ‘selective perception’ in the literature, postulates that the training and experience of individuals (i.e. their knowledge base) will bias how they interpret and subsequently act on information, because they have a propensity to focus on those things which they already have an understanding of. This bias gives rise to two interrelated problems. Firstly the knowledge base, goals and values of individuals will determine how they represent the problem, a process commonly known as ‘framing’ and widely reported by other researchers. The experimental data of Tversky and Kahneman (1981) showed that: framing the same problems and issues from different perspectives resulted in significant shifts in the preference of decision choices available to research subjects; once a particular situation had been framed in a certain way, it was very difficult for the subjects to view the situation in any other way; and the research subjects were generally unaware of the effects of different frames in terms of how they perceived the relative attractiveness of the decision choices. Although the framing was obviously manipulated in their experiments, framing occurs naturally as a result of the different knowledge base, goals and values of individuals as these variables largely determine how problems are conceptualised by an individual.

The second problem is that because framing determines how the problem is represented, it in turn determines which elements of the decision maker’s knowledge base is then activated, within which are perceptions as to the ‘solution space’ available (Newell and Simon 1972; Simon 1973). The result as Tversky and Kahneman have demonstrated, may be opposite solutions for logically identical problems. This they contend represents a systematic violation

of the elementary principles of ‘consistency’ and ‘coherence’ which underpin the notion of human rationality. At the same time, in viewing problems from their frames which research indicates are often extremely narrow and/or are deeply embedded in the past, individuals tend to ignore/dismiss other aspects of information which may herald potentially significant changes (Dearborn and Simon 1958; Wright and Goodwin 2009). For example, accountants will identify with the financial aspects of information but may dismiss technological aspects; engineers may focus on technological aspects but ignore financial or marketing aspects, and so on.

3.1.5 Overconfidence

This phenomenon describes the fact that people appear to be systematically over confident of their ability to predict (Lichtenstein et al. 1982; Russo and Schoemaker 2001; 1989: Schwenk 1986; Slovic et al. 1977) because of a failure to recognise the flimsiness of the assumptions underlying their judgments. Most of the empirical evidence in this area comes from laboratory studies associated with calibration in which it has been repeatedly observed that there is a discrepancy between how confident individuals are in their judgments and the percentage of correct answers they subsequently achieve in simple metaknowledge tests. The implication of this overconfidence is that people are not generally aware of how little they know and how much more they need to know in order to make correct judgments (Slovic et al. 1985). As Fischhoff (1975) notes, overconfidence may also be exacerbated by the hindsight bias.

Research findings are that overconfidence is less prevalent in group judgments and can be mitigated somewhat in individual judgments by regular performance feedback for example, but it persists in spite of experience and experts are no less prone to it than are lay people (Russo and Schoemaker 2001; Slovic et al. 1985). Although this bias has been the subject of many empirical studies (Einhorn and Hogarth 1978; Fischhoff et al. 1977; Koriat et al. 1980; O’Connor and Lawrence 1989), there is still disagreement in the literature as to explanations for the miscalibration.

3.1.6 The Illusion of Control

The work of Lefcourt (1973) and other researchers examining overconfidence (Langer 1975; Langer and Roth 1975; Larwood and Whittaker 1977), has identified that the act of predicting an inherently uncertain event appears to endow individuals with a feeling of control over this event even though they have no control at all, and predicting an event cannot make the event any more certain. Consequently it appears that not only do individuals overestimate

their skill at prediction, but they then act as if their predictions will impact the eventual outcomes.

3.1.7 Single Outcome Bias

Normative decision theory supposes that in searching for solutions to problems, individuals will specify all relevant values and outcomes and generate and evaluate alternative courses of action. Steinbruner (1974) however, postulates that individuals tend to be satisfied with a single interpretation of a situation and are predisposed at the outset of the decision process, to focus on a single outcome and a single alternative for achieving that outcome because for one thing, this reduces uncertainty.

This predisposition towards a single outcome is evidenced by Festinger's (1957) experiments demonstrating 'bolstering', a process in which individuals magnify the perceived attractiveness of desired alternatives so as to make them appear even more desirable than non-preferred alternatives. Not only do they attempt to magnify the attractiveness of favoured alternatives by for example, denying value trade-offs, but contrary to normative decision theory, they expend much effort identifying negative elements of non-preferred alternatives in order to convince themselves of the undesirability of the alternatives (Steinbruner 1974).

3.1.8 Belief Perseverance

Research in the 1950s by Allport (1954), Hovland et al. (1953) and Luchins (1957) had already established that individuals have a propensity to adhere to their initial opinions, attitudes and theories. More recent research (Anderson et al. 1980; Carroll 1978; Tversky and Kahneman 1982d) has since determined that individuals tend to adhere to their initial beliefs about themselves, others and relationships between social variables, even when it is made clear that the data on which they are founded is fictitious. Anderson et al. (1980) have also demonstrated that belief perseverance of social theories is even stronger where the beliefs are induced by a process of causal reasoning such as writing 'scripted scenarios'. The explanation offered for these findings is that once created, beliefs tend to become independent of the data on which they are founded; subsequently demonstrating that the data is not true apparently has no effect on the beliefs.

3.1.9 Confirmation Bias

The confirmation or ‘prior hypothesis’ (Watson 1960; Levine 1971; Pruitt 1961; Kozielecki 1981) indicates that once formed initial beliefs are not only difficult to dislodge because of belief perseverance, but they tend to structure the way in which subsequent evidence is interpreted; new evidence supporting initial beliefs is judged as reliable, evidence which contradicts them is dismissed as being unreliable or erroneous. Thus individuals routinely over estimate evidence which confirms their theories and expectations, but disregard or devalue evidence which falsifies them, or they maintain blatant self-contradictions and develop elaborate rationalisations to defend them (Jervis 1976; Steinbruner 1974). Paradoxically in searching for and being receptive only to supportive evidence, individuals unwittingly receive repeated reinforcement as to the correctness of their theories, even though they may be wrong.

3.1.10 Hindsight Bias

The hindsight bias described by Fischhoff (1982; 1975a; 1975b; Fischhoff and Beyth 1975) identified that when asked to recall original choices on simple tests, most individuals credited themselves with more successes than they actually achieved; and once an individual experiences an outcome, a decision made prior to the outcome appears in hindsight, to have been inevitable and easily related to cues at the time the decision was made. Hogarth (1980) suggests that instead of recalling the past in terms of the uncertainties that existed at the time a decision was made, individuals reconstruct past events focusing on factors which appear to have caused the outcome, to make sense of what subsequently transpired. In retrospect therefore, they are not surprised by what happened in the past (Hogarth and Makridakis 1981).

3.1.11 Escalating Commitment Bias

Researchers (Duhaime 1981; Fox and Staw 1979; Staw and Ross 1978) have found that once an individual has committed significant resources to a project, the individual will then commit more funds to the project if the feedback is that the project is failing, than would be the case if feedback indicated that the project is succeeding. It appears that the negative feedback acts as a signal indicating that more funds should be allocated to the project to save it. This phenomenon occurs even when there is evidence that the project is not paying off and it would appear that the basis of this bias is what is colloquially referred to as the ‘fear of losing face’. Evidence suggests that although several factors impact this bias, once the process of escalating commitment is started it is difficult to reverse (Schwenk 1984).

3.1.12 Reliance on Concrete Examples

Although it is widely assumed that individuals make decisions based on established rules and principles theorized from experience, a study by Read (1983) demonstrated that individuals place greater reliance on concrete examples. In experiments with students relating to culture and rituals or rule-governed behaviour, Reid discovered that: (a) where the rules or the cause and effect relationships underlying a behaviour are complex, rather than learn and apply the rules, people are more likely to base their predictions and to explain events by reference to a single, previously experienced, similar instance, even where this results in behaviour which does not accord with the rules; (b) even where the rules governing the behaviour are simple, it appears that people still exhibit a strong tendency to predict behaviour by reference to examples of single, previously experienced, similar instances suggesting that they rely as much on concrete examples as they do on abstract rules; and (c) individuals who use similarity of previous instances as the basis of their predictions do not see themselves as guessing and are confident of their predictions. In keeping with this, Hendrickx et al. (1992) demonstrated that concrete scenarios had a greater effect on increased probability judgments and decreased risk-taking behaviour, than did abstract scenarios.

In discussing heuristics and biases, Tversky and Kahneman (1982a) make several observations; firstly, that individuals use heuristics because they are available and economical; secondly, although the ‘statistically sophisticated’ may avoid elementary errors, even their subjective judgments are prone to the biases; and thirdly, that individuals do not appear to learn any of the fundamental statistical rules from their daily experiences. This leads Tversky and Kahneman (1982a) and Slovic (1982) to conclude that there are serious flaws in human reasoning and that intuitive judgments and decisions are often sub-optimal.

There are however four points to be noted with respect to these heuristics and biases. The first is that although discussed separately, all of the heuristics and biases are of course interrelated to a greater or lesser degree and as Schwenk (1986) has shown, biases interact and reinforce each other. The second point is that according to Evans (1982), biases are likely to be most prevalent when there is a multitude of factors to consider and the environment is inherently complex and uncertain, and although there has been some research on how to overcome biases, ameliorating them is far from simple (Wright and Goodwin 2009). The third point is that there is some discussion in the literature as to whether or not biases are the result of cognitive limitations or motivational factors. Tversky and Kahneman (1982a) assert that neither representativeness nor availability are due to motivational effects. The final point to note is that the conclusions that human reasoning is seriously flawed and that intuitive judgments and decisions are sub-optimal, and are not

universally accepted for two reasons. Firstly, there are some researchers who suggest that the locus of some of the biases reported in the literature is not in human judgment, but in the empirical data underpinning the biases. Secondly, there is a long-standing debate as to whether or not probability theory is in fact an appropriate standard for evaluating human reasoning. Accordingly, the next section explores these two issues.

3.2 THE LOCUS OF BIAS

The empirical work of Tversky and Kahneman on biases has come under attack on a number of fronts:

- the first point of attack is that the perception that human judgment is seriously biased is not based on convincing data according to Christensen-Szalanski (1986) and Beach et al. (1987). They argue that there is a 'citation bias' as evidenced by the fact that of all the publications in the area of human judgment over a ten year period (1972-1981), only a small percentage were based on empirical evidence; and although 44% of the results obtained in the empirical studies were good performance results, the poor performance results were cited an average of six times more often.

  Beach et al. (1987) also question the validly of the research by Tversky and Kahneman on the grounds that most of the experiments conducted involved word problems and it is not clear that some of the poor performance results obtained were not simply the result of the research subjects' failure to understand the problems. Support for this comes from Kruglanski et al. (1984), who have shown that some judgmental biases can be overcome by using better wording of the problems, and Pitz (1977) who demonstrated that a small change in the wording of questions used by Tversky and Kahneman in one of their word experiments, could produce evidence of both good and poor judgment.

- the second point of attack is that of the generalisability of empirical results obtained in laboratory settings to the real world. Beach et al. and Christensen-Szalanski point out that the research of Tversky, Kahneman, Slovic and others working in the general area of human judgment has centered on laboratory type studies of word problems with undergraduate students as the research subjects. Word problems they argue are not the type of everyday activities that decision makers get involved in; word problem experiments divorce judgment from action and in the real world, judgment is seldom an end in itself. At the same time, undergraduate students usually have no expertise in the area of word problems, have no direct interest in the outcome of the

experiments, do not have to act on the decisions they make in the experiments, and have no reputation to preserve. This they conclude, questions the whole generalisability of contrived laboratory findings of cognitive biases in decision making among students, to knowledgeable, motivated individuals working at familiar and important tasks in real world decision making. Barnes (1984) however (cited in Bolger and Wright 1994), suggests that this laboratory research is generalisable because the results were obtained across a variety of tasks, the subjects were intelligent individuals and in one particular instance in which an experiment with students was subsequently repeated in the workplace, the results were found to be identical.

In keeping with the above, there is a growing body of empirical evidence on expert judgments, notably auditor judgments (Bamber 1983; Butt and Campbell 1989; Cohen and Kida 1989; Joyce and Biddle 1981a/b; Smith and Kilda 1991; Tomassinin et al. 1982; Trotman and Sing 1989; Uecker and Kinney 1977) which indicates that the judgments of auditors (experts) engaged in auditing tasks are biased and deviate from the norms prescribed by probability theory, but less so than has been observed in the case of non-experts engaged in unfamiliar tasks. The same appears to be true for professional weather forecasters who do not exhibit a high degree of decisional bias because they receive quick and continuous feedback on their performance which enables them to learn from their mistakes (Hogarth 1975; Nisbett and Ross 1980). This would appear to suggest that experience and task familiarity may mitigate some heuristics and biases such as anchoring and representativeness (Beach and Braun 1994). Meanwhile Bromiley (1987) working in the area of organisationally produced forecasts, is also suspicious of laboratory experiments which demonstrate heuristics at the individual level as his empirical evidence is that biases such as anchoring and adjustment are either attenuated by task familiarity and/or other organisational effects, or the biases are not as ubiquitous as some research indicates. Bolger and Wright (1994) also point out that feedback from experience of making subjective judgments is necessary to improve calibration and although feedback is available in real-world situations, this is not generally the case in laboratory experiments.

- a third criticism of Tversky and Kahneman's work is that their conclusions are often too simplistic. For example, in examining several of their experiments which supposedly demonstrate the conjunction fallacy, Thuring and Jungermann (1986) conclude that although they do not contest the concept of the conjunction fallacy, by using a more complex mental model framework, the results of the experiments can be interpreted quite differently in terms of a broader theoretical basis. Curley and Benson (1994) also suggest that as important as it is, the shortfall of research on heuristics

and biases is that there is no integrating framework to it, the result being a disparate collection of heuristics and limited understanding.

- the point of final attack comes from (Goodwin and Wright 1991) who contend that even if the biases discussed above are common in subjective judgment in decision making, knowing this is of little value unless it can be determined to what degree the decision outcome would improve if these biases were eliminated

The consequence of all of the above according to Bamber (1983), is that two camps on judgment have developed; one which he labels the 'pessimists' who believes that biases are inherent within cognitive systems; and a second camp which he calls the 'optimists', who believes that the locus of biases is in the research. Tversky, Kahneman and Slovic are the most representative of the pessimists club whereas the optimists club is represented by Gigerenzer and his colleagues (Gigerenzer et al. 1991; Gigerenzer 1981) who have developed a theoretical framework and empirical evidence to support their contention that biases reported by the pessimist camp are effectively the products caused by dissimilarities between the artificial setting of the laboratory and the everyday realities of the real world.

Gigerenzer's argument largely hinges on the contention that the discussion on heuristics and biases by psychologists such as Tversky and Kahneman, is fundamentally flawed in that they have confused the basic but important distinction between single event probabilities and frequencies. To support this contention, Gigerenzer demonstrates that by taking the information used in laboratory experiments by Tversky and Kahneman and presenting it in terms of frequencies rather than single event probabilities, cognitive illusions and apparent errors in reasoning such as the conjunction and base rate fallacies, tend to disappear. Support for this comes from the empirical findings of Montgomery and Adelbratt (1982), Keren and Wagenaar (1987), Fiedler (1988) and Koehler et al. (1994). Nevertheless, the empirical work of Tversky, Kahneman and Slovic, continues to be widely reported and referenced, has been taken up by researchers such as Ariely (2009), and their work has contributed to the rise of a relatively new field known as 'Behavioural Economics'.

The discussion thus far has been associated with judgment of subjective probability estimates under uncertain conditions. In this context, judgments which do not match with those expected from the normative model of probability theory are attributed to heuristics and biases. There is however, a long-standing debate as to whether or not individuals use knowledge-based reasoning rather than statistically based probability reasoning. Beach and Bruan (1994) for example, are of the opinion that probability theory is a specific and unique kind of reasoning and as such, which may not be broadly generalisable. Meanwhile other

researchers (Barnes 1984; Hendrickx et al. 1989; Nisbett et al. 1983) have shown that people use both knowledge-based and statistical reasoning depending on the task and the environment, and are not rigid in their choice of reasoning. This has led to the development of a proposed contingency model of subjective probability judgment (Beach et al. 1986; Hendrickx et al. 1989; 1992) which suggests that individuals possess a repertory of reasoning strategies for making subjective probability judgments, and the choice of a particular strategy is both task and environment dependent. If this is the case, then the appropriateness of probability theory as a standard for evaluating subjective judgments is questionable. However as with the argument between the 'optimists' and 'pessimists', this is an ongoing debate in the literature and is likely to remain so.

3.3 COGNITIVE PROCESSES: KNOWLEDGE AND REASONING

Having looked in the previous sections at specific heuristics and biases which reportedly affect human judgment and at the ensuing debate as to their locus, the following section moves to a review of the literature on cognitive processes and human reasoning in terms of how knowledge is organised and processed.

3.3.1 Organisation and Activation of Knowledge

Although it is yet to be established with certainty how knowledge is stored in memory, one widely accepted theory is that knowledge is stored and organised in the brain in the form of a 'cognitive schema' which comprise the total of our past experiences (Minsky 1975; Rumelhart 1984; Schank and Abelson 1977). Consequently, when faced with a disparate stream of facts and events, individuals attempt to understand the situation by automatically applying the schema according to the similarity between it and the situation facing them. The problem is that although the choice of schema determines how an individual interprets the meaning of a situation, it is often difficult to establish what the appropriate schemata are for understanding certain situations.

In addition to understanding of information, schema also includes expectations as to what should happen in a given situation, the sequence in which they should happen, what alternatives exist and what information is required. Consequently the schema determines the relevance and significance individuals attach to new information and how they integrate this into their existing knowledge base so as to make sense of it. However laboratory studies have shown that schemata limit the solution space available to individuals in that they comprise deeply ingrained and unquestioned assumptions as to the nature of a problem, and a preconceived conceptualisation of the range of feasible options and potential solutions to the problem (Anderson and Johnson 1966; Klayman and Schoemaker 1993; Newell and

Simon 1972; Simon 1973). Accordingly once the problem set is established, solutions to problems are almost predetermined making it difficult to generate alternative strategies. This is clearly evidenced in the empirical work of Pennington and Hastie (1986; 1988). Working with mock juries, they demonstrated that although all the jurors heard the same evidence, each juror organised the information into a unique story, which ultimately predicted what verdict each juror would support.

The advantage to schematic thought is that it is efficient, but it is also subject to distortions and errors. For example, research by Bower et al. (1979) identified that when recalling situations from memory, individuals tended to fill in the elements of the situation which they had forgotten, with elements which from their schema they would have expected to have occurred in that situation. This is achieved by a process of causal 'gap-filling' inference based on extrapolating current knowledge (Warren et al. 1979; Klayman and Schoemaker 1993). A further problem with schematic thought is that in thinking about the future, individuals attempt to construct new patterns of events, which by definition they have not seen or experienced before. In such situations individuals cannot apply their schemata in the normal way because this requires 'productive' rather than 'reproductive' thinking. Jungermann (1985b) contends therefore that in the process of constructing scenarios, it is likely that individuals will either apply their existing (and therefore inappropriate) schemata, or will modify the task so as to suit their existing schemata. In either case, it is unlikely that the individuals will generate new, unimagined facts and events, which have not been previously experienced.

3.3.2 Script Theory

Something which appears to combine the features of representativeness and availability and is closely allied to the concept of cognitive schema, is the 'script theory' of Abelson and colleagues (Abelson 1981; Schank and Abelson 1977). This theory suggests that individuals experience numerous behavioural events that occur frequently and with little variation. In such cases individuals develop a 'schematic conception' or a 'cognitive script' of events that are expected to occur, and usually, the order in which they are expected to occur. This script therefore essentially guides the individual's understanding of the situation and his/her behaviour in it, by preparing the individual for the next scene in the script of expected events. According to Abelson, once scripts are formed they are a powerful influence on the individual's expectations and interpretation of immediate events and subsequent behaviour. Although there is empirical evidence that scripts do influence behaviour, interpretation and memory processes, Anderson (1983a) notes that research on how scripts are formed and how they influence intentions is ambiguous.

3.3.3 Causal Reasoning and Inferences

Tversky and Kahneman (1980; 1982c) assert that individuals make sense of the world by organising and interpreting the events impacting them in terms of cause and effect relationships, citing the works of Heider (1958) and Michotte (1963) amongst others, to support this. Tversky and Kahneman contend that one of the reasons why individuals are predisposed to cause and effect reasoning is that a causal schema or 'forward inference' has a natural and normal sequence in that causes logically flow forward into consequences in the natural order of time. At the same time, causal knowledge is easily transferable to any given situation. Diagnostic inferences on the other hand, require a 'backward inference' from the consequence to causes which is an unnatural more difficult process, requiring individuals to mentally reverse the temporal order in which events are assumed to have happened.

In a series of experiments they demonstrated that firstly, individuals make causal inferences with a greater degree of confidence than they do making diagnostic inferences, even when aware that the relationship between variables in the data is accidental rather than causal. Secondly, when presented with data which has both causal and diagnostic elements, causal data is generally accorded more weight in probability judgments than is diagnostic data, even where the cause and effect provide the same information about each other. Finally although they recognise that their schemas or 'mental models' may be incomplete and outdated, individuals are generally reluctant to revise their mental models to accommodate new facts; when revisions are made they tend to be marginal (Tversky and Kahneman 1980, 1982c). Revision is essentially a diagnostic process which as already discussed is difficult; therefore rather than revise their models, individuals are more likely to assimilate new facts into their existing models by developing causal accounts which satisfactorily explain the outcomes.

Several other researchers (Pyszczynski and Greenberg 1981; Weiner 1985) have established that people exhibit a high propensity to engage in causal reasoning when faced with important, unusual or surprising events because these events create uncertainty which triggers the search for a causal agent (Weiner 1985). It has also been shown that people relate best to concrete, causally coherent narratives (Pennington and Hastie 1988; 1986); that individuals judge events to be more likely if they are presented with scenarios containing causal information which describes how the events might occur, rather than just the events or outcomes alone (Hendrickx et al. 1992; 1989; Hoch 1985; Levi and Pryor 1987; Tversky and Kahneman 1983); that causal reasoning is engaged in more frequently and to a greater extent when examining concrete data rather than abstract data (Anderson 1983a), and that

causal reasoning based on single, similar instances is prevalent, suggesting that causal reasoning is grounded in real-world experiences (Read 1983). Finally, empirical work by Becker (1984) in the area of metaphors and problem solving processes demonstrated that causal and diagnostic processes resulted in very different solutions to the same problem.

In general terms the problem with causal thinking is that research indicates that the search for causality appears to be a basic drive in human cognition (Wright and Goodwin 2009), and individuals tend to see patterns within random events (Ayton et al 1989) and to then invent causes which explain the patterns even though there is no evidence to support them (Fildes and Goodwin 2007). There are no universally accepted rules for distinguishing between cause and effect; accordingly individuals distinguish causes from effect by relying on probablistically based 'cues to causality' including the temporal order of events, degree to which two events occur together, the number of competing variables or explanations, the degree to which one variable can predict another, and the similarity between events and prior knowledge. All of these cues are related to the heuristics and biases discussed in section 3.1 and as Einhorn and Hogarth (1982, p.32) observe, "one must guard against the way cues to causality quickly restrict our interpretation of the past by structuring and stabilising our perceptions of reality", which is apt to focus attention on the obvious and known at the expense of creative thinking. Even guarding against these cues, Taleb (2008) argues that it is impossible to predict with any accuracy, future causal chains of events as the sequence of causal impacts is seldom a linear cascading domino-like process. It is therefore only with hindsight that the chain of events underlying a significant development becomes obvious (Wright and Goodwin 2009).

3.3.4 Reasoning by Analogy

Steinbruner (1974) identified that decision makers often use very simple analogies and images to guide them in defining complex organisational problems, a process he described as 'reasoning by analogy'. The benefit of this reasoning process is that it helps to reduced perceived uncertainty and can be an effective tool in terms of developing creative solutions to problems (Huff 1980; Neuhauser 1995). However the process of reasoning by analogy can also have serious adverse consequences on decision making by virtue of the fact that: (a) using simple analogies may mislead decision makers into taking too simplistic a view of a particular situation; (b) attractive though the analogies or images may be, decision makers may not be aware that there are crucial differences between the analogy and the reality of the situation they face (Schwenk 1984); and (c) the use of analogies or metaphors provides models of phenomenon which focus the attention of decision makers on specific aspects

and a limited set of variables, thereby excluding consideration of other aspects and variables (Einhorn and Hogarth 1982).

3.3.5 Rationality

As discussed in the introduction to heuristics and biases, the source of heuristics may be explained in terms of rationality with respect to decision making. Although Simon's notion of bounded rationality (Simon 1956; 1955) was initially controversial because it challenged the validity of the classic 'economic man' and value maximising human behaviour, the concept of rationality being bounded is now widely accepted. But the question of rationality is a complex one and there is still no universally accepted theory of bounded rationality. What is clear from numerous empirical studies (Anderson 1983a/b; Cyert and March 1963; Einhorn 1974; Eisenhardt 1989; Fischhoff et al. 1978; Fredrickson 1984; Fredrickson and Laquinto 1989; Fredrickson and Mitchell 1984) is that as decision-makers, individuals have limited cognitive capabilities as evidenced by the fact that they 'satisfice' and search for information and alternatives haphazardly and opportunistically. Although a range of alternatives may be generated, only a few will be subjected to analysis and decisions are often arrived at by using predetermined procedures or heuristics rather than rigorous systematic analysis. The empirical findings related to the cognitive basis of group decision making are similar (Purkitt and Dyson, 1988).

It has been argued that satisficing behaviour may be the consequence of motivational bias, or a case of individuals engaged in an information search for decision making seeking to achieve a balance between the activity cost of acquiring additional information, the perceived payoff resulting from the additional information, and their own ambitions. This may be the case, but there appears to be little doubt in the literature that when it comes to decision making, human beings simplify the process of collecting and integrating information (Barnes 1984) out of necessity because of the limited cognitive processing capacity of the human brain. In doing so, they do not follow procedures of rationality (Simon 1991).

3.3.6 Imagination and Expectation

In the discussion on the availability heuristic it was suggested that individuals tend to evaluate the frequency or probability of instances or events according to how easy it was to imagine them. But it has also been demonstrated that imagining the occurrence of events through the use of scripted scenarios will make the images of the events more available, which leads to the events appearing more probable. Several experimental studies have been carried out in this area, namely:

- a study by Carroll (1978) which established that when individuals were made to imagine, through the use of elaborate scripted scenarios, a social event, they came to believe strongly that the event would actually take place.
- building on Carroll's work, Gregory et al. (1982), conducted a series of experiments in which the events manipulated in the scenarios were of a personal rather than social nature. The results were similar to those of Carroll, the subjects recorded significantly higher subjective probabilities estimates in terms of belief that the events described in the scenarios could happen to them. The results of their study also suggested that the process of imagining via a scripted scenario could influence behaviour.
- following from Carroll and Gregory et al., Anderson (1983a) performed a series of experiments in which subjects were asked to imagine scenarios in which they or some other person were performing/not performing a set of behaviours. The results of the experiments demonstrated that where the research subjects imagined themselves to be the subject in a particular scenario performing/not performing the behaviour, there was a change in personal intentions towards the target behaviour on the part of the subjects, and this intention change persisted for some time. Where the research subjects were not the subjects of the scenario, no change in personal behavioural intention was recorded. The experiments also indicated that the more frequently subjects imagined themselves to be the subject in the scenario, the greater was the personal behavioural intention change.

While all of the findings discussed above are attributed to the availability and/or representativeness heuristics, there may be other valid alternative explanations. For example, Gregory et al. (1982) suggest that there is an alternative explanation for the results of their experiments and those of Carroll (1978), which is that imagining an event in a given way creates a 'cognitive set' which then impairs the individual's ability to see the event in competing ways.

3.3.7 Groupthink

The focus in all of the discussion in this chapter to this point has concentrated on the individual and decision processes. However in researching decision processes, Janis (1982) has documented a phenomenon termed 'groupthink' whereby individuals forming part of a cohesive group tend to suppress any ideas which do not accord with what they perceive to be the ideas favoured by the group. This leads to bias in that critical ideas are inhibited and only those courses of action which are perceived as being preferred by the group are

examined. Although anecdotal information supports the existence of this excessive tendency to seek concurrence, there have been very few laboratory tests of Janis's theory, partly because of the difficulty of establishing a highly cohesive group in a laboratory setting.

Research (Nutt 2002) suggests that five decision-making defects characterise groupthink, these being that the group members: discuss only a limited number of options, ignoring other alternatives; fail to examine the adverse consequences of their intended actions; are quick to drop alternatives, which at first glance, appear unsatisfactory; make little attempt to solicit the advice of experts; and fail to develop contingency plans in the event that implementation of their preferred course of action is delayed.

One of the espoused benefits of scenario planning in the organisational context is that it can be used to mitigate groupthink in management teams by examining a variety of futures and not just those which the management team appears to favour. However there must also be a possibility that the scenario team itself becomes the subject of groupthink.

3.4 IMPLICATIONS FOR SCENARIOS

Having examined the research literature on cognitive limitations and processes, this section looks at the implications of the findings on developmental processes, content and presentation and the behavioural effects of scenarios.

3.4.1 Scenario Development Processes

The empirical evidence suggests that scenario development processes will be affected by cognitive processes. For example, Jungermann (1985a) maintains that using forward or backward inference will produce qualitatively and quantitatively different scenarios. Forward inferences are concerned with natural, cognitively easier 'downhill thinking' and individuals will intuitively begin constructing scenarios using this approach, which will mean that:

- the scenarios will be developed on the basis of the causal links of elements in sequential order; and
- the scenarios will be plausible but not very surprising because they will be developed around familiar causal models rooted in the past and are likely to include short-run dramatic elements of high causal significance, but underestimate the likelihood of events produced by slow moving developments.

If on the other hand, backward inferences or ‘uphill’ thinking is used:

- there will be a focus on goals to be achieved and policies that would lead to these and the scenarios will therefore be value rather than goal oriented. At the same time Wright and Goodwin (2009) maintain that using a backward logic focusing on the objectives of the organisation and their plausibility, overcomes the problems inherent in forward causal thinking by promoting the identification of drivers which will have the largest impact on the range of plausibility of the objectives.
- where there are many potential causes of given future events, individuals are likely to examine only one or a limited number of potential causes ignoring the others, and the scenarios are more likely to be ‘revolutionary’ and ‘unrealistic’ which might lead to the discovery of new options.

Script theory meanwhile suggests that how current events are interpreted and then unfolded into the future in a scenario will be largely determined by the existing schematic conception of the individual developing the scenarios. This schema will contain deeply embedded assumptions as to what is feasible and what is not in terms of how the future unfolds. Where this existing schema cannot be readily applied because the individual is attempting to construct previously unexperienced patterns of events, the individual will generally force the situation to suit the existing schema. At the same time, when undertaking analysis in the scenario development process, the notion of rationality presupposes that the individual will engage in satisficing behaviour in searching for information and is likely to use causal inferences from his/her cognitive schema to compensate for the gaps in his/her memory. Finally, once the individual has imagined how events might unfold in the future, it will be difficult for the individual to view these events from different perspectives.

In addition to the impact of cognitive processes, there are numerous heuristics and biases which potentially impact scenario development processes in terms of what information is searched for, how the information gathered is analysed, what data is accepted or rejected and how the scenario storylines are eventually constructed. For example:

- the experience bias and framing will impact what particular futures are explored; saliency and primacy will largely determine the starting point of the information search in the scenario development process, which in turn will determine what information is searched for as pathways of linked nodes in the neural network of the brain are activated. Once this search set is activated, the individual will likely be

insensitive to missing information, sample size, prior probabilities, and the concepts of regression and illusory correlation.

- at the same time co-occurring events will be accorded an unwarranted degree of probability as will events which are representative, well publicised, easily imagined and which generally lead to a single outcome. Interpretation of information will be largely guided by what the individual already has an understanding of and will be constrained by the individual's belief system and cognitive anchor. Information which is supported by concrete examples and which accords with the individual's experience and belief system will be readily assimilated, that which does not will be discarded.
- as a consequence of the simulation heuristic, once individuals imagine the sequence of events encompassing a scenario, the overall scenario will appear more likely to occur than the probability of the individual events comprising the scenario.
- finally, once the individual has developed a scenario he/she will be quite confident of the predictions underlying the scenario and will somehow be endowed with a feeling of some control over the events depicted in the scenario.

Although the theoretical and empirical findings from the cognitive psychology literature discussed in this chapter are according to Kuhn and Sniezek (1995), troubling in their possible implications for scenario development processes, the literature unfortunately leaves unanswered a number of important questions such as:

- do these cognitive processes, heuristics and biases function in all cases at all times, or are they activated or influenced by situational factors?
- can anything be done in designing processes, to offset or mitigate the effects of these cognitive processes, heuristics and biases?
- do some heuristics and biases offset one another as Schoemaker (1993) has suggested, and if they do, which ones and under which conditions?
- are there other, perhaps more important impacting factors which are not discussed or have not yet been identified?

From the current state of the research literature it is difficult to draw firm conclusions and these questions remain open. As Healey and Hodgkinson (2008) note, although scenarios can purportedly mitigate some biases, the actual process of constructing scenarios is itself 'susceptible to bias'. Until substantially more in-depth and systematic research is

undertaken, all that can be said with certainty from the current literature is that cognitive effects, heurists and their associated biases will impact scenario development processes; but what the precise impact will be is uncertain, and how the impact might be mitigated if it can be, is even less certain.

3.4.2 Scenario Content and Presentation

As with scenario developmental processes, there is not a large body of research in the area of scenario content and presentation, but a disparate stream of empirical evidence. As with process, in most of the research discussed the objectives of the research were not focused specifically on scenarios, but the generalisability of the research findings can be extended to cover aspects of scenarios in most cases. Examples of this include:

- the conjunction effect which suggests that adding more representative and salient details to a scenario, whether the details are relevant/consistent or not, will increase the scenario's representativeness thereby raising the perceived likelihood of its occurrence and therefore its acceptance. Paradoxically, increasing the level of detail in a scenario also increases the specific nature of the scenario which essentially decreases the likelihood of the scenario occurring.
- the inclusion of events or incidents in the scenarios which are: (a) causality linked in a plausible manner so as to explain why something might happen or why an event has occurred; (b) have happened recently; and (c) make it easier for decision makers to recall available supporting evidence because they are familiar, occur frequently or are highly publicised, will result in scenarios which appear more probable.
- the more vivid the scenario is made to be, the greater the chances are that the scenario will be unwittingly perceived as being likely by the scenario audience. Scenarios which contain vivid, concrete examples which match the experiences of the scenario audience, are likely to have a greater impact on the audience than will scenarios which rely on an understanding of complex causal relationships and abstract data. Vividly presented information is more easily activated and those scenarios which tell a ‘good story’ are seen to be more probable than are others.
- ensuring that the scenarios lead to a single outcome and are explained in full and do not leave the scenario audience with unanswered questions, will increase the likelihood of the acceptance of the scenarios.
- including desirable events in the scenarios rather than events which threaten the scenario audience, will raise the perceived probability of the scenarios occurring.

- adding a title to a scenario will strengthen the image of the scenario, increasing its perceived plausibility but how the scenarios are labeled i.e. as fact or as conjecture, will also affect the perceived credibility of the scenarios. At the same time presenting a scenario in the past tense endows it with a strong sense of certainty which the scenario audience find difficult to ignore, because the use of the past tense automatically leads to the assumption that the events described in the scenario have occurred.

It is apparent when reviewing the above that a number of the guidelines provided by scenario practitioners in the anecdotal experienced-based literature are supported by empirical evidence, although the practitioners may themselves not be aware or at best, vaguely aware of this as evidenced by the fact that few of them cite supporting empirical evidence.

3.4.3 Behavioural Implications of Scenarios

Several pieces of empirically-based research have relevance in this area, namely:

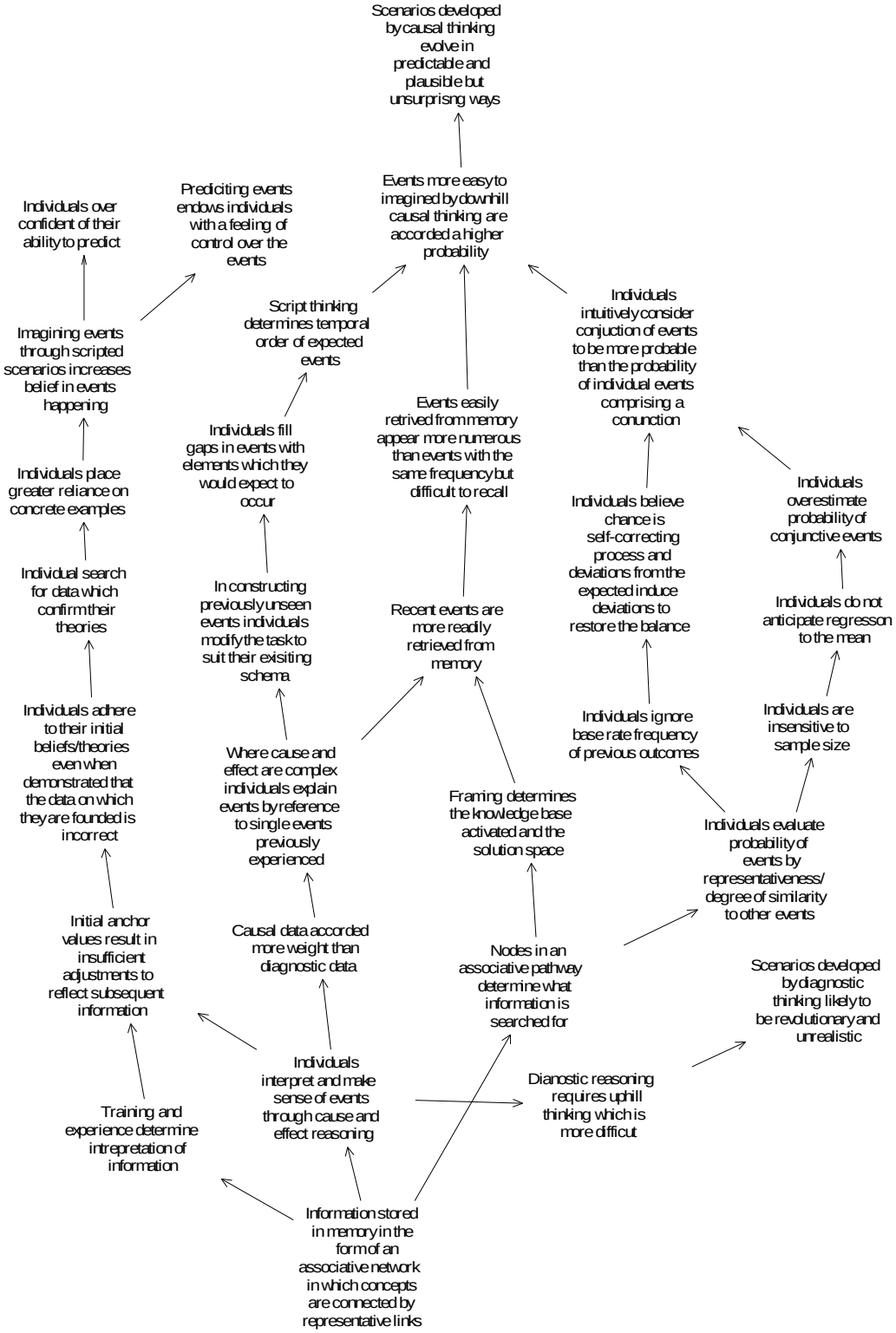
- Anderson's experiments in which the research subjects were to project themselves into a particular situation (Anderson 1983a). The implication of this research is that it would seem that merely reading scenarios will not motivate the decision makers in an organisation to change their intended plans; in order for this to happen it is essential that the decision makers become actively engaged in the scenario exercise by imagining themselves playing a role in the scenarios.
- Schoemaker's (1993) laboratory experiments which demonstrated that firstly, scenarios do stretch the subjective confidence range of individuals (by as much as 50%) but there is an incredulity point beyond the ranges contract; secondly, that scenarios alter beliefs, but not necessarily in a predictable direction; and finally, that scenarios can be used to overcome availability, anchoring and overconfidence biases.
- the experiments of Langer (1975) and others (Langer and Roth 1975; Larwood and Whittaker 1977) which demonstrated that the act of engaging in the prediction of uncertain events appears to endow individuals with a misplaced sense of control over the uncertain events.
- the early work of Anderson (1983b) and Gregory et al (1982) which indicate that decision-makers tend to anchor on scenarios which they perceive will have a greater impact on them and their organisation, and the more recent work of Bolton (2003) who

working in the area of forecasting new products, determined that individuals tend to ‘anchor their judgment’ on the first scenario they develop and debiasing attempts only succeeded in exacerbating the original bias.

Again however, there is no large, systematic body of research in the area of behavioural implications. Most of the research has come from psychologists who appear to have focused on demonstrating the power of single scenarios to bias decision makers in laboratory tasks, without examining scenarios in the way they are used in organisations. The result is that there is little systematic knowledge about the behavioural effects of complex, long-term scenarios and how they are handled judgmentally (Vlek and Otten 1987).

In light of all of the foregoing, as part of this research I have attempted to synthesize the literature on cognitive processes, heuristics and biases by developing a model which endeavors to demonstrate how theoretically, in combination, they impact the scenario development processes. This model shown in Figure 3.1 below while not exhaustive in that it does not include all cognitive processes, heuristics and biases discussed in the literature and is amenable to further testing and elaboration, clearly indicates that they have significant consequences on the scenarios developed process and the resulting scenarios developed.

Figure 3.1: Implications of Cognitive Processes on Scenario Development



3.5 CONCLUSIONS

The above concludes the review of the research-based literature on scenario planning and a number of observations can be drawn from it, the first of which is that although Armstrong (1978) states that some relevant research has been done, there is in fact a paucity of systematic research with respect to the cognitive and behavioural implications of scenario development. This conclusion is endorsed by Jungermann (1985a; 1985b) who states that there is need in particular, to focus on the process of scenario construction. What is required he suggests, is firstly, more experimental work and case studies which examine scenario construction processes in order to understand the ways in which cognitive factors affect it. Secondly, there is a requirement for the development and testing of techniques that may mitigate or counteract cognitive biases.

The second observation is that most of the reported research is rooted in the discipline of psychology and relates primarily to individuals and their cognitive styles of decision making and behaviour; very little of the research relates specifically to scenarios, although much of the findings appear to be generalisable to scenarios. What scenario specific research has been done relates predominantly to individuals in contrived or laboratory settings rather than investigating scenarios in a real-world organisational context in which they were intended.

The third observation is that there appears to be no coherent framework to what research has been done. Goodwin and Wright (1991) suggest that the research of Tversky and Kahneman gained popularity because their studies are easily understood by non-technical readers, but their interpretations of the data are ad hoc and a more comprehensive conceptual, empirically grounded model remains to be developed. Although the psychological research discussed above may be troubling in its potential implications with respect to scenario development processes and presentations, the research appears to be ignored by scenario practitioners. Nevertheless, the lack of empirical validation does not appear to have hampered the popularity and growth of scenarios.

In concluding the research literature review, it should be noted that firstly, in conducting the review what has not been specifically covered is the research literature on individual, situational and organisational influences on decision making such as personality, culture, group dynamics and so on. The reason for this is a pragmatic one, which is that of boundaries. In a multi-disciplinary research project such as this, the ‘relevant literature’ can extend almost indefinitely and therefore it is necessary to establish some reasonable boundaries. Secondly, it is acknowledged that many of the references cited in the two literature review chapters are dated. The reason for this is that this early literature

established the foundations of the scenario field; there has of course been much growth in the literature in the intervening years, but the contention is that very little in the way of new substance has actually been added and many of the issues raised in the early literature continue to remain open questions, as evidenced by the numerous calls in the literature for additional empirical research. Therefore although ‘old’, the early literature remains as relevant today as it was when first published.

This completes the review of the literature on the subject of scenarios. The following chapter now moves to a general discussion on research methodology and then reviews and justifies the particular methodology used in this body of doctoral research.

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CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.0 INTRODUCTION

There is no single best method of undertaking research and it is therefore essential in a credible research exercise to make explicit the research design employed and to reason why the particular methodology selected is considered appropriate to the research project. This serves several purposes. Firstly it demonstrates to the reader of the research report that the researcher understands the basic philosophical issues underlying research design and is aware of the limitations and issues associated with the use of particular methods and techniques, and their effects on data gathering and analysis. Secondly it should substantiate the research strategy selected within the context of these issues. Finally by identifying the researcher's frame of reference, it allows the reader of the research report to interpret and understand the findings of the research within a known context and to evaluate methodologically, the research findings.

The purpose of this chapter then is to provide the rationale underlying the choice of the qualitative methodology employed in this research project. But in order to do this, one first has to understand the debate over methodology. Accordingly the chapter begins with an overview of the nature of research, the importance of research methodology and the philosophical issues surrounding research design. The chapter then moves from the general to a more specific discussion on the particular methodology used in this project (participant observation to collect data which was subsequently analysed using an analytic induction approach) and provides the rationale as to why this methodology was regarded as appropriate to this research. This is followed by discussion on the details of the research process which concludes the chapter.

4.1 THE NATURE OF RESEARCH

It would seem appropriate that any discussion on research design and methodology should start with a discussion of some of the broad philosophical issues which ultimately informs ones choices, and the most fundamental question is, what is research? Fifty plus years ago Kidd (1959) suggested that an adequate or operational definition of basic research is not possible. Since then numerous definitions have been offered ranging from the simple to the more comprehensive.

Most writers on the subject make a fundamental distinction between ‘applied’ research and ‘basic’ research, although the distinction is not always explicitly stated. Whereas applied research is, according to Kerlinger (1979; 1969) and Sekaran (1984), directed at developing solutions for specific real-world problems or improving some process or activity, the purpose of basic research also described as ‘pure’ or ‘scientific’ research, is theory development i.e. to understand and explain natural phenomena. Whilst the by-product of research may be solutions to problems or process enhancement, Kerlinger is adamant that science is exclusively concerned with knowledge and understanding of natural phenomena, and therefore the singular purpose of scientific research is to develop theory (Kerlinger 1979). Easterly-Smith et al. (1991*)* suggest that pure research and theory development may take one of three forms, namely *discovery* (of a new idea or an explanation which emerges from empirical research); *invention* (of a new technique or an idea to deal with a particular situation or problem) and *reflection* (whereby an existing technique or idea is re-examined but in a different organisational or social context).

In addition to pure and applied research, there is a third form of research, ‘action’ research which has been defined in several ways, but there are three fundamentals underlying the concept, namely: the research is concerned with the management of a change; the research involves close collaboration between practitioners and researchers; and the research findings should inform other contexts beyond that of the actual research (Saunders et al. 2007). In terms of academics undertaking action research, Eden and Huxham (1996) indicate that the research should be linked to the development of theory.

Although the classification of research types on the basis of the outcomes of the research activity is a simple one, both Easterby-Smith et al. (1991) and Bordens and Abbott (1998) concede that given that there are many factors which impact how research is designed and subsequently carried out, these distinctions do not always hold in practice as some research combines elements of both pure and applied research and although it may be focused on solving problems, applied research is not independent of theory.

In terms of the research process, a number of writers (Churchman 1971; Morgan and Smircich 1980; Sekaran 1984) include in their definitions of research, terminology such as ‘systematic’, ‘controlled’, ‘orderly and ‘disciplined’. This conveys the fact that research is not an ad hoc exercise but a carefully planned and controlled activity. From the many definitions in the literature, it would also appear that there is a consensus among writers that research is characterised by a strong empirical approach, and that it is preoccupied with the investigation and subsequent explanation of observable natural phenomena and their relationship with each other.

Having arrived at a clearer understanding of what research is, the next question is, why is methodology and research design so important?

4.2 THE IMPORTANCE OF RESEARCH METHODOLOGY

Kelly (1994) characterised each person as a scientist who develops a set of strategies for determining explanations for observed behaviour. However these so-called 'common-sense' explanations or theories tend to be simplistic, based largely on limited and unsubstantiated information derived from hearsay, conjecture, anecdotal evidence, or some combination of these, and are typically derived from a framework of personal beliefs. Although such common sense explanations may serve people well, they lack methodological rigour and as a consequence are unlikely to be accepted as bona fide contributions to knowledge. In order for this to happen the research needs to be conducted in an orderly and coherent manner according to established conventions and principles, and a more systematised form of reflective thinking and inquiry is required. This may not prevent the occurrence of problems such as tautology. It should however reduce the potential for these problems by ensuring that research studies employ a process of continual testing, review and criticism and that the evidence behind conclusions drawn are scrutinised as to the procedures they use and the underlying assumptions they make. Explanations of observed behaviour derived under these conditions are apt to result in more rigorous and reliable theories, thereby enhancing the likelihood of them being accepted as valid contributions to the advancement of knowledge.

Assuming that the objective of research is to provide new knowledge about the world, research design is important then because it provides a coherent and established set of organising principles in terms of who or what is to be studied, what strategies of enquiry are to be used and what specific tools, processes and techniques are to be used in the collection and analysis of data. These organising principles in turn provide a framework to enable the researcher to obtain the answers to research questions as validly, objectively, accurately and economically as possible. At the same time, research design and methodology is important because it provides training for new researchers in terms of developing disciplined thinking, and it establishes organising principles by which new knowledge can be integrated and codified (Lazarsfeld and Rosenburg 1953).

Design is however, more than just the process of choosing which technique to use to gather and analyse data; at a higher level of conceptualisation there is an important relationship between method and theory in terms of how the empirical methods will be informed by and interact with theory, as will be seen from the discussion which follows.

4.3 THE PHILOSOPHY OF RESEARCH DESIGN

Although the term *methodology* is widely used as a synonym for 'technique', the term does have a more important meaning concerned with the role of theory in research exercises. In this context, methodology functions as a theory in guiding the conduct of inquiry. As is commonly noted in the literature, research methodology has a philosophical base oriented towards techniques and ways of knowing, and there is a long-standing debate among social scientists as to the most appropriate philosophical base from which research design should be derived. Regardless of the research method used, its selection will have implications for the nature of the investigation to be carried out because as Morgan and Smircich (1980) point out, underlying the choice of a research method are assumptions regarding the nature of knowledge and the ways in which knowledge can be obtained, alongside assumptions regarding the nature of the phenomena to be researched.

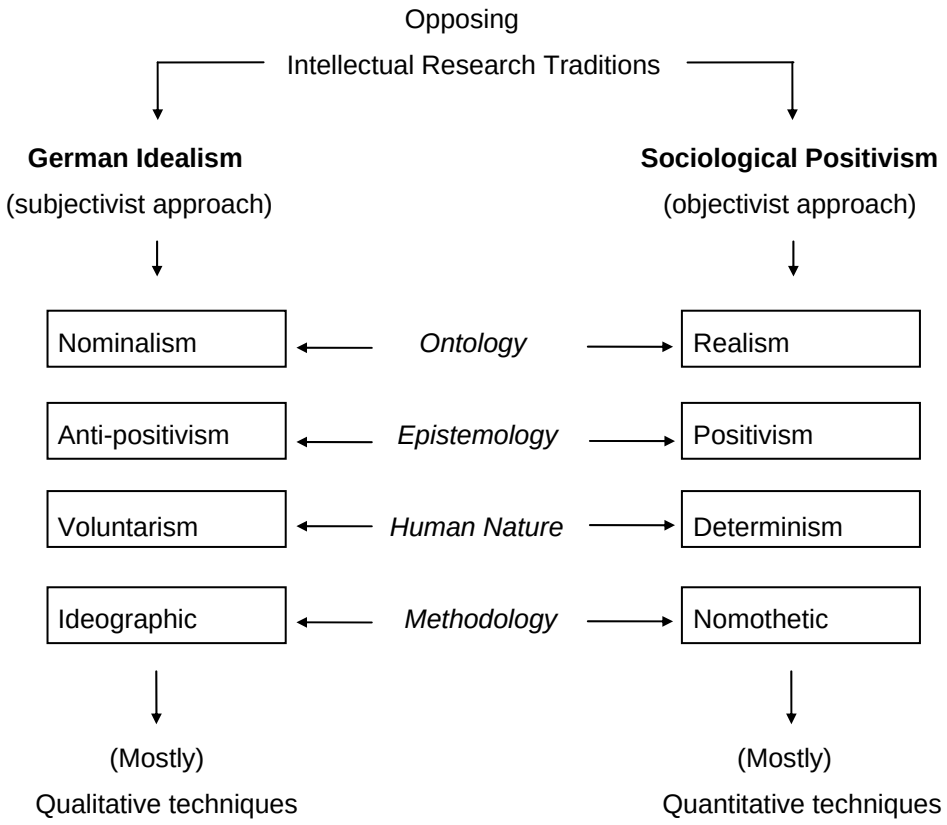
Burrell and Morgan (1994) argue that these interrelated assumptions revolving around ontological, epistemological, human nature and methodology issues, group together to form "two major intellectual traditions" or opposing approaches to social science research, *sociological positivism* (an objectivist approach) and *German idealism* (a subjectivist approach), which have "dominated social science over the last two hundred years" (Burrell and Morgan 1994, p.7). Taking the polar extremes of the underlying assumptions, these two intellectual traditions can be graphically illustrated as in Figure 4.1 below.

The Burrell and Morgan framework captures only the extremes of the underlying ontological, epistemological, human nature and methodological assumptions and there are many intermediate points between these extremes as indicated by Morgan and Smircich (1980). However in order to understand the two intellectual traditions it is necessary to understand the debate over these four interrelated assumptions regarding the nature of social science, and the next section attempts to provide this understanding by briefly examining the main issues associated with each assumption.

Guba and Lincoln (1990) provide a similar framework classifying alternative inquiry paradigms on the basis of their ontological, epistemological and methodological stances (Table 6.1, p.109), but subdivide Burrell and Morgan's 'German idealism' into a continuum of three separate inquiry paradigms, namely *postpositivism*, *critical theory* and *constructionism.*

Figure 4.1: A Scheme for Analysing Assumptions about the Nature of Social Science

(Adapted from Burrell and Morgan, 1994, page 3)



4.3.1 Ontological Issues

Ontological issues concern the essence of the phenomena under investigation i.e. the nature of phenomena in terms of what is the form and nature of reality (Burrell and Morgan 1994; Gioia 2003). At one end of the spectrum are the *realists* who hold the view that reality is objective and exists as an empirical entity external to individual cognition. Individuals do not therefore create reality, it already exists in the form of "hard, tangible and relatively immutable structures" (Burrell and Morgan 1994, p.4) even though individuals may be unaware of them. At the opposite end of the spectrum are the *nominalists* who contend that reality is internal to the individual in that there are no real structures in the world, merely names, concepts and labels which individuals use to structure reality. Nominalists view the world as an emergent social process which is created by individuals and therefore "there can be no reality outside of the consciousness of the individual" (Burrell and Morgan 1994, p.5).

4.3.2 Epistemological Issues

Epistemological issues relate to assumptions about the nature and scope of knowledge itself and whether it can be transmitted between individuals or can only be derived from unique, personal experiences. In this regard, two distinct philosophical schools of thought can be identified: at one extreme is the *positivism* school of thought which is underpinned by a realism ontological base; at the opposite extreme is the epistemology of *anti-positivism* which takes various forms e.g. *social constructionism* (Berger and Luckman 1973); *interpretive sociology* (Habermas 1970); *naturalistic enquiry* (Lincoln and Guba 1985); and *new paradigm inquiry* (Reason and Rowan 1981), all of which are collectively known as *phenomenology*. The differences between these phenomenological inquiry forms stem from different views as to what an anti-positivism paradigm implies.

4.3.2.1 Positivism

Comte, the French philosopher and founding father of sociology, is credited with having been the first to articulate the underlying principles of the positivist view (Hughes 1990). Although there are now many variants of positivism which is also variously known as *empiricism*, *behaviourism*, *naturalism* and *orthodoxy* (Hughes 1990), its basic tenant is that there can be no knowledge *a priori* of experience as the only form of knowledge which can claim to be knowledge, is that which is derived from carefully observed facts. As positivism assumes that the social world exists externally and is capable of being studied objectively, it demands that the properties of the social world "should be measured through objective methods rather than being inferred subjectively through sensation, reflection or intuition" (Easterby-Smith et al. 1991, p.26). A number of other general propositions have come to be associated with the positivist epistemology, these being that:

- the aim of research is to identify causal explanations and universal laws that explain behaviour and which facilitate prediction and control. Thus the emphasis is on the empirical content of a theory and understanding why observed regularities should be as they are, is not a fundamental question;
- deciding 'what' and 'how to' research can be done objectively as science is value free, and observers are able to remain separate from and independent of what they are observing and therefore objective toward what is being observed, maintaining a clear distinction between observed facts and value judgements;
- an appropriate research approach is a hypothetico-deductive one and all research concepts must be reduced to quantitatively measurable facts; and

- knowledge is acquired sequentially and linearly with one problem being addressed at a time, a problem is best understood when reduced to its simplest form, and large samples are necessary to be able generalise research findings (Bunge 2000).

There is however no unanimous agreement on precisely what the philosophy of Positivism encompasses, as it can be rewritten to accommodate particular individual purposes (Lincoln and Guber 1985). This is one of the major criticisms of positivism, but there are numerous other criticisms of the underlying principles advocated by it, namely:

- *the world is objective and reality exists as an entity external to the individual*. The objections to this ontological position is that aside from 'objective' reality there are three other forms of reality according to (Lincoln and Guber 1985): *perceived reality* (perception is an incomplete view of something thus no individual can ever know all of reality at any point in time); *constructed reality* (reality is constructed in the minds of individuals, therefore there is an infinite number or realities which can be constructed); and *created reality* (reality does not exist until such time as that reality is perceived).
- *scientific research is concerned with theory development which ultimately leads to successful prediction and control.* The criticism of this tenant is that it results in an inadequate conceptualisation of what science is because it excludes other equally legitimate purposes of research such as 'understanding', 'description', 'problem response', and 'status determination' (Cronbach 1982).
- *science is value-free and the criterion of objectivity is indispensable*. This assertion as Lincoln and Guber (1985) point out is in itself, a value claim. Albeit researchers may not want to appear to be in the grip of a particular world view which would render their research results suspect to those who do not share their view, Hughes (1990) contends that "every research tool or procedure is inextricably embedded in a commitment to a particular version of the world and to knowing that world", the consequence of which is that "there is no neutral point from which to stand back and perceive the world objectively" (Hughes 1990, p.18). At the same time all inquiry is value-laden according to Lincoln and Guber (1985), in that it is impacted by a wide assortment of values, ranging from the personal values of the researcher at one end, though to the cultural values inherent in the setting in which the research is conducted at the other. Heron (1981) adds that inquiry always serves some social agenda and therefore it cannot possibly be value-free.
- *observers are able to remain detached from and independent of what they are observing*. There are many arguments in the literature which refute the notion that the observer and the observed constitute a 'discrete dualism' and that one can observe

without distorting the object of observation. Proof of this comes from empirical evidence that research subjects react differentially to research stimulus, even when not in direct contact with the researcher.

- *research concepts must be reduced to quantitatively measurable facts in the search for linear causality*. There are three problems with this: the first is that phenomena, particularly human behaviour, is not always amenable to quantitative measurement. Mintzberg (1979) contends that although 'hard' data may create the foundations of theories, it is 'soft' data and 'rich description' which comes from anecdote and is not measurable, that enables theory building. Secondly, over emphasis on causality has Allen (1978) suggests, led to seeing problems reduced to independent-dependant variables, stimulus-response paradigms and cause and effect relationships, failing to recognise that most human actions are not actually mechanistic and deterministic. Thirdly, it is not always easy to determine if an observed regularity is a coincidence or there is a causal connection, therefore not all generalisations can be elevated to the status of general causal laws. Thus Lincoln and Guber (1985) contend that "linear causality as an epistemological orientation", is "so beleaguered and in such serious disarray, that it strains credibility to continue to entertain in any form approximating it's poorly defined one" (Lincoln and Guber 1985, p.141).
- *a problem is best understood when reduced to its simplest form*. The concept of reductionism is according to Lincoln and Guber (1985) objectionable and groundless because it assumes that all phenomena are subject to a set of common of laws, and findings in the sciences have revealed this as a misconception.

Despite these criticisms positivism was the dominant philosophy underpinning empirical social science for what Kuhn referred to as 'normal science' in the first half of this century (Hughes 1990). More recently however, the assumptions underlying positivism have been challenged by theoretical and experimental findings according to Hesse (1980) and Schwartz and Ogilvy (1979), and according to Lincoln and Guber (1985), inquiry has now passed into a 'post-positivist' paradigm era of epistemology rooted in phenomenology.

4.3.2.2 Phenomenology

The basic doctrines of phenomenology are essentially the reverse of those that define positivism. In general terms, phenomenology adopts a nominalist ontology based on the notion that reality is not objectively determined as positivism suggests, but is socially constructed and given meaning by people. If reality is socially constructed, it follows Easterby-Smith et al. (1991) contend, that:

- science is not value free, it is driven by human interests which guides the way we think, and therefore conditions the way we enquire into and construct our knowledge of the world;
- observers are an integral part of what is being observed and incapable of remaining independent of what they are observing, therefore neutrality is a more appropriate and realistic target than objectivity;
- a reductionist approach to understanding problems is not useful as one needs to look at the totality of each situation in order to understand and explain the different constructions and meanings that individuals place on their experiences;
- ideas should be developed through induction from data, and using multiple methods will provide different perspectives of the particular phenomena being investigated; and
- the aim of research is not so much to identify causal explanations and fundamental laws that explain behaviour, but to focus on meaning and to develop understanding and explanations of phenomena.

There are those (for example, Knights 2002) who suggest that the differences between these two ontological positions represent entrenched and irreconcilable intellectual perspectives. However, Easterby-Smith et al (1991) remind us that although the positivist and phenomenological philosophical schools of thought can be clearly delineated in terms of their underlying assumptions, they are not the views of one particular philosopher but represent an amalgam of propositions which over time have come to be identified as representing each of the two schools. Not all philosophers associated with a particular school agree with all of the propositions underlying that school, they have long been arguing about these matters without resolution and according to Hughes (1990), it is unlikely that they will arrive at one anytime soon. As Easterby-Smith et al. (1991) observe, in practise most researchers combine methods drawn from both schools. This is supported by Ladson-Billings (2000) who argues that in fact, all humans operate with multiple epistemological positions that are in constant symbiotic relationships with their world-views.

4.3.3 Human Nature Issues

Burrell and Morgan (1994) suggest that given that social science is concerned with the relationships and interactions between humans and their environment, any social-scientific theory must adopt some view as to what 'model of man' is reflected in the theory. On one side there is a *determinist* view which presupposes that humans are the products of their

environment and respond mechanistically to situations; the polar opposite is the *voluntarist* view which holds that humans are autonomous and have free will largely creating and controlling their own environment. Although this model of man may not be explicitly stated in a social-scientific theory, it is always implicit in that theory and in effect, influences the choice as to the mode of engagement adopted in inquiry (Burrell and Morgan 1994).

4.3.4 Methodology Issues

The central issue of methodology revolves around how the researcher can best understand the social world and in this context there are two broad kinds of knowledge disciplines, *nomothetic* and *idiographic*. The nomothetic approach takes the view that research should be based on organised protocols and techniques and it is therefore preoccupied with developing law-making through a process of advancing and testing hypotheses, and searching for causal explanations of the relations between physical phenomena and the natural laws governing behaviour (Lincoln and Guber 1985). Quantitative data gathering methods are commonly used allowing researchers to statistically prove relationships between defined variables.

The ideographic approach on the other hand, focuses on describing singular events and their relations, and takes the view that the best way to gain understanding is to obtain first-hand knowledge of the subject being investigated by getting close to the research subject. It assumes that the world is ‘messy’ and socially constructed and research needs to focus on understanding and explaining what is unique to individuals (Burrell and Morgan 1985). Data gathering methods favoured are those which yield largely descriptive data.

These two viewpoints have given rise to much, often acrimonious debate in the literature over the appropriateness and validity of quantitative versus qualitative and interpretive techniques. While there is nothing inherently right or wrong with either of the techniques, because each is associated with one of the two intellectual traditions, they have for some, come to represent the philosophical divide. This is evidenced by the fact that much of the literature on research design and methodology takes the form of denigrating one or other of the methods.

A further design element which is widely discussed in the literature is the distinction between *analytic induction* and *hypothetico-deductive* methods. Analytic induction is defined as “the intense examination of a strategically selected number of cases so as to empirically establish the causes of specific phenomena” (Johnson 1998, p.31). Inductive methods focus on understanding phenomena by attempting to systematically generate theory (or guiding

principles) grounded in observations and reflections of the empirical world, which can then be extrapolated to explain and predict similar phenomena. Deductive analysis which is the commonest form of conventional inquiry (Lincoln and Guba 1985), is essentially the reverse of inductive analysis in that it begins with the generation of theoretically based hypotheses which researchers then attempt to confirm or falsify by reference to a body of empirical data. Thus the data to be sought are defined *a priori* by the hypothesis to be tested and in Kuhn's terminology, deductive work is largely 'normal science'. As in other areas of the research methodology literature, the debate between these two rival methodologies is complex and fundamentally revolves around etic analysis favoured by positivism versus emic analysis favoured by phenomenology. Although proponents of each claim superiority of their approach, in reality researchers often move back and forth between inductive and deductive thinking when working with data (Strauss and Corbin 1990a).

The preceding discussion represents the polar extremes of the approaches to social science. In reality there is a continuum of beliefs with many intermediate positions between the extremes, each with their unique configuration of ontological, epistemological and human nature assumptions; and it is these configurations which predispose social scientists towards particular methodologies in terms of collecting and analysing data. Having looked at the nature of research, the importance of research methodology and the philosophical issues surrounding research design, this chapter now moves to a focused discussion on the particular methodology employed in this research project.

4.4 RATIONALE UNDERLYING THE RESEARCH PROJECT

In undertaking this research project, I hoped as indicated in Chapter 1, to fulfil two equally important aims, to meet the academic criteria required of doctoral research and to make some practical contribution to the practise of scenario planning through observation of the process. This meant that the research strategy would have to ensure that the outcome of the research investigation was matched not only to academic requirements whereby ideas are judged by their 'logical soundness and precision', but also to the practical orientation of practitioners who evaluate ideas in terms of their practicality and situation specific problem solving ability.

4.4.1 Quantitative versus Qualitative Techniques

Boudens (2005) and Maitlis (2005) suggest that qualitative research is generally appropriate for the inductive study of dynamic processes involving socially constructed reality, focusing on meanings and ideas. Although as indicated earlier, there is much, often caustic debate in

the literature in the area of quantitative versus qualitative techniques, as Bogdan and Taylor (1975) note, “when stripped to their essentials, most debates over methods are debates over assumptions and goals, over theory and perspective” (Bogdan and Taylor 1975, p.18). Hopper and Powell (1985) state that the form of enquiry embraced in a research project investigation should be consistent and appropriate in terms of the aim of the research and the underpinning values and assumptions. This notion that the appropriateness of a research approach ultimately derives from a combination of the research objectives and the nature of the social phenomenon to be explored, appears repeatedly in the literature (Bogdan and Taylor 1975; Easterby-Smith et al. 1991; Hammersley and Atkinson 1983; Kinnear and Taylor 1991; Morgan and Smircich 1980).

Given that neither the nature of my research, developing a richer understanding and explanation of phenomena with respect to a dynamic process, rather than the delineation and precise quantification between particular variables, it was clear that a quantitative methodology would not be appropriate. Required was a qualitative, interpretative technique enabling me to structure and come to terms with the meaning, rather than the amount or frequency of phenomena.

4.4.2 Process Research

In terms of process research, Pettigrew (1992) contends that “as long as research is carried out in an ahistorical, acontextual, and aprocessual manner, then researchers will continue to develop inadequate descriptions of change which are ill-composed guides for action” (Pettigrew 1992, p.10). This view is supported by others such as Boden (1994) who insists that there is a need to study organisations as they happen, rather than continue with the usual practice of conducting studies after the event. There are Pettigrew maintains, five guiding assumptions to maintain coherence in the overall approach to process research, namely: *embeddedness* (which necessitates studying process across multiple levels of analysis); *temporal interconnectedness* (understanding the sequence and the flow of events is crucial in process studies); *linking subject matter to context* (processes are embedded in contexts and need to be studied as such*); searching for holistic rather than linear explanations* (in processes research it is likely that multiple realities will be encountered which cannot be adequately studied in a fragmentary way as the whole is usually greater than the sum of its parts); and *linking analysis of process to outcome* (there are great advantages in process inquiry in having a clear outcome to explain as this provides an anchor for the whole investigation) (Pettigrew 1992). In other words, Pettigrew is suggesting that in process research it is insufficient to examine the parts of the situation by gathering data about isolated variables and dimensions, a holistic based approach which attempts to

make sense of the multiple interrelationships which emerge from the data is required in order to enable the researcher to arrive at a complete picture.

The above appears to support an approach to study process which has been termed ‘real time research’ (Samra-Fredericks 1998) i.e. studying real actors engaging in the process in real time and space, and dealing with real issues as opposed to developing abstract interpretations of historical events from a distance. In searching for a methodology which would satisfy all of the preceding, I came across the concept of *ethnography*, defined by Atkinson and Hammersley (1990) as distinctive forms of social research which exhibit some or all of the following features:

- an emphasis on exploring the complex nature of phenomena as opposed to testing hypotheses about them.
- a preference for examining a limited number of small-scale worlds/groups in detail.
- a focus on analysis of unstructured data in order to interpret and understand the meaning and functions of human actions and interactions in the form of verbal descriptions and explanations, rather than statistical analysis, the goal of which is sense making.

Ethnography is usually associated with anthropological studies of societies and their cultures because one of its guiding principles is that facts observed *in situ* must be grounded in a specific context i.e. observations must be connected with the backdrop against which they occur. Although my research would not qualify as conventional ethnography, in broad terms ethnomethodology and participant observations would it appeared, provide an appropriate framework to gather data on the scenario process under study in my research project, in order to put together a holistic picture, facilitating understanding while still maintaining coherence in the overall approach, as advocated by Pettigrew (1992).

Having made an initial determination that the appropriate research strategy for this project would be a qualitative, real-time ethnographic-based one, the next step was to undertake a more detailed examination of available methodologies in order to make a final determination as to the specific methodology to be used, along with justification for the choices made. Accordingly the next section of this chapter examines these methods in greater depth, beginning with a justification for opting for a case/laboratory study approach.

4.4.3 Case and Laboratory Studies

According to Gummesson (1991), case studies are becoming increasingly widespread in doctoral research in business-related subjects and there are he suggests, two types of case study: those which attempt to derive general conclusions from a limited number of cases, and those which seek to arrive at specific conclusions regarding a single case in which the case history is of particular interest. In a lengthy defence of the case study approach, Gummesson (1991) argues that one of the most important advantages of the case study is that it provides the opportunity for a holistic view of a specific phenomenon or process, but adds the caveat that this is time consuming, which explains why case study research projects usually involve a small number of cases. Yin (1984) meanwhile identifies three types of case study research, differentiated on the basis of the use of the research, these being *exploratory* (initial case study research such as a pilot study undertaken to provide a base for developing precise research questions or testable hypotheses); *descriptive* (which attempts to describe what happens in a particular situation); and *explanatory* (which aims at generating theory). The first two (exploratory and descriptive case study research), are he suggests, traditionally albeit unwarrantedly, accorded a low status within the scientific community while the third form (theory generating case study research) is viewed sceptically by mainstream scientists.

The reasons case study approaches are often viewed as lacking the scientific weight of more conventional research methods revolves around the fact that they are not generally based on rigorous statistical samples of large numbers of observations. As a consequence, they generally fail conventional evaluation criteria. Although it is not disputed that case study approaches are unlikely to meet these conventional evaluation criteria, there is the argument discussed in the following sections, that these are traditional positivist criteria and as such, are inappropriate measures for judging qualitative research.

In terms of Gummesson's definitions, this research project falls into the first category of case studies i.e. a small number of cases aimed at deriving general conclusions. In terms of Yin's categorizations, the research project is a combination of a descriptive and an explanatory case study in that while it attempts to describe what happens in the scenario development process, it also seeks to explain why this happens, leading to theory generation. Given that the project involved the observation of MBA students, it is also in essence a laboratory study. The advantages of a laboratory study aside from cost, is that firstly, it is easier to implement than real-world studies; secondly, the researcher has the ability to control and replicate certain sets of conditions deemed relevant to the study. The dominant criticism of this approach is the extent to which laboratory studies can simulate the real-world, because it is difficult to assess the impact of organisational and political factors which impinge on processes in laboratory settings. The criticism revolves around 'realism' which has two

dimensions*, mundane realism* and *experimental realism* (Bordens and Abbott 1988). Mundane realism refers to the degree with which the simulation mirrors the real-world environment in which behaviour occurs. Experimental realism meanwhile refers to the degree with which the simulation psychologically involves the subjects in the experiment, the argument being that unlike managers in the real-world, research subjects in laboratory studies generally have no real-world stake in the situation and are therefore unlikely to be predisposed towards a particular outcome before starting an exercise.

However in this research project there was a combination of factors which I suggest, mitigate these criticisms of conventional laboratory studies, these being that:

- unlike many reported laboratory studies, the research subjects used in this case were not undergraduates, but mature, post-experience, postgraduate students with an average age of 32 years of age and a minimum of 4 years' work experience;
- the research subjects were not paid to participate in this study, all were volunteers who had elected to undertake the Scenario Planning elective, and had an interest in understanding the scenario process;
- the research subjects did have a stake in the situation in that their efforts as a team would be evaluated and a final mark awarded to each team which counted towards the completion of the MBA programme. Thus the performance of the team would ultimately determine the marks awarded to the individuals comprising the teams, creating a strong motivation for the individuals to put considerable effort into their work in an attempt to ensure that a reasonable team mark was obtained; and
- there was a strong real-world element to the exercise in that the elective course revolved around a team developing a set of scenarios for a client and the format, tools and techniques used in the elective course was similar in most respects to that used in real-world scenario planning exercises.

4.4.4 Participant Observation Methods

The archetypal tools in ethnography are participant observation methods, defined by Bannister (1996), as "the accurate watching and noting of phenomena as they occur in nature, with regard to cause and effect or mutual relations, as opposed to an experiment, which concentrates on the manipulation of conditions, often in artificial conditions" (Bannister 1996, p.321). Four roles open to the participant observer are generally identified, based on the classic typology developed by Gold (1958). The first is that of the *complete participant* in which the researcher becomes a full member of the group under study, participating in their

activities, but any research objective is concealed from the group. The second role is that of the *participant-as-observer* whereby the researcher participates in the activities of the group and develops relationships with the group, but the research objective is not hidden from the group. *Observer-as-participant* is the third role in which the research objective is again, not concealed from the group, but the researcher's involvement with the group is deliberately kept to a minimum. The final role is that of the *complete observer* in which the researcher is fundamentally removed from the research setting and the research objective is concealed from the group. These four roles can be illustrated as in Figure 4.2 below.

Figure 4.2: Four Roles of Observational Methods.

(Adapted from Gold, 1958, page 219)

Actor

Overt Research		Covert Research
	Participant as Observer | ***Complete Participant***	
	Observer as Participant | ***Complete Observer***	

Bystander

Adler and Adler (1987) use the same four categories of observational roles, but differentiate them in terms of group membership roles, while Easterby-Smith et al (1991) propose the same four categories as depicted in Figure 4.2, but name the categories as *researchers as employee*, *research as explicit role*, *interrupted involvement* and *observation alone.*

4.4.4.1 Advantages of observation methods

Adler and Adler (1990) identify two advantages of observational methods, the first of which is that they are holistic in that they allow the researcher to study a group in the group's natural setting in all its phenomenological complexity. The second advantage is that observers are unconstrained by predetermined categories of measurement or response, but are "free to discover concepts or categories that appear meaningful, the observer bridges the gap between behaviour and constructs" (Kerlinger 1969, p.64). Other writers (Duncan 1979; Light 1979; Pound 1979) suggest that observation methods offer several other advantages, namely that:

- they are flexible methods which enable the researcher to incorporate unanticipated events, and discoveries can be validated even while the research is still on-going.
- they allow the researcher to study groups in more depth and for longer than is usually the case with other methods, allowing the researcher to capture accurate pictures of what takes place and how long they take.
- they allow researchers to observe behaviour directly; observers usually have no direct personal stake in the situation and are therefore able to look at the situation from different, detached perspectives.
- observation methods are generally non-interventionist, simple observations follow the flow of events and the researcher does not manipulate the research subjects.

4.4.4.2 Criticisms of observation methods

Although passionately defended by its supporters, the literature contains many criticisms of observation methods all of which can be grouped under three headings which Janesick (2000, p.390) refers to as 'the trinity of validity, reliability and generalisability'.

- Validity

  From a qualitative methods viewpoint the question of validity or accuracy of the findings, revolves around whether or not the researcher has gained full access to the knowledge and meaning of the informants (Easterby-Smith et al. 1991). Although a complex issue, in simple terms validity poses the question: are you observing and measuring what you think you are observing and measuring? There are three forms of validity, *criterion-related validity* (the ability of research findings to predict successfully to some criterion), *content validity* (concerned with the substance of what is being observed and measured), and *construct validity* (concerned with the psychological properties or 'constructs' underlying the variables being observed and measured).

  In terms of observation methods, criterion-related and content validity do not generally represent a problem because they are comparatively easy to understand; construct validity however, is an issue because the problem with observation is that humans have 'hidden' and 'unknown' windows as exemplified in the Johari Window concept (Luft 1984), which are not accessible to observation in the normal way (Hughes 1990). Phenomenologists refute this arguing that although not all mental states are directly

observable in the conventional sense, mental states are actually manifested in visible outward bodily displays, thus all mental states can be observed by studying these behavioural displays. This extends to sophisticated mental states such as beliefs in that "the beliefs people hold, the values they subscribe to, the judgements they make, their tastes and their preferences, are all publicly verifiable since they issue in, or result in, publicly observable behaviour, artefacts of various kinds, and so on" (Hughes 1990, p.22). At the same time Walker (1985) proposes that rather than attempting to evaluate qualitative research findings on validity criteria developed for quantitative research, qualitative research should be judged on a framework comprising *descriptive validity* (is each incident, act, event or indicator what it is thought to be by the researcher), *conceptual validity* (do the concepts used fit the data) and *theoretical validity* (the way concepts are handled and the coherence of the resulting theory).

- Reliability

As with 'validity', the criterion of 'reliability' was originally developed for use in quantitative methods. When applied to qualitative observation methods it relates to agreement between observers i.e. whether or not similar observations would be made by different researchers on different occasions and therefore, the extent to which research findings are reproducible.

Critics maintain that the biggest problem with all observation methods is that of the primary instrument of investigation, the observer, in that observation is totally dependent upon one individual's portrayal of events and that individual's perception of what is being observed. This gives rise to a number of problems, namely:

  - the issue of observer bias from their subjective interpretations of what they observe. Inevitably different observers will notice different aspects of the same situation and the argument that observation is always a theory guided process suggests that our ideas about what we want or expect to see, change how things look. At the same time because the observer's perception is shaped both by the observer's personality and by the nature of the interaction with the research subjects, the result may be different interpretations of the same behaviour by different observers. At the same time, even seasoned observers can make faulty, incomplete, incorrect or inaccurate inferences. Consequently without some acceptable form of observational cross-checking to validate their descriptions and interpretations, observers are likely to experience difficulties in

establishing the legitimacy of their work within the academic community (Adler and Adler 1990).

- the observer's presence, especially where the observer is an actor in the group, may alter the situation being studied in significant but unknown ways; the mere awareness of being studied is usually sufficient to alter behaviour as has been well documented. Added to this, the expectations of the observer can govern what the observer sees as a consequence of 'expectancy effects' whereby the observer develops preconceived ideas about the subjects and then inadvertently treats them in a way which ensures that the expectations are fulfilled.
- the fact that without statistical analysis to confirm the significance of observed trends or patterns, it is difficult to ensure that the findings are real and not merely the effects of chance i.e. it is often difficult to determine whether an observed phenomenon is a coincidence, or whether there is a causal connection leading to explanation and theory development (Denzin 1989).

In responding to these criticisms, the first point to note is that most of these issues are not unique to observation methods. For example, the argument that observations will be biased by subjective interpretations applies to all research in varying degrees because it is not possible ever to be completely objective as is commonly noted in the literature. In reply to the argument that what we want or expect to see shapes what we then see, Couvalis (1997) suggest that even if this is correct, there are limits to what he terms 'perceptual plasticity'. Meanwhile the argument that researchers cannot avoid influencing the setting being studied applies equally when undertaking laboratory experiments, questionnaires and interviews, as even with these methodologies, researchers inevitably create as well as measure attitudes (Bogdan and Taylor 1975). The objective according to Bogdan and Taylor (1975) and Webb (1966), is not to avoid researcher influences, but to account for them by providing readers with sufficient details to allow them to weigh-up the influence and its effects on the results reported. Becker and Geer (1982) meanwhile argue that observation methods are probably less prone to unacknowledged influences than are other methods, in that prolonged involvement in the scene means that very little will be hidden from the observer.

The second point is that there are steps that observers can take to overcome or at least to mitigate these problems, for example, researchers can ensure that the variables being examined are embedded in a theoretical framework, in which case

certain relationships should exist, thereby providing a known benchmark by which to gauge the interpretations (Lincoln and Guber 1985). Adler and Adler (1990) also suggest that when presenting their findings, observers can use *verisimilitude* or *vraisemblance,* a style of writing that draws the reader closely into the observations, so that when individuals read the reports they recognise and accept the representations because they correlate with their personal experiences. Although none of the above eliminate bias, they can be persuasive and enhance the credibility of the research.

- Generalisability

Generalisability (also known as 'external validity') relates to whether or not the results generated from a particular setting can be verified for extension to a larger population. Critics of observation methods contend that because these methods usually involve working with small groups which are seldom based on rigorous sampling procedures, it is unlikely they will be representative of the whole in a strict statistical sense (they may not even be typical of other groups), in which case the findings are not generalisable to other settings or subjects.

Again however, generalising from a single case is not confined to observation and it is not as big a problem as it appears according to Bogdan and Taylor (1975). Janesick (2000) argues that "for the needs of the bureaucrats, the old notions of generalizability seem to make sense. On the other hand, for those of us who are interested in questions of meaning and interpretations in individual cases .. traditional thinking about generalizability falls short, and in fact may do serious damage to individual persons ... in fact the value of the case study is in its uniqueness; consequently, reliability in the traditional sense of replicability is pointless here" (Janisck 2000, p.394). As Lincoln and Guba (1985) note, it is impossible to arrive at a set of consistent generalisations that can adequately account for all phenomena. Support for this comes from Schwartz and Ogilvy (1979) who suggest that there will always be multiple perspectives and all perspectives aggregated do not necessarily sum to the whole of the phenomenon. Yin (1984) meanwhile contends that small group or case studies are generalisable but in analytic rather than statistical terms. There are also remedies available to enhance the generalisability of findings, the most obvious of which is to limit the scope of the generalisations by acknowledging at the outset that the research is 'exploratory'. Finally, Rock (2001) maintains that the question of the generalisabilty of findings should not stand in the way of research as there are occasions when researchers want to investigate some group, or organisation, or

process in detail simply to see what is going on, and this he suggests, can be of significant benefit, especially when very little is known about a particular phenomenon.

To summarise this discussion on the criticisms of participant observation methods, the champions of these methods contend that the concerns over validity, reliability and generalisability stem from a positivist paradigm and lose relevance as issues in the post-positivist framework. The criticisms would be valid Rock (2001) suggests, if ethnographic studies had the same objective as those involving variable analysis, but they do not. The result according to Lincoln and Guba (1985) is that qualitative findings should be judged not on the traditional positivist criteria of validity, reliability and generalisability, but on the basis of being 'auditable', 'confirmable', 'transferable' and 'credible' which is more in line with the axioms of the naturalistic paradigm.

Reading the literature on the reported disadvantages of observational methods heightened my awareness of the attendant difficulties associated with the methods, but I was satisfied that there was sufficient support in the literature to defend a research strategy based on observation, given the nature of my research. Having thus resolved to use observational techniques as my primary data collection methodology, I now had to determine which of the observer roles I should use.

4.4.4.3 Observer roles

Determining which is the most appropriate observer role in an investigation requires consideration of a number of aspects, notably the extent to which the observer should participate in the activities of the research subjects, and whether the observations should be made covertly or overtly. In the case of this research project, the two actor observer roles (*complete participant* and the *participant observer)* were rejected, given that the research subjects were students who had had prior experiences with me as a lecturer in the foundation stage of their MBA programme. The fact that I had a history with the subjects and was a member of staff would have undoubtedly altered the behaviour of the subjects in unknowable ways had I assumed an actor's role in the research.

The above narrowed down my choice to one of the two bystander observer roles and the choice ultimately revolved around the issue of how much to disclose about myself and the research, a problem in all observational methods and an especially acute problem in covert observation. As previously indicated, the objective of the inquiry was to examine a process and it appeared that the most efficient and effective way to capture the process was to record it on videotape. There is much discussion in the literature indicating that once

research subjects are aware that they are being observed they may be inhibited and modify their behaviour, a phenomenon described by Webb et al. (1966) as 'reactivity'. I resolved to avoid this by not informing the research subjects that they were being observed, recording the process covertly using a hidden video camera. This raised a dilemma; filming people without their knowledge is a deception and clearly an invasion of privacy which makes this method vulnerable to moral attack and charges of ethical malpractice. However, support for the approach of covert observation is offered in the literature by writers such as Nason and Golding (1998) who state that it has been widely used in educational research.

Invasion of privacy can take one of two forms; entering into private spaces or misrepresenting oneself (Adler and Adler 1990). This research was on safe ground with respect to the first form, as no private locales would be entered, all observations would be made within the Business School buildings in semi-public settings. The second form, misrepresenting oneself is a more difficult issue because as Ditton (1977) points out, all participant observation methods are essentially deceitful as researchers cannot avoid deception in situations in which they are simultaneously participating in and observing; without deception, many classic research exercises such as Milgram's (1974) obedience research, would not have been possible. One way of coming to terms with this ethical issue was to adopt the pragmatic approach proposed by Taylor and Bogdan (1984), who suggest that when asked about the purpose and nature of his/her work, the researcher should use *passive deception* i.e. be truthful, but vague and imprecise rather than actively mislead the research subjects. I chose to adopt this approach on the basis that although still an invasion of privacy in the strict sense, it was a less insidious form.

Therefore in terms of Gold's typology, I elected to adopt the role of 'complete observer'. However prior to using an observation system, it is necessary to decide when and how the behaviour is to be sampled. Traditionally researchers sample behaviour through *event* sampling (observing behavioural occurrences or events of a given class) or *time* sampling (observing behavioural units at different times). Given that I was interested in observing a group process from beginning to end and was therefore concerned with continuity and context, I would essentially be combining elements of both event and time sampling.

4.4.5 Data Capture using Video Recording

Naturally occurring behaviour is complex and fast moving and it is difficult to capture all the actions and nuances of behaviour accurately and completely through conventional note taking; it becomes an order of magnitude problem when observing groups of five or six individuals. There is also the problem of ensuring that the notes taken accurately portray the

behaviour observed. Using a tape recorder would lessen these disadvantages, but capturing words alone is insufficient and consequently I decided as previously indicated, to capture the behaviour of the research groups using a video camera. This offered a number of advantages, namely that it would:

- allow me to capture the sequential interactions and activities of the groups, *in situ*. This suggests Heath (1997) is part of "the richness and rigour of video-based studies" as it permits the investigation of events and activities as they occur in the context in which they occur, and allows the researcher to "demonstrate how participants themselves are orienting to the organisation of activities described in the analysis, and examine the resources used by participants in organising their conduct" (Heath 1997, p48).
- be a permanent record which I (and perhaps others) could review as many times as necessary giving the potential to pick up behaviours which might have been missed in a live observation.
- provide a body of data which could serve a range of theoretical and analytical interests. Once I had the data on videotape, every event and action would be the potential subject of inquiry. This would allow me to follow Janesick's (2000) advise to make assertions drawn directly from the data, supported by using direct quotations from the video transcripts.

One of the problems associated with video recording of research subjects is that it would not be possible to capture their conversations and activities between the formal group sessions when they were not in the rooms in which the video equipment was installed. However this is not unique to video recording, it is a problem common to most observation methods and the experience of researchers such as Samara-Fredericks (1998) is that if these conversations and activities are significant to the participants, they will inevitably find their way into the formal group sessions.

In view of all of the foregoing, I concluded that video recording was an acceptable methodology to collect/record observations on the basis that it was basically no different from using audio equipment to record conversations, which is an established methodology with a long history for example, in discourse analysis. Having determined how the data would be collected and recorded in this research project, the next issue to address was how to analyse the data collected.

4.4.6 Data Analysis Techniques

There are arguments in the literature which contend that methods of analysing qualitative data are labour intensive overloading the researcher, require a high level of skill, and are not well formulated, offering few guidelines for protection against self-delusion and the presentation of unreliable or invalid data (Hart 1987; Miles and Huberman 1984). Glaser and Strauss (1967) do not deny the first two contentions but do not accept that qualitative methods are not well formulated; they argue that it is not the methods which are at issue, but researchers who use qualitative data in a non-systematic, non-rigorous way, which has resulted in scepticism within the research community with respect to qualitative data.

4.4.6.1 Analytic induction

The term *analytic induction* (AI) was coined by Znaniecki (Bogdan and Taylor 1975) and is broadly defined as the detailed and rigorous examination of a small number of strategically selected cases in order to empirically establish the causes of specific phenomenon (Johnson 1998). The difference between this and deductive approaches is that in deductive approaches, an *a priori* frame of reference is imposed on behaviour to explain it whereas in inductive approaches, explanations are inductively derived from *a postpriori* understanding of behaviour. An advantage of AI is that it does not stipulate how data should be collected and can therefore be applied to a wide range of research settings, including participant observation. There is some question as to whether or not 'pure' induction is actually possible, and critics of AI contend that the small samples used present problems in generalising theories developed, but as many authors have noted, all methodologies have their limitations and the cardinal rule is that essentially, any methodology is acceptable, so long as it is well-formulated, rigorous and produces verifiable results.

4.4.6.2 Content analysis versus grounded theory

There are two basic ways of analysing qualitative data, *content analysis* and *grounded theory* both of which aim to distil the essentials from text through systematic classification methods to arrive at some form of higher-level synthesis. Content analysis is a structured approach whereby raw data is organised by systematically coding it according to some scheme, and it is then searched for commonalties across it that form patterns, by noting the frequency and or distribution of key words or phrases. Grounded theory meanwhile, defined by Strauss and Corbin (1990a) as "a qualitative research method that uses a systematic set of procedures to develop an inductively derived theory about a phenomenon" (Strauss and Corbin 1990a, p.23) differs from other qualitative approach such as content analysis, in two

interrelated ways. Firstly, grounded theory methodology emphasises theory generation as an integral element of social research; secondly no predetermined structure or organising scheme is placed on the raw data, the structure is data-induced i.e. derived from the data by teasing out theme, patterns and categories which are used to develop grounded theory (Easterby-Smith et al. 1991). However, Denzin and Lincoln (1990) warn that although the process may be systematic and orderly, as in all qualitative methodologies, interpreting and making sense of data is difficult as there is no single interpretative truth in data, multiple interpretations are usually possible depending on who is doing the interpretation.

At first glance, it may be argued that grounded theory comes close to positivism in that it appears to assume an objective external reality and neutral observers who objectively discover data, and it proposes techniques for the analysis of data which are arguably reductionist. However it departs from traditional positivism in that it recognises art as well as science in the analytic process, accepting the mutual creation of knowledge by the observer and the observed, it challenges the ascendancy of quantitative research methods, and it aims at meaning and developing understanding of behaviour, rather than simply identifying causal explanations and fundamental laws governing it.

Given the above and that my intention was to focus on understanding specific phenomena in the scenario process by attempting to generate categories of behaviour grounded in observations and reflections which could then be used to predict similar experiences, it was clear that a form of modified grounded theory approach was appropriate for this research.

4.4.6.3 Grounded theory methodology

Beginning with the seminal work of Glaser and Strauss (1967) who first articulated the concept and provided guidelines for the practice of grounded theory, much has since been written about the subject. Glaser and Strauss advocate the generation of theory through codification and ‘constant comparative’ analysis of data, and they identify two theory levels, *substantive theory* and higher-level *formal theory*. A core dictum of the methodology as developed by Glaser and Strauss is that the researcher should approach the field of inquiry ignoring the literature in the substantive area under study. The basis of this is a concern that in reading the literature prior to undertaking analysis of data, the researcher will inevitably develop unconscious assumptions as to what should be found in the data. This ‘pre-understandings’ will bias and severely limit rather than expand the researcher’s effort to develop theory from the data (Glaser 1992).

The philosophical approach which underpins grounded theory is that the social organisation of the world is integrated and there is no need for preconceived theorising because all of the theoretical explanations are already present in any substantive area of inquiry. The researcher's task is to uncover, through analytic induction, the conceptual issues which are important to those in the substantive area of study, and which lie buried in the mass of data. To achieve this, the researcher has through a combination of creativity and theoretical sensitivity, to discover which patterns of behaviour exist which when synthesised, explain most of the variations in the data (Lowe 1996). The process consists of a four-stage framework involving coding of incidents within data and the constant comparing of incident to incident and incident to code. The first stage, *open coding,* is concerned with comparing incidents applicable to categories through isolating significant discrete events, happenings or other instances of phenomena, which are examined and compared for similarities and differences in order to group them according to their properties and dimensions, under higher order, abstract categories. This is followed by *axial coding* which is a progressive synthesis of the data to integrate categories and their properties which have a logical relationship with one another to generate a 'paradigm model'. The process of s*elective coding* which follows is a higher, more abstract and conceptual rather than descriptive level of analysis, and entails selecting the central phenomenon around which all the other categories revolve, validating the relationships and filing in the categories that need further refinement and development to derive a theory grounded in data. The final step is to delimit the theory and write it up.

Although the grounded theory approach appears logical and well formulated, it is open-ended and can be extended indefinitely which can be problematic in terms of achieving closure, especially for inexperienced researchers. Critics of grounded theory claim amongst other things, that it is an inadequate approach to theory development because it is based on inductive logic and the problem with inductive logic is that any set of facts is open to multiple interpretations. At the same time, Glaser's (1992) claim that there is no need to force data as with patience concepts eventually emergence, is according to Lincoln and Guba (1985), a significant understatement of the effort, ingenuity, and creativity required.

Glaser and Strauss (1967) contend that the attempts to discredit grounded theory stem from the traditional preoccupation of social scientists with the verification of theory generated by logical deductions from *a priori* assumptions, and rigorous quantitative verification, which they argue, is inappropriate. A well-constructed grounded theory Glaser and Strauss suggest, must meet four interrelated criteria, namely: *Fit* (the theory should closely fit the realities of the substantive area in which it will be applied); *Understanding* (as the theory represents the realities of the substantive area, it should make sense and be

comprehensible to lay people working in the substantive area); *Generality* (the theory should be sufficiently general and abstract enough to render it applicable to a variety of contexts in the substantive area); *Control* (the theory must enable the user to have enough control in everyday situations to warrant its application). Any theory which meets these criteria, will Glaser and Strauss argue, contribute to both theory and practice.

Having reviewed the literature on data analysis methodology and given my research aims, I was satisfied that there was sufficient justification for an analytic induction methodology using coding processes based on a grounded theory approach. The research would not however qualify as true grounded theory as firstly, prior to the start of data collection I had read much of the literature in and around scenarios and therefore unconsciously or not, preconceived theorising would inevitably be a factor in terms of my biasing my assumptions of what might be found in the data. Secondly, rather than use the coding process advocated by grounded theory methodology, I settled on the process identified by Becker and Geer (1982), beginning with descriptive analysis in which I attempted to place initially observed events into conceptual perspective and searched for further indicators of ideas, concepts or themes which I thought likely to be involved; this was followed by more focused analysis in which I checked the frequency and distribution of phenomena to determine if the events were widespread and typical; and the final stage was selective analysis focusing on the attributes of different activities with the aim of constructing a model to provide a general framework within which the observations could be described, as detailed in section 4.5.5.

4.5 DATA COLLECTION AND ANALYSIS

Having discussed the data collection and analysis methodology, this section describes the specifics of the data collection and process. As with all inquiry activity, this research exercise is the product of particular groups of people, engaged in a particular activity, in a particular context of time, place and ideas. Altheide and Johnson (1990) suggest that in order to satisfy the basic elements of ethnographic principles, an ethnographic report should provide a comprehensive account of the setting and situation surrounding the research to enable readers of the report to better understand it and put it into an appropriate context. Accordingly, in the following section I have used elements of their report framework to convey the context of this research project to the reader.

4.5.1 The Context and Setting

The scenario planning elective, developed for the MBA programme by van der Heijden (KvdH) and modelled on the process as used by RDS and Global Business Network (GBN),

was designed to give students first-hand experience of undertaking a scenario planning exercise in as close to a real-world situation as possible. Given the interactive nature of the elective it was limited to 25 students, but demand for the elective was such that it was necessary to run the elective five times. It was also necessary to offer the elective in one of two formats to accommodate various MBA routes. For full-time students the elective was run over a period of weeks with students attending two evening sessions of 3 hours each (1830-2130) followed by two full-day sessions of 12 hours each (0930-2130) followed by a final two x 3 hour evening sessions (1830-2130). The second format, developed for part-time and open learning students, had the elective running over a 2 ½ day weekend (1400-2130 on Friday and 0900-2130 and 0900-1800 on Saturday and Sunday). Of the five elective offerings, four were run under the evenings plus weekend model, while the fifth was run over a single, long weekend. The groups observed in this research were two groups of full-time students, and one part-time/open learning group and the timeframe over which the research was conducted, including the pilot study, was a period of eight weeks spanning the last week of April through to the end of the third week in June.

The rationale for observing three groups rather than just one group is that this would allow me to compare and contrast the patterns of behaviour across groups undertaking the same process under the same conditions, and derive general conclusions rather than specific conclusions emanating from a single case study, thereby enhancing the ability to generalise the findings. At the same time I could have observed three groups of full-time students, but chose instead to observe two groups of full-time and one group of part-time/open learning students. The rationale underlying this was to determine if there were observable differences in the behaviour patterns of groups of students who were engaged in full-time studies and undertook the scenario planning exercise over several weeks, versus students who all held full-time jobs, were studying on a part-time basis and undertook the same exercise but in a shorter, more compressed timeframe.

As in a real-life scenario exercise, the students worked in small groups or syndicates, and each group was pre-assigned a specific room in the building which they then used as a base to carry out the exercises associated with the scenario planning process. Two of the rooms used by syndicates were used as observation rooms to gather the data for this research project. The first, Room 524, known as the ‘Decision Support Room’ (DSSR), is purposely designed for research containing a large one-way mirror built into the inside wall of the room, ceiling mounted microphones, and an observer room hidden behind the mirrored wall. A tripod-mounted video camera and monitor was placed in the observer room and connected to the microphones to record activities in the DSSR. However it was discovered that being a larger room, the camera could not record the length of the room in a single frame. Thus the

camera had to be placed in the left corner of the room and angled to the right which then captured a view of approximately three quarters of the room, including the tables and chairs in the middle of the room and the whiteboard on the front wall of the room.

The second observation room was Room 525, a standard small meeting room, adjacent to the DSSR. A small wide angle peep-hole camera and microphone were installed in the suspended ceiling of this room and camouflaged as a part of the overhead water sprinkler system, so as not to be immediately visible. This second observation room was deliberately chosen because firstly, being a small room it was determined that by placing the camera directly above the entrance to the room the camera was able to capture a view of the entire room; secondly, being adjacent to the DSSR reduced the cabling necessary to connect the camera in Room 525 to a recorder and monitor in the DSSR observer room.

The observer room situated behind the DSSR thus became the base for the recording of the activities of the groups working in Rooms 524 and 525. Although none of the students on the elective course were advised that they were being unobtrusively observed and recorded, most if not all of the students in the groups using the DSSR were aware that the glass wall was in fact a one-way mirror; however they appeared to disregard the mirror for two reasons; firstly they had all used this room several times in the course of their MBA and therefore the mirror was not a novelty to them; secondly, they had been given no reason to assume or suspect that they were to be observed during the course of the elective.

4.5.2 Key Participants

There were two key participants in the research project, the research subjects (MBA students) and Kees van der Heijden (KvdH), the lecturer responsible for designing and running the course. Prior to starting the elective the students were assigned to groups comprising 5-6 students, this being the ideal group size which had been established in running the elective in previous years, in that it was large enough to ensure diversity of member composition, but not too large so as to present problems in terms of working together as a unit. The group composition was pre-arranged by the course administrator in order to ensure that there was as far as possible, an equal gender distribution and as wide a variation in terms of the age, qualifications and work experience of group members on the basis that the practitioner literature suggests that diversity of team members purportedly enhances the ability of the team to contemplate a wider range of futures. In compiling the syndicates diversity of composition was achieved as far as the skills and work experience of team members was concerned; but it was not possible to achieve a gender balance or wide diversity in terms of age, as females accounted for less than 30% of the MBA students and

the majority of the students were aged between 27 and 33 years of age. (Details of group member ages and work experience are shown in Appendix 1).

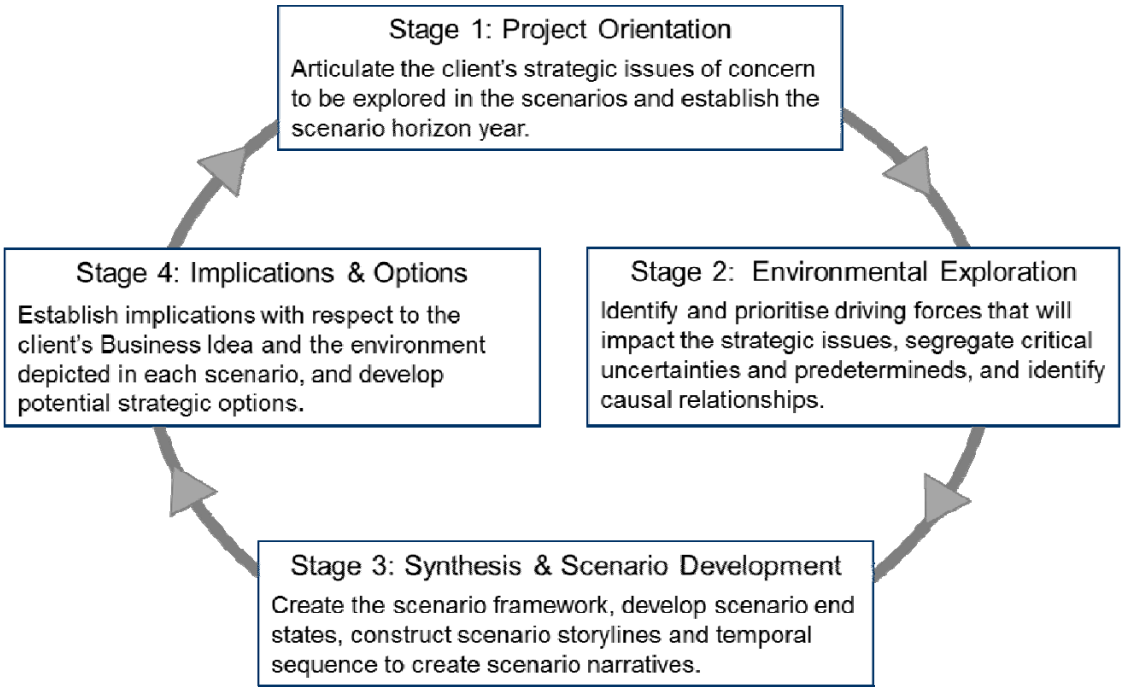
The decision was made to observe two groups in each elective offering, one group which would be assigned the DSSR and the other, Room 525. The decision as to which of the groups undertaking the elective programme to observe was done randomly and syndicate room allocations were arranged to ensure that the groups assigned to the DSSR and Room 525 had the rooms for the duration of the elective.

To legitimise my presence at the electives, at the introductory plenary session of each elective offering, I was introduced to the students who were told that I would be 'helping Kees'. They were also advised that I was conducting research on scenarios, and that at the end of the elective I would be asking all participants to complete a questionnaire and would be interviewing a number of them. Although not explicitly stated, the impression deliberately given to the students was the research would comprise the questionnaires and the interviews conducted at the end of the elective; no mention was made of the intended observation of selected groups. However, at the end of the elective, the students were debriefed on my research and permission sought from all those that had been filmed, to use the material in this thesis and subsequent publications. All participants readily gave their permission, except one individual who only gave his concept once I had given him copies of the recordings which he later returned to me.

4.5.3 The Activities

In the elective, the groups were set the task of developing a set of scenarios for a particular client, in a four stage process, as shown graphically in Figure 4.3 below. This is a generic four stage development model based on the models promulgated by RDS and GBN.

Figure 4.3 Scenario Development Framework



The 'client' in the scenario exercise in each syndicate was a group member who role-played the position of CEO (or other suitable senior position) within his/her company. Each syndicate was left to decide which of the companies represented by the group members would be the client for the scenario exercise. Having selected a client the other group members then interviewed the client; on completion of the interviews, the individual role-playing the client reverted to being a member of the scenario group for the remainder of the course.

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The format of the elective itself was one in which there were a series of plenary sessions followed by group work sessions. The plenary sessions were used to unfold the scenario planning process to the students in stages through a series of exercises; thus at the end of each plenary, the students were given a set of instructions comprising an exercise, which detailed the next step in the scenario building process. (See Appendix 2 for a complete set of these instructions and exercises, labelled as 'Syndicate Exercises'.) The groups then adjourned to their meeting rooms for a specified period of time to complete the exercise, at the end of which they reassembled for a further plenary session to be given the next set of instructions/exercise. During the syndicate group work sessions, KvdH visited each group in rotation to ensure that they were making progress and to provide advice and input where

required. I also visited each group periodically, ostensibly to check that they were working to plan and to provide support to those who were experiencing problems. By making regular visits to the groups I was building familiarity with the groups and legitimising my presence.

4.5.4 Significant Events

There were two principle phases in the collection of the empirical data, the first being a pilot study to test my initial ideas about the data gathering strategy I had selected and equipment to be used; the second was to embark on collecting data for the full study, having adjusted my strategy as required based on the lessons learnt from the pilot study. The pilot study was carried out with students undertaking the first of the five scenario elective offerings run on the 4 evening/two weekend model.

My initial strategy had been to use the DSSR to observe one group in each elective offering. This presented no problems in the first two of the evening sessions; the evening began with a plenary session of 1½ hours followed by a short break at the end of which the groups adjourned to their respective rooms to carry out the next designated exercises in the scenario process for the remainder of the evening session. Consequently groups were only in their rooms for a maximum of 90 minutes during which they were focused on carrying out the exercises. There was little movement from the team in the DSSR, they sat around the table in the centre of the room engaged in their exercise and recording them was not a problem.

On the first day of the two day session, a problem was encountered in recording the team in the DSSR. The schedule for the day comprised two one hour plenary sessions, one at the start of the day and the second following lunch, the remainder of the day being allotted to group work in the syndicate rooms. Initially recording in the DSSR presented no problems as the students continued to either sit around the table discussing issues, or congregated in front of the whiteboard carrying out post-it and clustering exercises. However as the day progressed, two events occurred which hampered the recording of the team's activities. The first was that as the whiteboard in the front of the room filled with post-its, the group began to expand its working area by attaching flipchart pages to the rear wall of the room and the group would periodically fragment with some group members congregating around the flip charts on the back wall while others collected around the whiteboard at the front of the room. As indicated earlier in section 4.5.1, the DSSR is a large room and it is not possible to capture the entire room in a single frame with a video camera; this meant that I could capture what was going on at the front wall of the room or the back wall, but not both simultaneously. The second event was even more problematic in that from the back wall, the

team eventually moved to using the one-way mirror wall as a working surface, attaching flipchart pages to it which obliterated my view of the team, hence my ability to record their activities.

In addition to the above, a second unanticipated problem arose on the two day session. During the evening sessions students would take a short break after the plenary session and then reassemble in their syndicate rooms to carry out the designated exercise for the evening. During the full day sessions however, it became apparent that the groups were taking extended breaks and were in no hurry to return to their syndicate rooms; in effect the groups were continuing to work on scenario exercises, but were doing so in what was presumably the more comfortable setting of the MBA lounge. The problem with this of course is that I could only record on tape, activities which occurred in the observer room, and therefore might fail to capture critical events in the activities of the group being observed.

Following from the above, it was obvious that a rethink of my data recording strategy was required. The solution to the problem of the limitations of recording in the DSSR arose from a discussion with the Audio Visual Services Supervisor at the Business School; he suggested that the problem could be overcome by using a smaller room and installing a small wide angle lens camera which could capture the entire room in its view. Several 'peep-hole' cameras were tested in various meetings rooms and eventually Room 525 was selected because of its smaller size and proximity to the observer room behind the DSSR. Experiments were undertaken to find the best location for the camera in terms of room coverage and it was found that placing the camera above the entrance to the room afforded the camera a view of the entire room. Thereafter Room 525 became the primary observation room, however I continued to record the activities of the groups using the DSSR because although an incomplete record of activities in the room would invariably be captured, what was captured might later prove useful in some way.

The second problem of students working outside of the syndicate rooms was solved through accidental discovery. I discovered that I could cue teams to return to their syndicate rooms by wandering into the MBA lounge after the designated length break period. The groups appeared to take the sight of me entering the lounge as a signal that they should return to their syndicate rooms and continue with their exercises. This probably stems from the fact that during the course of their MBA the students had become conditioned to the extent that the sight of the lecturer entering the lounge at the end of a break period indicated a 'return to class' required. Although this cue did not work in every case, if I followed up by indicating to a group that it was time for them to return to their syndicate rooms, they heeded the request.

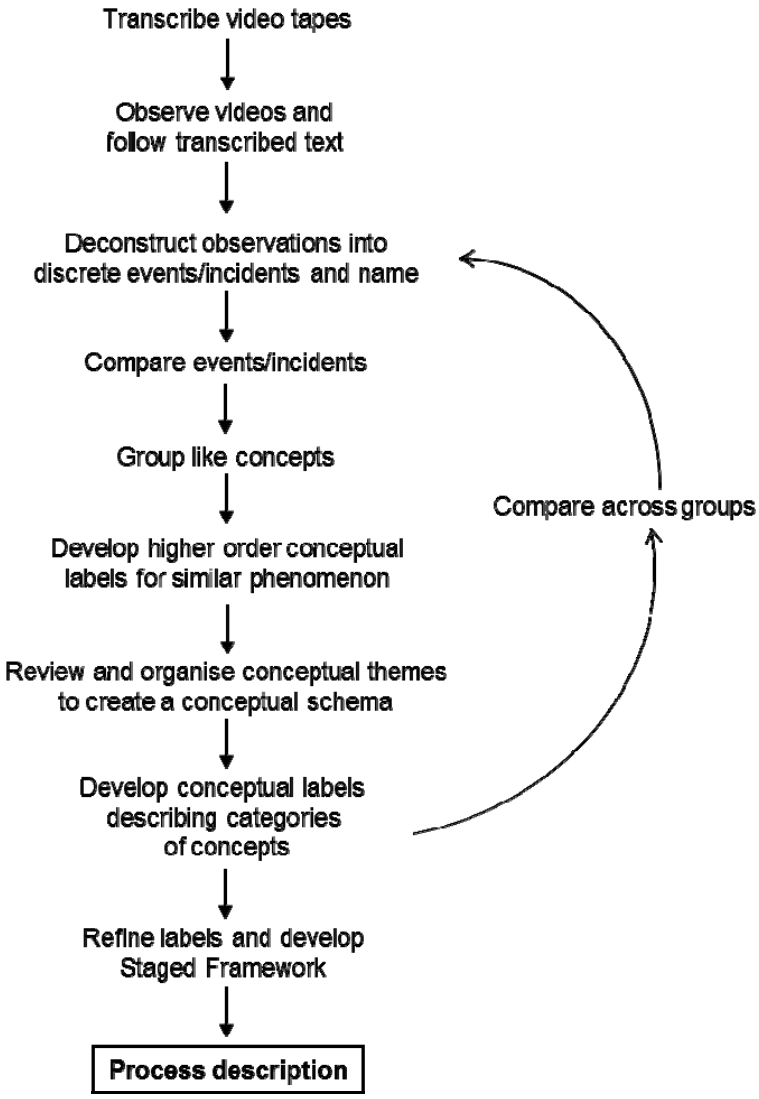
Several other smaller, but no less valuable lessons were learnt from the pilot study. For example, the need to be constantly aware of where the groups being observed where at all times throughout the day so as to ensure that I did not spend time recording an empty room, or that I did not forget to switch the recorder on whenever the team was in the room. Having internalised the lessons learnt from the pilot study and made the appropriate adjustments in terms of data recording, I proceeded to record the next three scenario elective sessions.

4.5.5 Data Analysis

I watched video tapes of each session within a day of the recording, to check on the sound and viewing quality of each tape, and made simple hand-written field notes of what appeared to be interesting events such as group members' movements around the room, members coming from and leaving the room, reactions of the group to visits by KvdH and so on. I then set about transcribing the tapes as 'naturalised talk' (Silverman 2001), an exceptionally time-consuming activity which involved repeated slowing down and replaying of tape sections to ensure that I had accurately captured conversations. I could have contracted out the transcription, but reasoned that it was critical that I do this as a way of engaging with the conversation data. In undertaking the transcription, two things became apparent, the first being that there were periods of relatively long silences during which the group members were preoccupied with the exercise they were working on; the second was that people do not generally speak in neat, complete sentences, and many sentences were not completed as a consequence of interjections by group members.

Having transcribed a set of tapes, I then viewed the tapes and working with the conversation texts, attempted to isolate incidents, compare and code them. The focus was on the group's activities in terms of the scenario development process in order to address the research question - what factors impact the scenario development process, ultimately affecting the achievement of the success criteria?

Figure 4.4: Research Journey from Transcription to Staged Framework



The process as illustrated in Figure 4.4 above comprised a number of sequential steps. The first was to deconstruct the observations into discrete events and incidents by looking at the text line-by-line, asking questions such as 'what is this person saying?' and 'what does this person mean by this?' and giving each distinct utterance or incident a simple label such as 'arguing', 'confused' and 'concerned' as a general indicator to describe what I was seeing in the group. The second step was to review the text coding and compare events and instances to see if there were concepts which appeared to link or relate to the same phenomena and which could be subsumed into higher order integrated category groups; this was done by asking questions such as 'is this the same as that?' and 'what does this relate to?' and developing a conceptual label to describe the phenomenon. The next step in the

analysis was to review and organise the conceptual themes and attempt to develop a conceptual schema of the observations by asking the question 'what seems to be happening here, what does all of this represent?' Initial labels in the form of a name or a metaphor which encapsulated the particular category of concepts where then developed. These integrated categories of concepts were reviewed across the coding of the two other groups and the labels refined, leading ultimately to a description of the scenario development process in the form of 'staged framework' or broad conceptual schema of the process. The resulting staged framework is described in Chapter 6 and illustrated in Figure 6.1. Examples of the coding and categorisation of the transcripts are included as Appendix 3.

Some reflections on the data analysis task include the following: firstly, in analysing and coding of the transcripts, I experimented briefly with NUDIST software to aid the analysis, but abandoned this as using this software requires a long learning curve, and I found that although immersing self in the data was time-consuming, tedious and at times frustrating, it was more interesting and ultimately more useful in terms of interpreting the data. Although the original observations were captured on video, I was able to transfer the video tapes to compact disks which proved to be very useful, enabling me to view the tapes on a laptop. Secondly, although the research journey depicted in Figure 4.4 suggests that the analytical task was a simple and continuous linear process, it was in fact very much an iterative process, with repeated viewing of the videos and reading of the transcribed text. It was also a lengthy process taking almost a year to complete as I had other commitments to attend to, and there were a number of occasions in which I became 'bogged down' and had to set aside the data and take a break from the analysis and coding process. Although this extended the process, it proved beneficial in that after a break, I came back to the task of analysis and coding refreshed and energetic. The third observation is that the final staged framework discussed in Chapters 6 and 7 did not arise from a sudden overnight epiphany, it emerged slowly over a long time period and required numerous modifications.

Finally although there are suggestions in the literature that interpretive data should be shared with others to validate the findings, I elected not to do this, the justification for this coming from Alvesson and Deetz (2000) who argue that giving data to colleagues for validation is misguided as often these colleagues share the same biases as the original researcher. There was also an issue of practicality in that finding someone who would willingly review many hours of video and read several hundred pages of transcription, would not be an easy task. However, in order to include an element of intercoder reliability checking, I conducted an informal peer review of my coding by giving samples of my coded transcripts to two of my senior colleagues experienced in qualitative data analysis. Both colleagues reported that from the sample reviewed, the coding structure appeared

appropriate which increases the validity of the emergent categories and so findings. Inevitably the analysis of qualitative data can be problematic and so some assurances from competent research colleagues offers increased confidence.

4.6 CONCLUSIONS

This concludes the discussion on research design and methodology. What I have set out to do in this chapter is to: demonstrate an understanding of the main philosophical issues associated with research design and methodology; to make explicit my line of reasoning behind the research strategy I chose to follow and to find support for this in the literature; and to describe the setting, participants, activities, key events and data analysis in the research process to provide the reader with an account of the context of the research project.

In deciding to use participant observation and a coding process of observed behaviour as my research tools, I knowingly accepted that there were problems associated with them and they are often denigrated in the literature as being less than rigorous. I am also aware that in seeking to understand behaviour, it is inevitable that my beliefs and values will unavoidably influence my interpretations of events observed. However my understanding from the literature is that no inquiry methods are problem free and in the analysis of qualitative data, there are no well-established and widely accepted rules and routines analogous to rigorous statistical testing in the analysis of quantitative data; prescriptions are vague and analysis essentially proceeds on the intuition and judgement of the researcher. However I take comfort in Argyris's pronouncement that "rigorousness is to a researcher what efficiency is to an executive: an ideal state that is always aspired to, never reached and continually revered" (Argyris 1968, p.196).

The two chapters which follow proceed to extract the findings from the observation of the research project, and in constructing the research findings in these chapters I have used verbatim quotes from the group members as exemplars of the issues and events described.

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CHAPTER 5

FINDINGS: SCENARIO DEVELOPMENT PROCESS TASKS

5.0 INTRODUCTION

The empirical findings are presented in the following two chapters. This chapter presents the empirical findings in terms of observations of the tasks involved in the scenario development process, while the chapter which follows presents the findings in terms of the process design.

5.1 THE SCENARIO DEVELOPMENT TASKS

The generic 4 stage process framework used by the students to develop a set of scenarios discussed in Chapter 4, is reproduced in Table 5.1 below. The instructional steps given to the students which detailed each of the steps in the scenario building process are included in the table in order to see how they relate to each stage of the process framework.

Table 5.1: Scenario Development Framework and Instructional Steps

Scenario Development Framework	Syndicate Exercises
Stage 1: Project Orientation Articulate the focal question/strategic issues of concern to be explored and the horizon year, and identify the current organisational assumptions.	**Instructional Steps: 1 and 2** • Select client. • Interview client using 7 Questions. • Identify client's strategic issues. • Establish scenario horizon year.
Stage 2: Environmental Exploration Identify and prioritise driving forces that will impact the focal question, segregate critical uncertainties and predetermineds and identify causal relationships.	**Instructional Step: 3** • Brainstorm and cluster driving forces. • Identify knowledge and research agenda. **Instructional Step: 4** • Report on research undertaken. • Repeat brainstorming and clustering. • Use importance/predictablility matrix to select 2 independent drivers to create scenario matrix. • Create end-states and develop storylines.
Stage 3: Synthesis & Scenario Development Create the scenario framework, develop scenario end states and construct scenario storylines and temporal sequence to create scenario narratives.	
Stage 4: Implications & Options Establish implications with respect to client's Business Idea and in the environment depicted in	**Instructional Step: 5** • Select Strategic Options. • Identify outcomes of options.

the scenarios and develop strategic options.	● Prepare and present scenarios and options.

5.1.1 Stage 1: Project Orientation

Step 1 of the process, selecting a group member to assume the role of the client, explained in the preceding plenary session and supported by the instructional Step 1 handout, was not an especially difficult task. There was however an initial period of uncertainty within the groups as to what exactly was to be done, as evidenced by statements such as:

> *Okay, so what do we have to do now … what is the first thing we are supposed to do?*
>
> *Jeez, you know I am confused … we have to … what … interview one of us who is the client?*
>
> *Yes I think this what he (KvdH) said in the lecture, one of us who knows about a business should be the client … and then we interview him using the … something questions he gave us … right?*
>
> *But first I think we have to decide who to be the client … isn't that right?*
>
> *Yes but I heard him (KvdH) say that we should talk among ourselves first to see who would make the best client … someone who was senior in the company.*

Once the groups had selected a member to role play the client, there was very little apparent task confusion in carrying out Step 2, the client interviews, clustering of interview data and determining the strategic agendas. This may be explained by the fact that the students had already undertaken a similar client interview exercise in a previous course (Strategic Issue Exploration) and were familiar with the interview process, use of post-its and interview data clustering techniques.

However, while Instructional Step 2 stated that the objective of this step was to uncover the client's 'strategic issues', the discussions by both the clients and the interviewers focused predominantly on operational level issues. For instance, in answer to the question, *what important decisions lay ahead*, the client responses were:

FT1 Group:

> *Right. Well the culture of the company, it is a small family company. This is the third generation running the company. I don't know who they're really thinking of, if anybody in terms of passing the company onto, because he himself doesn't have anyone, he has one son but he's physically handicapped and I've heard whispers there might be a*

nephew in the wings somewhere but it's not clear at this point. I mean Blair is about 39 so is still fairly young but it's not clear at the moment what he intends to do in terms of continuing the family business, and because it is a family business he takes the major decisions. He has inputs from the production director, finance director, the marketing director but at the end of the day what Blair wants is what's done. It's a big question and a big decision to be made, where do we go to from here?

FT2 Group:

Good service and I would include good customer service, employees and good image for the store. Good layout, good presentation with the … a nice atmosphere. That's one. Erm, the products and the customer who we want in the east because a lot of the times the products we don't have in the store or have on the line, because that's not something we thought about before …good opportunity to bring it in.

In reviewing the interview clusters developed by the groups, the strategic issues were typically operational issues such as how to recruit and retain better caliber staff, how to improve marketing, how to reduce costs and so on. There was an exception in the PT/OL group in which the client's concerns revolved around the need to determine target customers and positioning in the market which is somewhat more strategic.

PT/OL Group:

I think of the decisions I have to make, I still come back to the … define the target customers, define the products and services offered to them and define the structures that are put in place that allow you to do that. The reason they're so important is almost each one affects the next. If I set the target customers were the top 300 customers in the UK in the business market, I would be turning round and saying get rid of all that chunk and I would chop what we've got fantastically and I would make us a small trader. If I say we want a main domestic, thousands in the middle band and 300 in the top band, implications of that are that we need an infrastructure that would be able to do the billing, the metering and billing transaction as well as the marketing transaction. So at the moment we're only resourced to do the marketing in a particular way. We don't have the facility for doing it in a different way. To stop waffling, those are the things.

A general observation of the interviews was that firstly, the group members became engrossed in discussions with the clients and had difficulty in maintaining the conversation at a strategic level. This is likely the consequence of the fact that the majority of the students

worked predominantly at an operational level, albeit at senior levels in some cases. The second observation was that it appeared that the interviewees were in effect, frustrated with their organisations, they were in no doubt as to what the issues in the organisation were and what needed to be done to rectify them, and the interview provided the opportunity to voice their opinions. This may be interpreted as the fact that it is difficult for individuals to consider higher strategic issues when there are more immediate operational issues which first have to be aired and dealt with.

5.1.2 Stage 2: Environmental Exploration

There were a number of observations in the first stage of the scenario development process.

5.1.2.1 Definitional issues

The first observation was that there was a considerable period of task confusion with respect to carrying out Instructional Step 3 (brainstorming and clustering driving forces), common in all groups and which centred on the following issues:

- understanding exactly what constituted a 'driving force';
- determining if a concept represented a driving force or an outcome/consequence of a driving force;
- relating driving forces to the strategic agenda developed in the previous step;
- choosing how to cluster the driving force post-its i.e. what form of taxonomy should be used for the clustering of concepts; and
- determining the number of post-its a cluster should contain, and the appropriate number of clusters.

This is evident from the selection of comments below, recorded for the FT1 and FT2 Groups:

FT1 Group:

> *Can I be clear about where we are now?*
>
> *What we have up there so far are issues, not driving forces, it is a jumble of everything.*
>
> *Are we on the right track ... what was he (KvdH) talking about?*

Well if we start to look at the high ground around these topics … and they tie together quite a lot, then the driving forces will fall out.

I think it would be a good idea to pull out the main ones … these ones.

Yes, then pick up the main driving forces … I think this is what he (KvdH) was saying.

And then start to work on the driving forces and then see …

Labour, what about labour?

But these are not driving forces.

No, no, no, we are not talking about driving forces yet.

But you have to start with the driving force.

No you start from that (the client issues) and then look for the driving forces.

What about fashion then, what is it? Is it a driving force?

What are the driving forces behind fashion – nationalism, globalism?

Yes they are driving forces.

No but I think there is something else.

Fashion is just a concept, you have to go behind it to see what affects fashion, to get to the root cause of the intangibles, you have to get behind fashion to see what drives it.

Suppose you take low cost leadership – then I think labour is a driving force.

Well okay, you know I thought I understood this driving force thing, but I am quite confused now.

Yea, I think that … well I am not sure actually.

When you say driving forces, are you looking at the forces which make the company money?

No, well actually we are looking at the driving forces which …

The key determinants that flush out the scenarios really.

Er .. trading patterns drive investments … drives competition. I've got a feeling it is not really a driving force, it's a fundamental … know what I mean?

No, why should you have investment as a driving force?

It's not a driving force.

Well everything is a driving force to a certain extent. I mean, what exactly is a driving force?

But we have taken it as a driving force.

We mustn't get too bogged down in arbitrary rules, I mean just because you put it down doesn't mean is it right.

Okay … well … but how do we cluster them?

FT2 Group:

Are we going to do anything, do you know … know what we are doing?

Driving forces, are they of the company?

Write anything and then … driving forces, hmmm?

Outsourcing? Economy in general? Disposable income? Recruiting?

Competition?

Let's be more specific.

Because external factors I thought could affect the competition as well maybe? Grants, Government?

So these are driving forces?

If a company potentially advertises it's doing something about the environment, and actually is doing so genuinely like not using paper bags, leaving money to ecological. That's an attitude. If people change in that direction which seems to be a trend, then it might help.

I don't think that's a driving force though.

Cheap imports, I mean that is a driving force.

What have we got to do before we go back today?

Write up the driving forces and cluster them.

Yea, this driving forces is proving difficult. How do we cluster them?

We've struggled with this all morning, let's get our arses in gear, we are running out of time, get Kees and see…

The exchanges between the group members plainly indicated that they were confused by this exercise. This was likely attributable in part, to the fact that Instructional Step 3 lacked exactness. For example, no precise definition of a driving force was given other than a

nebulous ‘force which will shape the future’, and no well-defined guidelines were offered in terms of clustering.

5.1.2.2 Media-determined search set

The second observation relates to the driving force ideas surfaced by the groups. The Step 3 Instructional, discussed in the plenary lecture session, stated that participants should use team diversity to the maximum with the objective of opening up as wide a range of variables as possible. In following the group discussions, it appeared that in each group a narrow rather than a broad range of the initial ideas were raised as potential driving forces, and these were largely media determined i.e. they were related to relatively recent happenings publicised in the media. Issues such as AIDS, events in Afghanistan and Kuwait, the enlargement of the EU, the situation in British politics, the state of the UK/European economies, the rise of China, environmentalism, and technology dominated the discussions. Other issues such as famine, disease, societal and cultural issues, religion, resources and conflicts were raised, but were either ignored, or deemed to be of no consequence to the client’s strategic issues and accorded minor attention. Selected examples of typical discussion topics included:

FT1 Group:

> *Things that are kind of given is the demographic changes are going to be long term, there’s not going to be an immediate effect on those. They are probably going to see protection design by the licensing people. Markets are going to be increasingly specialised and fragmented. Rapid technology changes in the global market will continue. Cultural change will be in terms of the general culture, not corporate culture. Tourism, state benefits, environmental issues, I mean the green factor is going to just be part of everything.*
>
> *They can’t beat the Chinese. The Chinese can supply the raw materials but if they get the retailing, then …*
>
> *And there’s a lot of worry in the industry about China who at the moment is stock piling raw materials. Now they have an immense labour force. They use convicts in prison so they have absolutely no labour costs … and the worry is they, from an unfair cost base, will split the market with cheaper fabrics. This is a very real worry. One of the quotes that I saw was that this would de-industrialise first world countries …*
>
> *Actually I read something about that in the FT, I think it was yesterday, the Chinese will take over the world because of their cheap labour.*

Yea, I think there was a BBC documentary about that just the other day… China ruling the world. I believe it.

It's already happening, we can see it already.

Yes, China is taking over the world … everything you buy says made in China.

What about India?

No, that's not going to happen. It will definitely be China.

FT2 Group:

I think, my half time thoughts were the election coming up and the effect of that must be one of our axes. Must be one of the events, you know the election is an event and that's a driving force along that axis.

The other thing was technology is a driver. You've currently got a commodity product. But with technology all of a sudden an innovative use of technology began to let you offer a different product or service. Because it gave you new ways to communicate, bill and pay, allows you to design things around control technology so inside the house you can provide the customer with information they've never had. Or control use of energy they've not had. So those are the issues. Technology, I think is one of the things that came out, it's all very predictable, technology will enable all of that.

Yup, I agree, but isn't technology itself quite predictable?

Well…well.. yes, I suppose so. Yes.

But it is such a big thing in the world, you read about it everywhere. So it's predictable?

PT/OL Group:

I put up the environment and green aspects and it was mainly coming back as inside customer behaviour. I think it's predictable. There's a growing trend on peoples' concern about environmental matters and generation coming through is even more into it than we are, you see it all the time.

It's quite interesting because environmental and green issues should actually turn out the other way. You would get more environmental and green things implemented if energy was twice the price it is. It's too cheap so people just abuse it, it's like cars, America is a good example, cheap petrol, 5 litre engines, 55 mile an hour speed limit. Totally ridiculous. So I think that's what will happen.

What else? Are we not saying for the next ten years we're going to have a sort of moderate, not very much happening slow economic decline into obscurity that we've had for the last 40 years… quite predictable if you think about it.

5.1.2.3 Knowledge gaps and research

Although the Step 3 Instructional indicated that the groups should identify knowledge gaps and undertake research, it appeared that research undertaken by the groups was limited, the archetypical response to the question, *did anyone come up with anything new?*, being:

No, not really, I mean I did some reading … but I think we already captured most of the important stuff the last time.

Where research was reported, it was typically superficial research reinforcing the media-determined ideas the groups had already discussed in the previous session. For example in the FT1 Group:

Remember we talked about this last time as a driving force. Well, something I picked up yesterday in my trial and error here and there from the FT of yesterday - textile industry which is somewhere. I had a … it did not have that TV appeared here … ah okay, here it is, considerable over capacity. Now this one… internet a few days ago .. textile mill in Northern Ireland suffering from considerable overcapacity…I was thinking perhaps we should really incorporate this in our scenarios.

At the same time, it was apparent from the research reported that research had been undertaken on the client companies and their competitors, rather than developments in the environment, for example in FT2 Group:

What did you discover?

I mean what I did … I pulled out company reports on the company's divisions and everything. Got some idea of figures, profits and losses and ratios and the number of people who work there, that sort of stuff. I can't remember …

Basically its' a small industry.

Yeah it is quite small. I also pulled out a few articles, again I can only remember one or two of them, but I did quite a few, and it is a small industry.

When KvdH or I visited the groups and suggested that some of their ideas necessitated further research to get a better understanding of the ideas as there were possible paradoxes which should be explored, these suggestions had no discernible impact on the group's thinking and were effectively dismissed. Two examples illustrate this: firstly, on visiting the PT/OL Group engaged in a discussion on the rampant growth of AIDS across Africa, I noted that in fact Pneumonia, Diarrheal diseases, and Malaria were responsible for more childhood deaths in developing countries than was AIDS/HIV. This had no visible effect as on leaving the room, the group continued to focus their discussions on AIDS/HIV and the issue of including this on the research agenda was not raised. The second example was the suggestion to the PT1 Group by KvdH that while technology was obviously an important driver in almost every context, it merited further discussion and research as the evidence was that it was not as fast moving as was popularly believed. This again seemingly had no impact on the group's thinking, on KvdH's departure for the room the group resumed the discussion from where they had left off prior to the intervention, and again the item was not formally included on the research agenda.

The consequence of the above is that it appeared that little new knowledge or new ideas had emerged from the research task following the initial brainstorming. There was some re-clustering of the original clusters following the reporting back of research undertaken, but this largely consisted of reshuffling the post-its within and between the clusters, rather than the development of new ideas and clusters.

5.1.2.4 Predetermineds and uncertainties

The exercise Step 4 indicated that groups should segregate out the predetermineds from the uncertainties in the driving force clustering, and the rationale for doing this was discussed by KvdH in the plenary session lecture. However this step appeared to have been missed as a distinct task by the groups observed and questions one might ordinarily expect from participants on this issue such as: *are we quite sure that this is predetermined;* h*ow do we know it is predetermined; do we need to do some research on this to establish whether it really is predetermined or not,* were not raised in the groups. This was presumably because the groups felt it was an unnecessary step as they already had clear notions in their minds as to what the predetermined driving forces were and the direction in which they would move in the scenario period, as previously indicated by the comments from FT1 and PT/OL Groups noted in section 5.1.2.2.

5.1.3 Stage 3: Synthesis and Scenario Development

Stage 3 (Step 4) of the process involved use of the importance/predictablility matrix to select two independent drivers to produce a conventional 2 x 2 scenario matrix, creating scenario end-states and developing the storylines for the scenarios. Observations of this stage included the following:

5.1.3.1 Selection of the scenario matrix

The ranking of the clusters on the important/predictability matrix resulted in much discussion with the groups, particularly with respect to the 'predictability' aspect and confusion as to whether or not this referred to the predictability of a particular event represented by a cluster, or to the predictability of the subsequent outcomes of the event. Compounding the issue was the fact that the groups had basically clustered the driving forces based on the acronym STEEP (Society, Technology, Economics, Environment, Politics) or some derivative of it. The fundamental problem with this is that these generic headings inevitably encompass a wide range of (often loosely) related factors, some of which are generally predictable, while others are inherently unpredictable.

Equally, selecting two clusters from the most important/most unpredictable quadrant of the matrix to form the scenario matrix, and determining whether the clusters were independent or interrelated, generated much discussion; for example FT2 Group:

> *I agree with your qualification. I personally don't think lifestyle is sufficiently independent of the economy. My money is on something to do with foreign markets. If it's not that remote from the EU. The problem seems to be that the timescale where things could change regarding the EU is too far away. I don't think we were wide off the mark by honing in on the EU. We just don't have the precise facts.*
>
> *Okay, what about competition because if you think about it … I mean accessibility to the market. I don't think there's a big difference between plus and minus. That's my opinion. Competition and technology?*
>
> *Is that back to the economy then?*
>
> *Technology and …*
>
> *On the other hand we could presume the economy is not going to change that much for say five to ten years*
>
> *Back to the EC again?*
>
> *We had EU community and it was quite strong … so basically there won't be any change as far as we can see before the turn of the century.*

Technology with competition?

But then again … yeah we are on the right tracks I think.

Competition is definitely one. Okay so how about technology and competition together, does that make sense?

We have been at this a long time, why don't we go for something like economy and competition?

The only thing I'm not entirely sure, I may be misunderstanding. The way you're describing that …it sounds awfully like competition reacts to the economy. Yet I felt all along these two variables should somehow be independent.

Well they could be independent. If it was something like import controls or something like that. Or control for investment then the two would be independent.

Okay, you know he is right, we could go on and on, and we are running out of time, so why not use economy and competition? I mean, I can see it working.

Yea, okay, I go for this.

So we all agree?

PT/OL Group:

I don't know. But what have we got left. Technology comes next.

What we're saying was, it's predictable.

Shall we just try to get them all up? So what we're saying is it's quite important. In that box at the moment but predictable?

What about competition, we talked a lot about it?

Well maybe because competition comes, maybe we have it here because competition is not only who the competitors are, but also alternative suppliers.

Ok so these are linked together. And does that cover the gas market as well?

Yes. And we say that's less predictable.

I think the outcome of it ... the fact that the regulation itself is predictable. The consequences of it are not.

We're trying to get the two main dimensions and one was about who will be competing, who are the competitors and where are they coming from. It was all about the industry structure and shape but we said that competitors shape and influence industry

structure. Then it was about the customer behaviour and we said domestic, by that I mean mass market, above that we've got business market. The third issue we had was political and legislative change and to get down to two issues we could say the two things are political interference and how customers behave.

So we have our matrix then? Yes?

Yes, I think so.

Yea, I agree, this will work.

It's quite interesting, we ended up … we went through all that and came up with political and legislative change and customer behavior which is really were we started.

5.1.3.2 Crafting the scenarios

In exploring recent events and happenings underpinning the scenarios, each of the groups tended to have a clear view as to how they would unfold in the future; there was some discussion around this and the groups did engage in freewheel thinking in terms of possible combinations and alternative developments, but they invariably returned to consider combinations and alternatives already known. In reviewing the scenario diagrammes and storylines as they were being developed, it was apparent that developments envisaged by all groups principally epitomised variations around a common, already well-articulated midpoint of events that were expected to occur. While extreme developments were raised periodically, they largely lay dormant and were eventually discarded as being unrealistic and implausible, particularly adverse events.

The headline news at the time suggested that while the UK/European economies were growing after the recent slowdown in the early 1990s, they might be slowing; the Chinese economy meanwhile was growing strongly, perhaps even overheating. In contemplating this, the combinations and outcomes discussed in the syndicates ranged from: the UK and Chinese economies would continue to grow, to the UK economy would slow while the Chinese economy would manage a so-called 'soft landing'. When the idea was raised in the groups of a possible collapse of the EU/UK economy and a move back into recession, the idea was summarily rejected as an implausible development by the majority of the group members, as evident from the discussions in the FT2 Group:

I think we kind of lost sight of our thinking. Last week the European Union was driving the competition by making money available. I think somehow in the darkest recesses of

our mind it's still there but we don't say it anymore, because everything we read has told us really that the situation is not going to change till at least the end of the century.

So it's high growth, not explosive growth, it's sort of incremental thing where you've got to get better growth, which is plausible. I can see that happening. The other one is growth slows down, stagnates or ... well more likely it will grind along.

Yes. Which means there's less money available. I'm sure many people don't think that is plausible, but I personally think it is plausible that we'll go back into recession within the next 6 months, or a year kind of thing.

Recession? No, I think that is pushing the boat out too far ... but grinding along, yes I can believe this.

Okay, so maybe we just stick with your grinding along idea, more believable. Agreed?

Yea, I think so ... a recession is not ... well I don' think it's on the cards.

Similarly, the suggestion that the rate of technology development could stall, perhaps as a consequence of growing distrust and fears as to where it could ultimately lead to, or a 'Luddite' backlash, was quickly rejected as being implausible.

A second observation at this stage was that as the groups developed their scenarios, they searched for evidence to corroborate their storylines rather than information which would discredit or disconfirm the ideas, evidenced by comments such as:

Yes, I saw something about that exact thing in the papers, not sure when it was, I'll see if I can find it.

Wasn't there something like that on TV a few weeks ago, did you see it.

Funny, but I was talking to someone from the group down in the end room before we started, just to see where they are at you know, and she said that they have some of the same ideas as we do and she said she had a bunch of articles which showed that we are on the right track … so … uhm …so what are we going to do next?

In developing the scenario sets, while all groups used the scenario matrix, none of the group developed 4 scenarios in full, most developed only 3 scenarios. Two reasons for this were evident from the observations, the first being the issue of time and the view that it was better to spend time developing 3 well-formulated scenarios rather than 4 poorly constructed ones. The second reason was that the nature of a the scenario matrix commonly resulted in one quadrant which appeared counter-intuitive or illogical; for example low economic growth combined with increased social investment, or a static industry culture coupled with

increased spending on technology. The response to this issue from the groups was to ignore this quadrant and develop scenarios for the other 3 quadrants of the matrix.

None of the groups appeared to have difficulty in developing the scenario storylines. When questioned as to progress being made, the comments from the groups were similar:

PT1 Group:

> *It's going okay, once you have figured out the basic plot, it sort of then just falls into place … it's not that difficult really, it all kind of makes sense.*

PT/OL Group:

> *No, no problems … well I don't think so anyway … you can see how one thing leads to another here.*

The scenario storylines themselves were developed using causal thinking, as exemplified by variants of the statement frequently heard, such as: *okay, if you are saying that X happens, then of course Y will also happen, and that will lead to Z.* This also evidences script theory as it was clear from the group discussions that once the group had agreed on the occurrence of a particular event, there were obvious expectations from the group members as to what consequential events would follow, and the order in which they would follow.

5.1.3.3 The final scenarios

While the scenarios developed and presented by the syndicates were generally well constructed, written and presented, the range of driving forces used by the groups as the axis to develop the scenario matrix were limited. As can be seen from the sample shown below, the dominant forces used as scenario axes were 'technology', the 'economy' and 'politics', which parallel many of those seen in published scenario reports, a phenomena also observed by O'Brien (2004) in a similar scenario exercise setting which she labels 'future myopia'.

X Axis	**Y Axis**
Political Intervention (intervention/free market)	Public Behaviour (passive/active)
Technology Spending (high/low)	Industry Culture (dynamic/static)

Technology Convergence (fast/slow)	Politics (nationalism/free trade)
Technology Competence	Customer Intimacy
Technology Growth (fast/slow)	R&D Public Funding (high/low)
Economy (high/low)	Competition (high/low)
Economic Climate (poor/good)	Competition (open/restricted)
Global Economy/Trade (expanding/contracting)	Political Situation (stable/uncertain)
Global Economy (fast growth/moderate)	Market Trends (favourable/unfavourable)
Regional Economy (good/bad)	Social Investment (increase/decrease)

None of the final scenarios developed and presented contained extreme events, major disruptions, or radical developments; all of the scenarios fundamentally evolved in largely predictable, incremental and plausible patterns. Although descriptors or polar extremes of the scenario matrices axes such as high/low, good/bad and stable/uncertain were used to develop the scenarios, the scenarios themselves were more closely focused on the middle ground between the extremes, representing what Kahn and Wiener (1967) described as described as “canonical variations around a midpoint”.

For example, several groups used the ‘Economy’ as one dimension on the scenario matrix with the extremes of this dimension shown as ‘slow’ or ‘low’ growth versus ‘high’ or ‘fast growth’. However in no scenario was there a significant economic crisis; the same was true with respect to the positive extreme in that the economic growth described in the scenarios was modest rather than ‘high’ or ‘fast’. This applied equally to the other drivers, for instance, while politics was fractious in those scenarios that used politics as an axis, in no scenario did it deteriorate to the point of outright conflict. This may be partly explained by the fact that the groups were hesitant to present scenarios with extreme events as these might be deemed implausible by KvdH and the fellow students, thereby negatively impacting their marks for the elective course. However, it also suggests that there were a number of deeply held assumptions about the world and how it might evolve underlying the thinking of the groups.

The final observation was that each group presenting their scenario was quite confident that the scenarios they were depicting would come about, to the point of becoming very defensive and providing elaborate explanations when questions were raised by KvdH or the audience, regarding the storylines or particular events described in the scenarios,.

5.1.4 Stage 4: Implications and Options

This stage of the process was generally well done by all groups and more time was spent on this task than was spent on developing the scenarios. This may be explained by the fact that strategy development was something that the students were comfortable with, having already undertaken several strategic management courses on the MBA programme.

In all groups observed, the group members representing the client organisation dominated the discussions, and were steadfast in their convictions as to what constituted acceptable options for the clients, as indicated by the group comments below.

PT1 Group:

> *Consider the options in the scenario itself … what about 'Scotland the Brave'?*
>
> *The industry is getting dynamic and there is new technology, so what happens to the company, what business ideas stand up.*
>
> *Well, under capability it would be invest in people and technology, but under business portfolio options, I think at that point you can look at business development.*
>
> *One of the things we could look at is for instance in either of these two bottom scenarios, what they would have to do is make this service aspect a conscious thing not just an accident and they could invest in things like labour skills perhaps and just make do with the technology they have at the moment and look at ways of improving the quality and service quality of the product and design.*
>
> *It's very easy to say the strategy should be to invest, but where are they going to get the money to invest? Remember I know this company, this would just not work for them, no way at all.*

FT2 Group:

> *So we have 2 pretty good options ... well I think they are good.*
>
> *They seem okay to me, so what's the problem?*
>
> *Okay, I hear what you are saying, and I am not saying they are not good options, but believe me, they would not work in this company, I just know it. I know El Presidente, he would not accept these.*

PT/OL Group:

The thing is this is going to happen before the scenarios unfold so you've got to take it as a given that I'm going to have to make the investment, but how I do it has to be tempered by what you're giving to me. I need to have the flexibility and need to … you've highlighted things like the mass market's not going to work for you you've got to be very quickly able to get into the niche market. And make it work. You've got to make every expenditure very controllable and very variable. And avoid fixed costs because the scenarios themselves have an uncertainty attached to them. But the investment will happen, take it from me, I know the company inside out.

Given that the individuals role-playing the clients had worked for the client organisations, and therefore had an in-depth knowledge of the organisation, this observation is not surprising,

5.2 SUMMARY OF FINDINGS

The findings indicate that although scenario development ostensibly involves groups moving seamlessly through a simple 4 stage process, it is not that simple. There are for example, definitional issues with respect to some of the terms commonly used in scenarios; there are issues with how cognitive processes, heuristics and biases determine thinking patterns and information searches; and finally there are issues with tools commonly used to structure scenario sets.

In presenting these findings I have been critical of the student group performances in the various scenario development process tasks. This however, should not be taken as a criticism of the caliber or the abilities of the students as they were mature, bright, energetic and motivated individuals. The criticism of the task performance relates principally to the design of the overall process, which is the subject of the chapter which follows.

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CHAPTER 6

FINDINGS: SCENARIO DEVELOPMENT FRAMEWORK DESIGN

6.0 INTRODUCTION

Having discussed the findings related to process task activities in the previous chapter, this chapter begins with a discussion on the findings related to the overall design of the scenario development group process, and then moves to discuss the findings regarding the advocated purpose of scenarios and the fundamentals required to develop effective scenarios.

6.1 SCENARIO GROUP DEVELOPMENT PROCESS

Many proposed models of group development are recorded in the organisational literature, but the model most often referred to is that developed by Tuckman (1965). In the article *Developmental sequence in small groups,* Tuckman proposed a generalisable sequential model of changes in group life over time comprising four discernible hierarchical stages, which he labelled as *Forming*, *Storming*, *Norming* and *Performing.* In 1977 Tuckman and Jensen proposed an update to the model, adding a fifth stage which they named *Adjourning*, "reflecting a group life cycle model in which separation is an important issue throughout the life of the group" (Bonebright 2010, p.117). The model distinguishes between two realms: interpersonal relationships and team task activities, both of which group members attempt to resolve concurrently while moving through the five stages. The interpersonal relationships realm refers to how members in the group act and relate to one another in the life of the group; the task-activity realm relates to how a group actually works to accomplish the task(s) set for the group. The salient features of the model and associated behaviour at each stage is shown in Table 6.1 below.

Although Tuckman developed his model by organising and synthesizing existing research data and theoretical precepts rather than through empirical data gathering, the model does he suggests, "withstand the test of common sense as well as being consistent with developmental theory and findings in other areas" (Tuckman 1965, p.396). The model does have limitations, perhaps the most significant of which is that the literature reviews on which Tuckman based his model was not a representative sample of settings in which small group development processes occur, leading to the criticism that the model "has been generalised well beyond its original framework" (Bonebright 2010, p.115).

Table 6.1: Stages and Features of Tuckman and Jensen's Group Development Model

(Adapted from Tuckman and Jensen, 1977)

Stage	Stage characteristics	Interpersonal realm	Task-activity realm
***Forming*:** Immature group	• confusion, uncertainty and boundary testing	• initial assessment of interpersonal relations and group behaviour norms • establish individual identities/relationships within the group	• orientation to nature of task(s) and boundaries • clarification of issues and ground rules • identify information requirements
Storming: Fractioned group	• intragroup conflict and arguments re group structure and leadership	• unfolding of personal goals and expressing of individuality • leadership struggles	• establish rules on how best to organise to achieve group task(s)
***Norming*:** Sharing group	• consensus and team cohesion	• behaviour, roles and norms established • camaraderie and relationships form	• increase data flow and information exchanges as members open-up
***Performing*:** Effective team	• role issues resolved and constructive group performance	• independence as members work alone/in subgroups • minimum emotional interaction in groups	• strong task commitment • high level problem solving/task completion activities
***Adjourning*:** Disbanding group	• disengagement	• anxiety over ending and disengagement • upbeat over group accomplishments	• attention to wrap-up activities • reflection and evaluation

The arguments of Miller (2003), Rickhards and Moger (2000), Sundstrom et al. (1990) and other theorists critical of Tuckman's model, are that: (1) group development is not as straightforward as Tuckman implies, it is significantly more complex; (2) group development processes are far more dynamic and complex than can be captured by linear, hierarchical forms such as Tuckman and Jensen's model; and (3) as is the case in all human group processes, the demarcation between stages is not always clear, there is often overlap between stages, and groups invariably deviate from any proposed stage theories.

Numerous models have been since been proposed usually with more steps, for example the Team Evolution and Maturation (TEAM) model developed by Morgan et al (1994) has nine developmental stages through which newly formed, task-oriented teams purportedly evolve. However as Miller notes, “for the most part the hierarchical models demonstrate a high degree of consistency in the similarity and development of the stages” (Miller 2003, p.122).

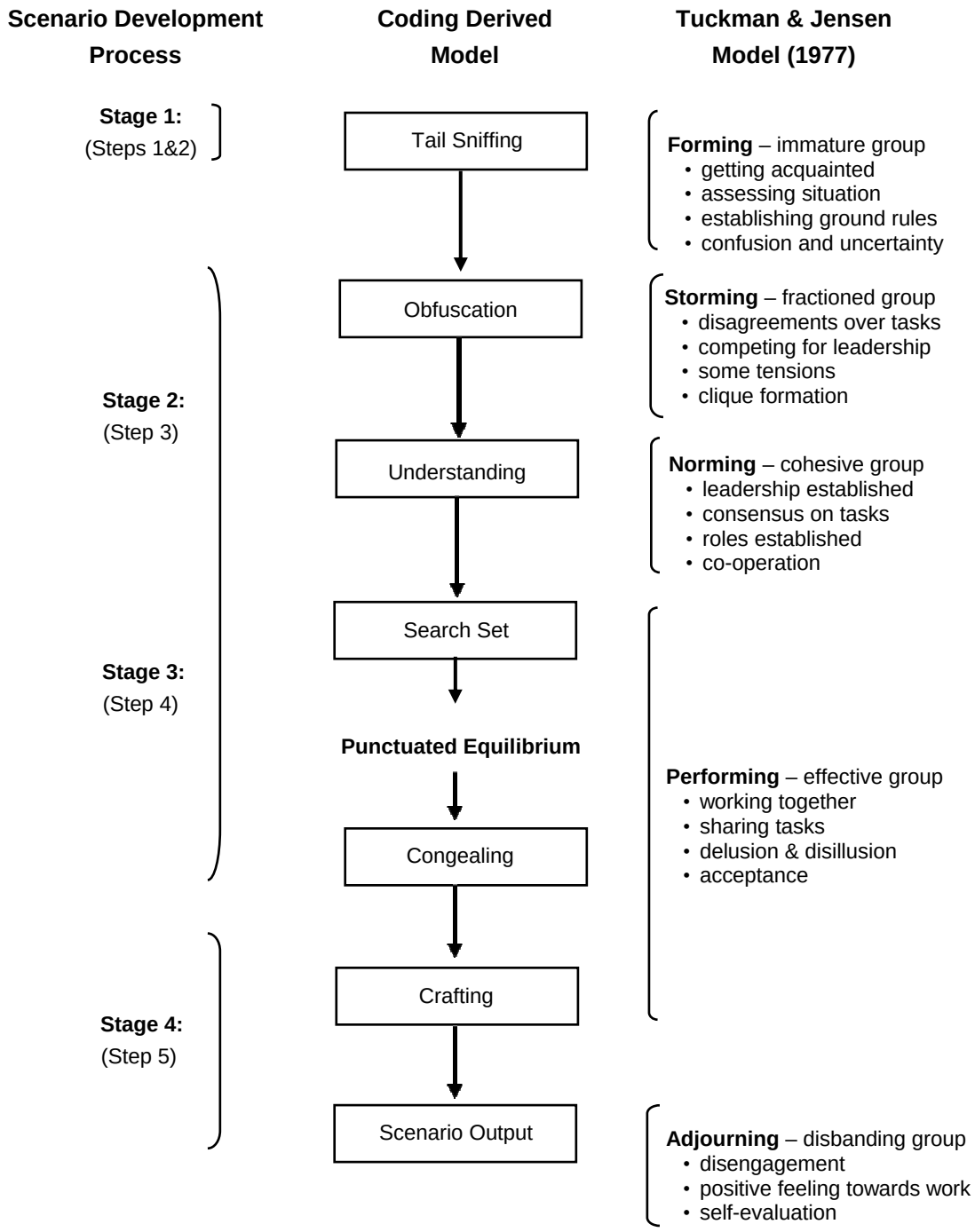
In spite of the growth of literature on the subject of group development processes, McGrath and Tschan (2004, p.102) suggest that a number of critical questions remain unanswered in the study of group development over time, notably:

- do all groups of all types, change in the same way?
- do the time-based patterns in group development stages happen in the same fixed sequences for all groups?
- if there is a fixed sequence of stages of development, are the stages of equal length, and do all groups progress through the stages at the same rate?
- are the patterns of stages immutable or can they vary depending on circumstances or events external to the group?
- if a group does not follow a fixed sequence of stages, does this signify a breakdown in the group's development, or does it represent a normal variation arising from background conditions?

Despite the criticisms of Tuckman’s model and the questions it raises, the model is widely recognised and applied because it is Bonebright suggests, seen as a “useful starting point for team development practitioners because the model is accessible, easy to understand, and flexible enough to apply to many different settings and group situations regardless of the projects or tasks to be completed” (Bonebright 2010, p.118).

In the case of this research, the overall observation was that in working through the four stage scenario development process, the teams went through seven distinct phases which in the process of coding observations and voice transcripts, I labeled as *Tail Sniffing, Obfuscation, Understanding, Search Set, Congealing, Crafting and Scenario Output*. In comparing this model to Tuckman and Jensen’s model, if two of my model stages (Congealing and Crafting) were to be considered as subsets of Tuckman and Jensen’s *Performing* stage; my seven development stages are essentially the same as the five stages described in the Tuckman and Jensen model. Figure 6.1 below shows these seven stages and how they relate to the Tuckman and Jensen (1977) model.

Figure 6.1: The Scenario Process Journey



The interpersonal realm elements in terms of group behaviour of the five stages described in the Tuckman and Jensen model were broadly similar to those observed in this research. The initial stage of the process or 'tail sniffing' (the descriptor being analogous to dogs who when

meeting, tend to sniff each other in order to assess one another and establish boundaries), revolved around the team members getting acquainted with each other during Stage 1 (Steps 1 and 2) of the development process.

Observations in this stage where in line with those described in the Forming stage of Tuckman and Jensen as to the interpersonal realm. There was however, a marked difference in behaviour between the Full-time (FT) and Part-time/Opening learning (PT/OL) groups. In the two FT groups, one individual volunteered themselves as the client almost immediately, and was accepted without much discussion within the group. In the PT/OL group however, the client selection was only made after a discussion in which each of the team members introduced themselves, and indicated what position they occupied in what company. On reflection this is not surprising and may be logically explained by the fact that the elective came towards the end of the MBA programme by which time the FT cohort members who interact throughout much of the MBA course on a daily basis, already knew each other and their backgrounds reasonably well and already had experiences of working with most of them. Consequently individual identities and relationships within the group i.e. the leaders and followers, had to a large extent already been established. The PT/OL group however comprised individuals from different cohorts who only interact intermittently, while some of the group had met each other in previous courses, some were meeting for the first time, and therefore it was necessary for the group members to follow the detailed process for the client selection outlined in the task instruction.

There were initially disagreements and some subtle but obvious leadership challenges within the groups, but they were relatively minor and it appeared that the groups reached a level of comfort as to the establishment of group norms and rules of work in a relatively short space of time. None of the teams observed formally appointed a time keeper, a scribe to document the discussions, a team leader, or a facilitator; however team leaders essentially emerged in that there was always one or two individuals in each group who tended to dominate the discussions and determine when the groups should move on, thereby becoming both the de facto group leader and facilitator. Documentation of the discussions rotated among the group members as they moved through the process.

The period of ‘Obfuscation’ shown in Figure 6.1 varied in the groups, the turning point at which the groups moved from this to an ‘Understanding’ phase (equivalent to Tuckman and Jensen’s *Norming* stage) was when KvdH visited them to see what progress they had made, and provide explanation and guidance on the process (although there were instances where the groups were more confused following a visit by KvdH). At this stage it was clear that the

groups were working well together, roles were well established and there was a high degree of commitment to completing the required tasks within the allotted time.

As the groups progressed through the scenario exercise, three findings considered significant emerged for the observations, which are not discussed in the Tuckman and Jensen model, namely:

6.1.1 Punctuated Equilibrium

There was a common pattern discernible in Stage 2 (Step 3) and particularly in Stage 3 (Step 4) in all groups, this being periods of "inertia punctuated by concentrated, revolutionary periods of quantum changes", time being the stimulus for the transition in group behaviour, a phenomena described as 'punctuated equilibrium' (Gersick 1990, p.16). A selection of comments from the groups attesting to this includes:

FT1 Group:

> *Just as a procedural thing, we haven't got much time left you know, I mean …*
> *I thought you said split it up one do …*
>
> *What do you think, are we nearly there?*
>
> *Well I think we should be going on … we have spent a lot of time talking about this, time to move on.*
>
> *Given the incredibly short time we have, the only thing I would be concerned about… what are we going to do now?*
>
> *We can type it straight into the computer, can't we? I mean we can meet up on Monday.*
>
> *No, let's finish it now.*
>
> *Yes we really have to finish it now. We still have a way to go and less than an hour and half …*
> *Okay, we need to get going full speed, time is running out.*

FT2 Group:

> *We've struggled with this all morning, let's get our arses in gear, we are running out of time get Kees and see…*

Yes we really need to move fast now.

We should make sure each group knows what it has to do and then let them get on.

PT/OL Group:

This could really take some time to sort out and without that time what are we going to do? What do we finish today, do tomorrow?

What he's saying is we haven't really got time to start building the models, influence diagramme stuff.

We're a bit constipated right now. It's one of the things we're finding slightly tricky, is it because we rushed through this lot, there's a lot of loose ends and so as we're talking this through people are saying, well what does this actually mean then? And we're getting side tracked. We need to crack the whip a bit, we don't have much time left.

However unlike Gersick's model which proposes that the transition point is the midpoint in the time allotted for a particular exercise, the transition point varied within each group observed, but in all cases it exceeded the halfway time point in the workshops. All the syndicate rooms were fitted with large wall mounted clocks at the front of the rooms, and this may have increased the sensitivity to time. Although an interesting observation, a more significant phenomena arising from the punctuated equilibrium was observed, the stage labeled in the coding structure as 'Congealing'.

6.1.2 Congealing

Once the punctuated equilibrium transition point was activated, the groups largely abandoned any further examination of ideas captured on the post-its or exploration of new ideas; the groups self-sealed on ideas already discussed, organising and interpreting these in terms of cause and effect relationships. While some new ideas were surfaced by some participants, they were done so hesitantly and were generally ignored or dismissed by the rest of the group after a superficial discussion.

Once the groups reached this coagulation point, interventions by the facilitator proved ineffective. When KvdH visited the groups, reviewed what they had done, offered comments (for example, that the relationship between variables depicted by the groups could have been accidental rather than causal and they groups needed to explore this further), and attempted to injected new ideas (for example, what was needed to add substance to the scenarios), group members ignored this. They appeared to pay attention, nodding and

apparently understanding and agreeing with his comments and some clarifications were sought with comments such as:

By this I take it you mean we should do some more research on …

Okay, so if I understand you, what we need to do then is …

However on KvdH's departure from the room the groups continued to work on and develop the ideas that they had been working on prior to his intervention, with what appeared to be an escalating commitment, and in the case of the PT/OL group, perceptible annoyance at his intervention. The groups had in effect, congealed on their ideas, some revisions were made based upon KvdH's comments, but these were minimal in nature and scope. This occurrence was seen in all the groups observed and comments captured to this effect in the PT Group 1 and PT/OL Group include:

PT1 Group:

It was nice of Kees to finally come and see us.

Kees said we need to think about whether some of the things we have up here really are connected…I think he said something about the causality.

Yea, I heard that, but …also …

Okay, but that would take more time, I think we have got it right, I mean we understand it, we agreed on this, so why do we need to do …

Yes, I agree… we have it okay, I like it, it makes sense to me.

So let's keep what we have then, I mean let's keep going with it.

But …well okay, you're right. So where were we again?

PT/OL Group:

I don't know about you, but I find this very annoying, I don't think he (KvdH) understands what we have done. What does he mean by more research?

He did have some good ideas, and he said he liked what we had done.

But he comes in, we have worked damn hard and …

I'm not sure, I think we have damn good end states, I don't think we need any more big ideas, besides there isn't time to go away and do more research. I don't have the time.

So we agree then, we work on what we have and finish it.

Okay, yes …we do have good stuff here.

No verbal comments were captured from PT2 Group, but again once on KvdH's departure, the group resumed their discussions from where they had left before the intervention, appearing to take no notice of the comments and suggestions he had made.

The significance of the congealing point was that it was a critical turning point in the development process, once groups reached this time-induced point, further interventions by a facilitator were likely to be unproductive.

6.1.3 Facilitation

As indicated in the methodology chapter, the group undertaking the scenario development exercise worked largely alone, with intermittent facilitation by KvdH who briefly visited each group in turn while they were undertaking the various step exercises. There were several occasions in which the groups were experiencing problems and went in search of KvdH to get help with resolving the problems. In discussing the process with groups and interviewing a number of group members following the completion of the elective, it was apparent that not having a full-time facilitator was an issue, as evidenced by the following quotations:

FT1 Group:

I think it would be a great thing to do, I know it's not a practical suggestion but if one person was involved with us all of time who really knew about the technique, with each group, because when you get a low point you're stuck and we have to hope one of you (KvdH or myself) are going to come in.

OL/PT Group:

This stuff is pretty hard, ah, ah, well more confusing actually…it would be easier you know if we had someone in the group who could tell us when we were going off the tracks, we have wasted a lot of time discussing things …we got sidetracked a lot you know, then Kees came in and we found we were not doing it right…and he also confused us sometimes…I mean we thought we understood but when he left we were more confused, I'm not saying anything bad about Kees, well you know what I mean.

Although KvdH provided guidance to the groups, given that he was not always available when needed, some of the confusion was obviously resolved during the breaks when the groups met each other and discussed what was happening in their groups. Testimony to this is that there were several references in the recorded group discussions referring to what they had discovered other groups had done, for example the comment from the FT1 group:

> *Are you actually happy with this? I panicked, because I looked at some of what the other groups have done and I thought, shit, if we don't commit, because I knew our thinking and processing was just as good as what the other groups were doing. Maybe in some ways even better because it's very focussed. But I felt we are in serious danger of talking about it, and talking about it, and talking about it, and at the end of the day not having anything to actually communicate with, so I actually just went ahead and put this together ...I mean I just did it.*

The section which follows now moves to a discussion on the effects on the scenario process, of the different room sizes used by participant groups in the workshops. This variable was not part of the considerations in the initial research project design but emerged from observations as an unexpected but seemingly important factor in the process, which is why it is being included in this thesis.

6.2 NON-TRIVIAL PROCESS TRIVIALTIES

Huxham (1990) contends that detailed accessories (availability of flip charts, quality white-board pens and wall space for displaying flip chart pages), together with some basic skills (the ability to capture spoken data in legible handwriting) and the physical surroundings in which workshops are organised, are usually regarded by many as either negligible issues or as self-evident. According to Huxham the fact that these are usually viewed as practical 'trivialities' and have no intellectual content, explains why they have received so little attention in the literature. The truth Huxham hypothesizes is that observation indicates that these issues are neither trivial nor self-evident. Eden (1990) meanwhile states that although there is "an everyday world-taken-for-granted body of knowledge that good consultants use to help them manage these elements of process (*the role of environment and architecture*) … little of this knowledge has been explicated" (Eden 1990, p.154).

In this research project, the effect the physical room size on the effectiveness and behaviour of the scenario groups appeared to be a significant factor and therefore an issue worthy of discussion. In designing the research project, no attention was paid to room size or layout other than to ensure that each scenario group had their own room, and that each room was

equipped with a standard set of classroom/workshop equipment (whiteboard, flip charts, post-it pads, white-board pens). Given that the smallest meeting room in the Cathedral Building can accommodate 6-8 people and none of the scenario groups were larger than this, the physical size of the various meeting rooms in terms of their appropriateness for creative group work was not consciously considered, albeit a consequence of a lack of awareness rather than a deliberate decision on my part.

During the course of the scenario electives, it became apparent that physical room size appeared to have a marked effect on the behaviour of the scenarios groups during the day-long sessions, during which the groups spent 6 hours (or more) in their syndicate rooms. This fact surfaced when viewing the tapes of the groups in rooms 524, the DSSR, a large room which can accommodate 20 or more, and the group in the adjacent room 525, a much smaller meeting room designed to hold 6-8 people. The following observations were made:

6.2.1 Team in Room 524

Although the group started each group work session sitting in a square facing each other around the tables which had been placed towards the front of the room, as the sessions progressed the group moved about the room, individually at times, in small subgroups at other times. Some of this movement was deliberate in that on occasions the group made a decision to form subgroups, each tasked with a specific exercise and the subgroups would move to separate areas of the room to continue with their assigned task. However it was also evident that periodically the group would reach an impasse in that they appeared unable to arrive at a consensus on the issue under discussion. Invariably at this point an individual within the group would stand up and leave the group, walking to another part of the room to look at the flip chart pages on the wall, to write something on a flipchart or whiteboard, or simply to stare out of the window, presumably reflecting on the discussion at hand. Periodically one or more of the remaining core group would leave the group to join the individual who had left, forming an ad hoc subgroup, which would then engage in a discussion. At times these subgroups would return to the table to join the core group, at other times the core group would leave the tables to join the subgroup. Although there was no predictable pattern as to when this would happen, or how, where and when the group would ultimately reform, it was evident from watching the video tapes that there was a lot of fluidity in the group.

A number of other facts were observed. The first is that although individuals within the group periodically left the core group to wander to other areas of the room, individuals seldom left the room except when required to do so, as for example, to attend a plenary session or to

take a meal break. The second is that as the group work session progressed throughout the day, individuals appeared to become more relaxed, as evidenced by the fact that several individuals were seen taking off their shoes in the room and there were observed instances of subgroups sitting comfortably on the floor, rather than sitting on chairs at the desks. The third is that it appeared that on the whole, there tended to be little manifest friction within the group throughout the workshops.

6.2.2 Team in Room 525

As indicated above, this room could comfortably accommodate 6-8 seated at tables arranged in a square in the centre of the room. Although there was sufficient room for the group to gather around a flipchart or whiteboard, being a small room, there was no free space to which individuals or subgroups could adjourn. The behaviour of the group in this room was markedly different from that of the group in the adjacent, larger room. From time to time, one or more individuals within the group would begin side conversations within the group while seated at the table. Most of these interruptions were short and the rest of the group members continued with the discussion at hand. However there were also a number of occasions in which it was observed that these side conversations appeared to disrupt the focus of the group. Invariably at this point one or more individuals would leave the room, ostensibly to visit the rest room or to get a drink, and in the process bring the group discussions to a halt in that once one individual left the room, others would inevitably follow. Usually within a reasonably short period (10 minutes or less) the individuals would return to the room and the discussions would begin again. However the cycle repeated itself throughout the daylong sessions, the consequence of which was that there appeared to be less unity and more friction within the group, relative to the group in the adjacent room. A comment captured during a session from the group in 525 which illustrates the issue of room size:

> *Yea, take over China. Oh, why has he left? You'd think they could give us another room with more space and light – I think we should see someone about it. There has got to be another room.*

It should be reinforced that the above observations applied only in daylong sessions during which the groups spent most of the day in group work sessions. In the shorter evening sessions during which the groups generally spent an hour (90 minutes at most) in their group work rooms, there was no marked difference in the behaviour of the groups in the two rooms.

It is recognised that it is difficult to argue convincingly that it was the physical size of the room alone which accounted for the observed differences in behaviour between the two groups, because as Huxham (1990) reminds us, it is difficult to separate out issues related to the physical environment from other process related issues. In addition, one of the problems with observation methods is that it is difficult to prove that observed relationships are causal, one can only speculate about the cause of behaviour. However in interviewing members from both groups at the conclusion of the workshops, individuals from the group in 525 specifically noted that the room which they had been assigned to was too small, commenting that:

> *We could hardly move around the room it was so small.*
>
> *There was not enough wall space to hang flip chart pages in the room.*

The second comment is interesting as when subsequently checking the videotapes, it was noted that in fact much of the wall space had not been used at all. This suggests that the physical size of the room undoubtedly had some effect on behaviour of the groups and it may be hypothesized that the apparent lack of friction observed within the group in the larger room may have been due in part, to the fact that unlike the group in the smaller room, the dynamics of group meeting were not entirely governed by seating positions as individuals were able to move about and change their positions. The significance of room size and seating positions is endorsed by Phillips and Phillips (1993) who state that the physical environment including room size, in which a group works, has an impact on how the group functions and that "most meeting rooms are woefully inadequate for effective group work" (Phillips and Phillips 1993, p.540). Support for this comes from Grinyer (2000) who suggests that consideration must be given to the workshop environment which should be in "comfortable and attractive surroundings … in a conference room with appropriate layout and facilities". He goes on to suggest that the workshop seating should be an oval or circular arrangement citing the 'Steinzor Effect' whereby "participants tended to communicate more with those facing them across a round table than with persons adjacent to them" (Grinyer 2000, p.30).

Having discussed observations related to process design in the previous sections, the findings in the following section moves to the advocated purposes of scenario planning.

6.3 DEFINITIONS: PURPOSE AND EFFECTIVENESS CRITERIA

It is axiomatic that determining the success of an endeavour is dependent upon establishing the purpose of the endeavour. This being the case, this section begins by examining the definitions from a range of authors to determine the outcome variables or fundamental purposes of undertaking a scenario, which can then be used as a yardstick to determine if a scenario intervention is successful.

6.3.1 The Purpose of Scenarios

As noted in Chapter 2, one of the earliest and most comprehensive definitions of scenarios is that published in 1967 by Kahn and Wiener. Some 15 years ago, de Geus stated that scenario planning today "remains surrounded by vagueness and an air of mystery. People are unsure whether it is a process for reaching better decisions; a way to know the future better; or a combination of both" (de Geus 1997, p.9). This appears to still be the case today as despite the proliferation of definitions that now populate the literature, many do not explicitly state the outcome variables of scenario planning. Support for this comes from Chermack (2002, p.369) who suggests that the lack of outcome variables "may support the notion that some definitions are unclear about their primary intentions", and Burt and van der Heidjen (2003) who note that most of the literature assumes as a starting point that there is an existing need for the scenarios and the expected outcome, which has previously been articulated and agreed to by the relevant parties. This though, may be changing as according to Chermack, "scenario planning professionals are just beginning to consider the importance of defining what they do and explicitly stating what they intend to achieve by doing it" (Chermack 2002, p.369). However even where not explicitly stated in definitions, it is often possible to distil the outcome variables implicit in the definitions.

Van der Heijden (2005) argues that there is a confusing assortment of reasons as to why one should engage in scenarios, and the importance of clearly identifying the purpose of undertaking scenario work is to make the appropriate selection of methodology to be used before embarking on it. The purpose he submits can be divided along two dimensions; the first dimension is to establish the extent of the scenario work i.e. whether the scenario work is to be a one-off project, or part of on an on-going scenario-based planning process. The second dimension is that of the primary value of the scenario work, this being either to raise questions, or to answer them as an aid to decision making (van der Heijden 2005).

This combination of these two dimensions results in four purposes of scenario work, namely:

- Sense-making: a one-off 'exploratory question-raising scenario project';

- Developing strategy: a one-off ‘decision-making scenario project’;
- Anticipation: an ‘on-going exploratory scenario activity’; and
- Action-based organizational learning: an ‘on-going decision-making activity’.

Van der Heijden continues by suggesting that these four purposes represent a hierarchy of interconnected aims serving the ultimate goal of ‘strategic success’ in which organisational learning is the “overarching broad organisational skill” achieved when the scenario work is an on-going decision-making activity (van der Heijden 2005, p.162). Using van der Heijden’s matrix of aims as a basis, the following sets out to establish the purported purposes of scenario planning in a two-step process.

Step 1: Select Definitions

From the literature 20 definitions were deliberately selected so that they comprised a range of authors, some internationally regarded, seasoned practitioners (for example: Godet, Schoemaker, Schwartz, van der Heijden), others who have produced what are regarded as seminal papers (for example: Bunn and Salo, Kahn and Wiener, Wack) and others who have included elements in their definitions which are not commonly found in the literature (for example: Alexander and Serfass, Rotmans, van Asselt). From each of the definitions the purported key outcome variables were extracted i.e. the supposed purpose of undertaking scenario planning, and these along with the original definitions are show in Table 6.2 below.

Table 6.2: Scenario Definitions – The Purpose of Scenario Planning

Author(s)	Definitions	Outcome Variables
Alexander & Serfass 1998, p.35	‘Scenario planning is an effective structuring tool that enables planners to examine what is likely and what is unlikely to happen, knowing well that unlikely elements in an organisation are those that can determine its relative success.”	• Future likelihoods and unlikelihoods examined.
Bunn & Salo 1993, p.297	“A scenario can be defined as a route through a decision, supported by a narrative catalogue of events and opportunities.”	• Narrative catalogue of events and opportunities to support decision making.
Chandler & Cockle 1982, p.4	“Creating coherent pictures of different possible events in the environment and testing, through linked models, the impact of such changes upon a set of businesses.”	• Coherent pictures of possible events for testing the impact of changes on businesses.

Ducot & Lubben 1980, p.51	"A scenario is a set of potential occurrences which belong to a certain field of relevance (e.g. world population, energy or raw materials); relate to a certain time period; and are connected by various kinds of relations (e.g. temporal succession, causality, effectuality, intentionality, instrumentality and conditional probability) in such a way that an approximation to the whole set can be derived from a subset of basic hypothesis taken from it."	• A set of potential occurrences belonging to a field of relevance from which a subset of basic hypothesis can approximate the whole.
De Geus, 1997 p.46	"Tools for foresight-discussions and documents whose purpose is not a prediction or a plan, but a change in the mind-set of people who use them."	• Changed user mind-sets.
Eden & Ackermann 1998, p.148	"Scenarios are aimed at helping to determine how strategy can be robust and, at the same time, appropriately flexible and opportunistic."	• Developing robust, flexible, and opportunistic strategy.
Godet 2001, p.63	"A scenario is simply a means to represent a future reality in order to shed light on current action in view of possible and desired futures."	• Representation of future reality to consider the impact of current actions.
Huss 1988, p.378	"A narrative description of a consistent set of factors which define in a probabilistic sense alternative sets of business conditions."	• Factors defining probability of future business conditions.
Jansch 1967, p.180	"The term 'scenario writing' denotes a technique which attempts to set up a logical sequence of events in order to show how, starting from the present or any given situation a future state may evolve step by step."	• A step by step evolution of a future state from the present.
Khan and Wiener 1967, p.6	"Scenarios are hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision-points."	• Focused attention on causal processes and decision points.
Linneman & Klein 1979, p.84	"The result of systematic attempts to develop complex statements about the future conditions relevant to your company."	• Develop relevant, complex statements about future conditions.
Makridakis et al. 1998, p.92	"To challenge conventional thinking and avoid extrapolation into the future in a linear fashion."	• Challenge conventional thinking.
Ringland 1998, p.83	"That part of strategic planning which relates to the tools and technologies for managing the uncertainties of the future."	• Managed future uncertainties.

Rotmans and van Asselt 1991, p.330	“Scenarios are archetypical descriptions of alternative images of the future, created from mental maps or models that reflect different perspectives on past, present and future development.”	• Archetypical descriptions of futures reflecting perspectives on past/present and future developments.

Schoemaker 1995, p.25	"A discipline methodology for imagining possible futures in which organisations decisions have to be played out …scenarios are a script-like characterisation of a possible future presented in considerable detail, with special emphasis on causal connection, internal consistency, and concreteness."	• Detailed possible futures which emphasise causal connections, consistency and concreteness.
Schwartz 1991, p.45	"A tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out … scenarios are vehicles for helping people to learn."	• Ordering perceptions about alternative future decision-making environments, which helps learning.
Thomas 1994, p.6	"Scenario planning is inherently a learning process that challenges the comfortable conventional wisdoms of the organisation by focusing attention on how the future may be different from the present."	• Learning process which challenges conventional wisdoms about the future.
van der Heijden 1997, p.5	"External scenarios are internally consistent and challenging descriptions of possible futures … to create a more adaptive organisation which recognises change and uncertainty and uses it to its advantage … to 'wind tunnel' strategies and develop robust options."	• Building an adaptive organisation, testing strategy and developing robust options.
Wack 1985, p.72	"The most important purpose of the scenario building process is to shift the thinking of the leadership inside the organization about what might happen, in the future, in the external environment … to perceive more clearly connections between forces and events driving the system …leading to strategic insights previously beyond the mind's reach."	• Shifting thinking of leadership about the future of the external environment.
Wilson 2000, p.24	"Scenarios are a management tool used to improve the quality of executive decision making and help executives make better, more resilient strategic decisions."	• Improved executive strategic decision making.

Step 2: Map Definitions

The definitions and outcome variables from Table 6.2 were then mapped using the tool Decision Explorer, in an attempt to cluster the definitions, in order to arrive at what might be called the fundamental objectives or purposes of scenario planning. In mapping and

clustering the variable from the definitions, they collapsed into three major categories of interlinked variables, as depicted in Figure 6.2 on the following page, namely:

- to understand the causal processes, connections and logical sequences underlying events and how they move, which determine how a future state may evolve;
- to challenge conventional thinking, reframe perceptions and change the mindsets of leaders in organisations; and
- to improve decision making and strategy development in organsations.

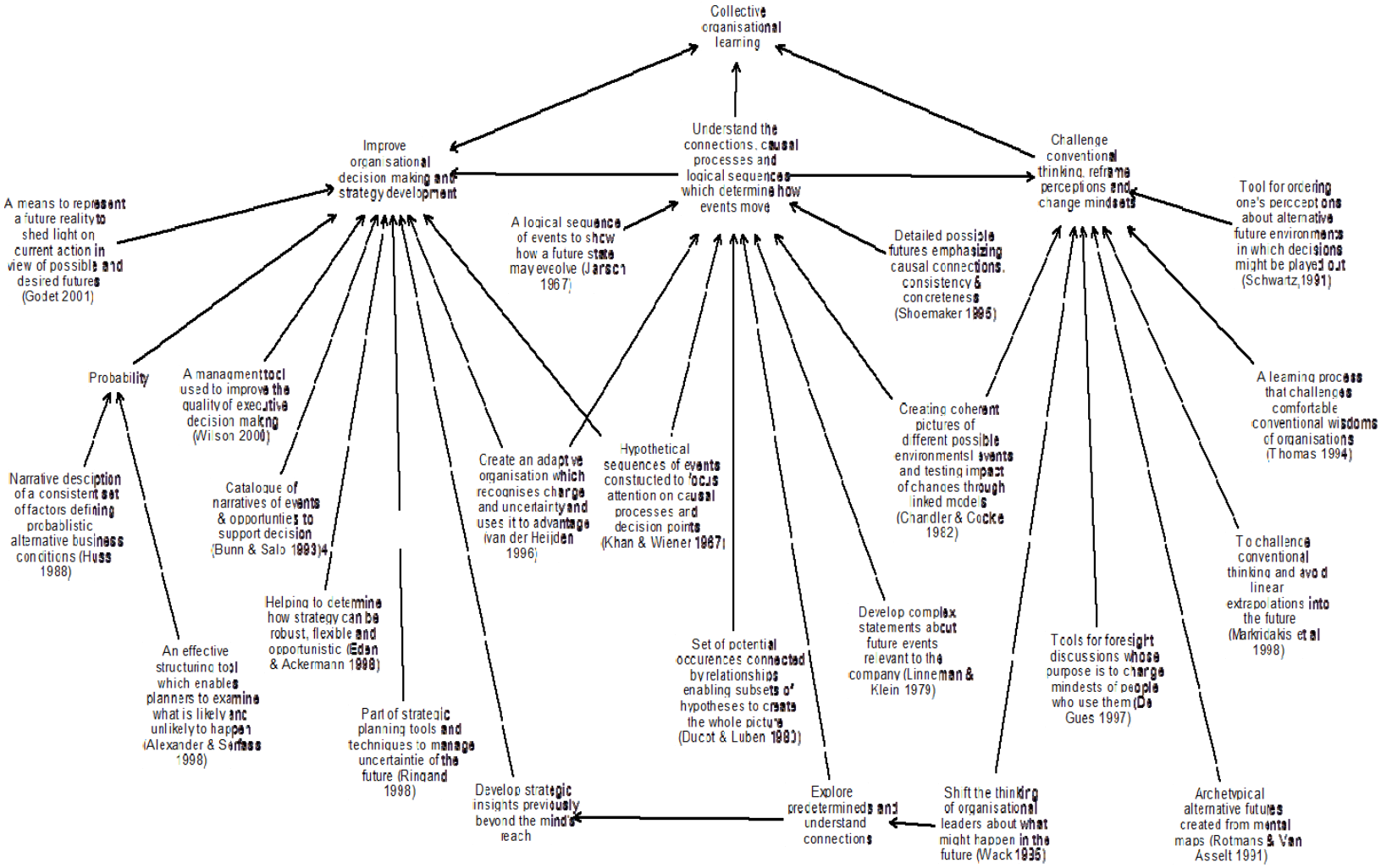
Support for this comes from Varum and Melo (2010) who after undertaking a comprehensive bibliometric analysis of the literature on scenario planning, state that there is a consensus in the literature as to the three benefits reported derived from using scenarios which essentially revolve around these categories, namely an "improvement of the learning process, improvement of the decision-making process, and identification of new issues and problems" (Varum and Melo 2010, p.362).

These three outcomes are interlinked in that: firstly, understanding the connections, causal processes and logical sequences which determine how events may move in the future to create different futures, will challenge conventional thinking and will also prove of benefit in improving organisational decision making and strategy; secondly, challenging conventional thinking, reframing perceptions and changing mindsets should result in collective organisational learning; and collective organisation learning should enhance organisational decision making and strategy which in turn should enhance collective organisational learning.

From these outcome variables illustrated in Figure 6.2, an initial, imperfect, but integrative definition of the purpose of scenario planning can be posited as:

The purpose of Scenario Planning is to undertake a group process of developing a set of scenarios depicting alternative future environments in which decisions about the future may be played out, in order to understand the connections, causal processes and logical sequences which determine how events may move to create these different future environments, which challenge conventional thinking, reframe perceptions and change mindsets, and improve decision making and strategy development, all of which enhance collective organization learning.

Figure 6.2: The Purpose of Scenario Planning



Using this definition, the criteria to determine if in fact a scenario intervention has been successful, is some form of assessment to measure if the intervention led to these outcome variables or not.

6.3.2 Fundaments of Effective Scenarios

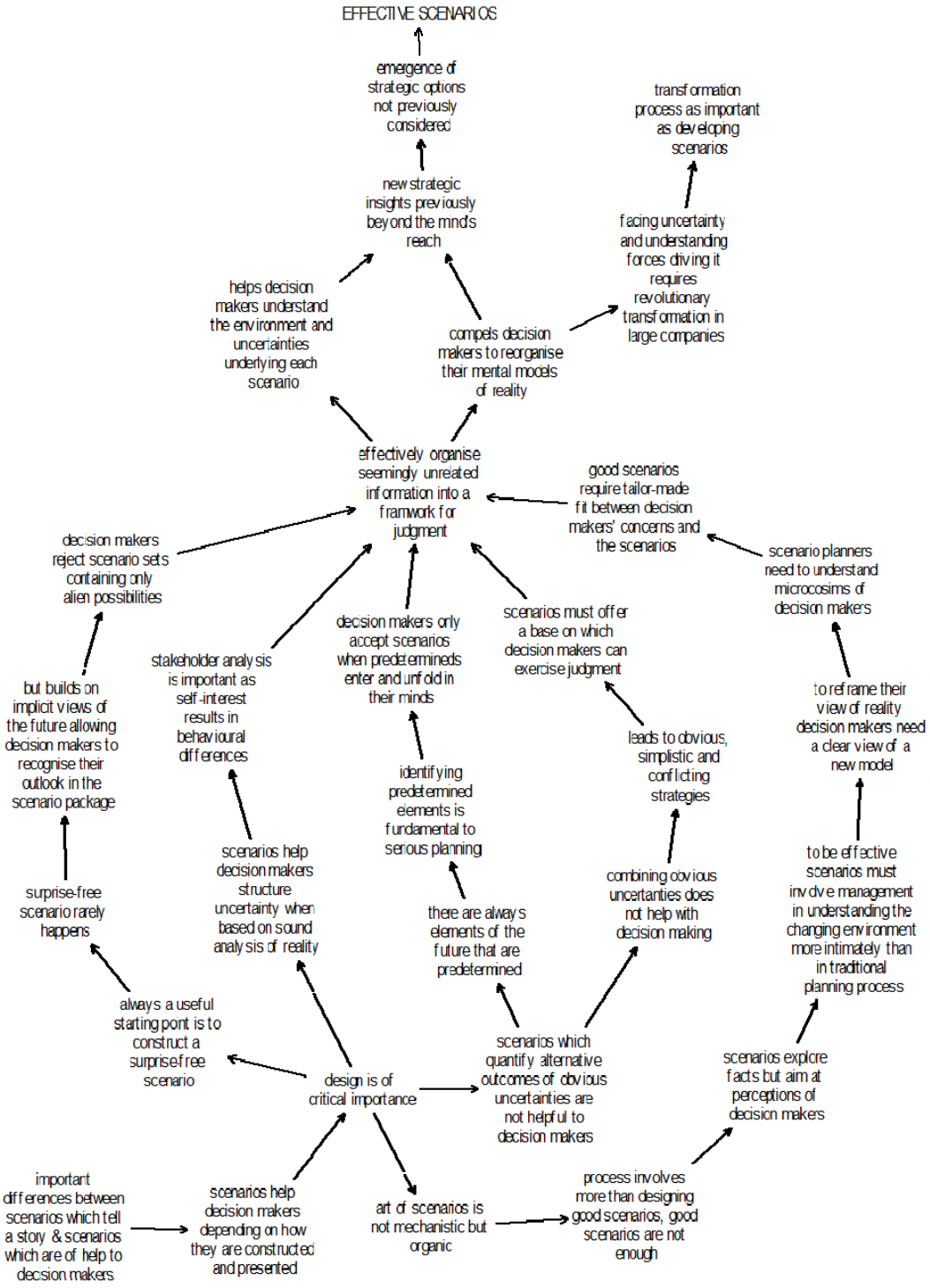
Having determined what the purpose of scenario planning is, the question that then arises is how can the scenario planning process be designed to achieve the outcomes variables, what are the fundamental elements of an effective scenario planning process necessary to achieve the outcomes? This is distinct from the consistency, plausibility and relevance criteria widely endorsed as standards to evaluate the scenarios themselves (discussed in Chapter 2). The best and most reliable source in this respect that I have come across in the literature, are the seminal papers by Wack (1985a, 1985b) in which he describes the introduction, evolution and impact of scenarios on RDS's management.

Again using the Decision Explorer tool, the elements of the process which Wack contends leads to effective scenarios, were mapped and this is shown in Figure 6.3 below.

From this map it can be seen that the initial design of the process in terms of how the scenarios are constructed and presented is of critical importance, and the fundamental elements which need to be incorporated in the design include, but are not limited to:

- using bespoke scenarios to achieve a 'tailor-made' fit between the concerns of decision makers and the scenarios developed;
- the objective is not to produce 'good' scenarios, but rather scenarios which change the view of reality in the minds of decision makers;
- constructing a 'surprise free' scenario as this allows decision makers to recognize the 'business-as-usual' view of the future implicit in their minds;
- the foundation stone of scenario work is identifying and exploring predetermined elements of the future which are always present, and which decision makers expect to see in scenarios;
- avoiding simply combining obvious uncertainties as these do not provide a base on which decision makers can exercise judgment;
- incorporating stakeholder analysis is important as different stakeholders exhibit significant behavioural differences, and it essential to understand these using both soft and hard data.

Figure 6.3: Effective Scenarios (Wack 1985a; b)



Finally, Wack suggests that one can test the value of scenarios by asking two questions:

- What did the scenarios leave out i.e. when looking back 5-10 years, what important events happened which were not reflected in the scenarios?
- Did the scenarios lead to action? He also indicates that the RDS experience was that the process of getting decision makers to accept uncertainty and understand the forces driving it requires a revolutionary transformation process in large organisations which is just as important as the process of developing scenarios.

6.4 SUMMARY OF FINDINGS

The findings in this chapter indicate that there is a staged process which groups in a scenario exercise progress through similar to that described by Tuckman and Jensen (1977) but with an important difference, this being that there is a time-induced punctuate equilibrium point in the process; once this is reached, the groups congeal on their ideas and do not readily accept facilitator interventions. Also of note is the finding that room size is a potential factor in the group's performance. Finally, by examining the literature, it is possible to develop both a set of interrelated success criteria for scenario planning, and the essential elements required to develop effective scenarios.

This concludes the findings of the research, the final chapter which follows is a discussion around these findings.

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CHAPTER 7

DISCUSSION AND CONCLUSIONS

7.0 INTRODUCTION

In observing a scenario planning process in detail, I have developed new insights in terms of the task activities and design of the process, and this chapter is a discussion of these insights as related to my research questions. As indicated in Chapter 1, in undertaking the empirical element of this research I set out to observe a scenario development group process in action in order to determine what factors were likely to impact the development of good scenarios. I could have done this using real-world groups undertaking a scenario process, but opted instead to use MBA students undertaking the same scenario process that would have been used with real-world groups, and I observed 4 groups in total, one of which was a pilot study. The 3 groups observed following the pilot study comprised 2 groups of Full-time students and 1 group of Part-time/Open Learning students. The results from the 3 groups were essentially the same which gives me confidence in suggesting that although it is possible that the results may have been different had I observed real-world groups, it is firstly unlikely, firstly because of the specific nature of research questions; secondly the fact the Part-time/Open Learning students were in essence real-world in that they were all in full-time employment. Additionally, the process facilitator and scenario development process would have been the same in the case of both the MBA student groups and real world groups.

The chapter also identifies the theoretical contribution and implications for practitioners, which is followed by a discussion on the limitations of this research, suggestions as to further research areas, my reflections on the research journey, and the overall conclusions of the research project.

7.1 THE SCENARIO PROCESS

The following section discusses the issues arising from a combination of the instruction Steps of the development process representing the task activities, and the overall process design.

7.1.1 Exploring the contextual environment

The initial confusion over Steps 1 and 2 of the process, selecting and interviewing the client would not be expected to happen a real-world situation as the client would normally be known long before the scenario process was initiated. While the groups interviewed only the client, in real-world practice van der Heijden (1996) suggests that the entire senior management team should as far as is practical, be interviewed in order to identify their key issues of concern and the dominant organizational mental model, from which can be developed the scenario agenda or focal point for subsequent scenario development. The observation in this case study was that both the client and the interviewers focused largely on internal operational issues rather than external contextual environmental issues. This may be explained by the fact that this was an artificial case, but it demonstrates that interviewing clients and attempting to establish their concerns regarding the external environment is not an easy task for the inexperienced.

One of the benefits attributed to scenario processes is that they engage participants in a wide ranging exploration of exogenous variables and systematically contemplating how these may combine to evolve in a variety of ways, and in so doing shift the personal frames of reference of the scenario participants (van der Heijden 1996; Schwartz 1996). However in examining the behaviour of the syndicates observed, it was clearly evident that this was not the case. Firstly, in all groups there was considerable confusion as to what constituted a driving force in that in the context of scenarios, the identification and exploration driving forces relate to issues and events playing out in the contextual environment which is external to the organisation and over which it has little if any control or influence over, rather than internal operational issues and events which are largely within the organisation's control ; secondly, in brainstorming the dominant driving forces which would shape the future, group members tended to offer a narrow set of high level variables, mostly related to topical happenings covered in the media. At the same time, although the step instructions asked the groups to discuss and separate out the predetermined elements from the uncertainties, there was little discussion around predeterminеds. In term of developing effective scenarios, this is a critical omission as Wack (1985a; 1985b) contends that identifying and exploring predeterminеds is fundamental to scenario planning in that after careful examination, often what initially appears as uncertain is predetermined, and the reverse is also true.

The list of potentially significant variable which need to be researched in almost any scenario work is substantial and requires considerable skill and time. One of the criticisms of the process design in this case study is that the workshop time available for the exploration of trends and their interaction was wholly insufficient. The process assumed that the groups would work outside of the class hours, and while some may have, this is a problematic assumption, especially given that groups were in effect, self-policing. At the same time the

scenario development process is ideally an iterative rather than a simple linear one, in order to reflect on, challenge and add to what has been done in previous workshop sessions. In this case this was discussed in the lecture sessions and the Step 4 instruction specifically noted that the groups should revisit their clusters and incorporate new ideas garnered from research. However, again the time allotted to this was insufficient, and this combined with the fact that there was no officially appointed facilitator working with the groups, mean that the groups essentially engaged in satisficing behaviour (Simon 1956), relying on their existing mental models to determine what was relevant and seemingly significant, rather than rigorous research and debate. As indicated in the literature, satisficing results in decisions that are neither wholly satisfactory nor maximising, but they are usually sufficiently good enough to carry on with for the time being, particularly in time-pressure situations, as was the case in this scenario process.

The contention is that the behaviour observed in terms of exploration of the environment can be explained thus: availability in term of saliency and primacy largely determined the starting point of the information search, which in turn determined what information was searched for as pathways of linked nodes in the neural network of the brain were activated. The search for information was largely guided by events and happenings reported in the media and what group members already had an embedded understanding of; and constrained by their cognitive anchors, experiences and belief systems, information that did not accord with this was discarded. Once this search set was activated, the group members were commonly insensitive to missing information, and assuming that some research was done, group members intuitively searched only for confirming evidence. Evidence supporting these findings around heuristics and biases is provided in Appendix 4 which includes samples of transcript text Indicating heuristics and biases.

7.1.2 The scenarios developed

In developing the scenarios, the groups appeared to quickly reach a consensus as to how the particular forces identified as uncertainties would unfold within the scenario time frames and much of the discussions centered around identifying supporting data and causal explanations that could plausibly describe how and why the future unfolded in a particular way in each of the scenarios. In essence the groups were engaged in developing scenarios around alternative outcomes of obvious uncertainties, which Wack 1985a; 1985b) suggests does not lead to effective scenarios because they are not helpful to decision makers. This is echoed by Shoemaker (1998) who warns that a scenario which does nothing more than confirm conventional wisdom is valueless.

In listening to the groups presenting their scenarios and reviewing the presentation materials afterwards, the contention is that underpinning the substance of the scenarios, were events which were representative, easily imagined, founded on recent happenings, and which could be causality linked in a plausible manner so as to explain why the events occurred. None of the scenarios included any catastrophic events, radical changes, abrupt or continuous discontinuities or what Eden and Ackermann (1998) describe as 'flip-flop' events; all the scenarios presented moved in linear and fundamentally predictable paths.

While this does not make for effective scenarios which should contain elements of novelty and surprise (van der Heijden 2005; Schwartz 1996) this observation is not surprising. In investigating 22 scenarios studies undertaken between 1985 and 2005 in a variety of organizational contexts, van Notten et al. (2005) report that half of the scenario sets examined did not address the issue of discontinuity in any of their scenarios. In two cases, the decision to exclude disruption and discontinuities was a deliberate methodological choice in that it was considered inappropriate in the scenarios. There are however, other possible explanation offered for the omission of discontinuities, for example De Mooij and Tang's (2003) contend that discontinuities are relevant only in scenarios with very long horizon years. A more likely explanation however, is that of the so-called 'evolutionary paradigm' in which the world supposedly evolves progressively and incrementally; in such a worldview, Brooks (1986) and Morgan (2002) argue that "it is difficult, if not impossible, to imagine discontinuity, let alone incorporate it in a scenario study" (quoted by van Notten et al. 2005, p.189). Ironically in reviewing the failure of climate scenarios to improve decisions and policies in the Netherlands, van Drunen et al. (2011) posit that one of the causes of the failures may have been that of ignoring discontinuities.

The contention with respect to the absence of discontinuities in the scenarios presented is that it was the result of several interrelated factors. Firstly, it is it would appear that the groups were locked into an evolutionary paradigm view of the world; by all accounts in the literature, this is not unusual even the most seasoned practitioners can fall into this trap as evidenced by the fact that Schwartz, a high profile scenario planner who headed the scenario unit in RDS and cofounded GBN, produced a book (*The Long Boom*) in 1999 co-authored with Hyatt, which predicted a 25-year period of uninterrupted economic growth and prosperity. The second reason posited for the lack of discontinuities is that the scenario process used in the elective explicitly called for a causal reasoning approach in developing the scenarios, and as Jungermann (1985a) suggests, causal reasoning tends to focus on slow moving developments resulting in plausible but unsurprising scenarios. The third reason is that of creating scenarios by selecting two driving forces which are deemed important and unpredictable, and using these two to create a two-by-two scenario matrix of

four somewhat arbitrary themes. In all cases observed the groups selected obvious important/uncertain macro environmental variables such as the economy and technology, and in using these on a matrix to develop scenarios, were reluctant to consider the extremes of these two variables because of a range of interrelated biases (such as availability, representativeness, anchor and adjustment), allied with script theory. This is not to say that the process of selecting two variables and using a matrix is unacceptable, it depends on whether the matrix is used as a starting point and can be superseded as the thinking progresses, or it is used as the final framework which nests everything else, the latter being the case in this research project. It is also possible although there was no direct evidence of this from observations, that the groups intuitively (or deliberately) avoided depicting extreme scenarios on the basis that there was a danger that they would be deemed implausible, which in turn, might negatively impact their final mark for the elective.

7.1.3 Process Facilitation

With the exception on an article by Grinyer (2000) which comprehensively details the scenario process, the literature makes only a passing mention of facilitation of the scenario process; for example, van der Heijden (2005) and Schwartz (1996) suggest that scenarios workshops require an able and skilled facilitator to engage participants in conversation about the future but no guidance based on empirical findings is offered in terms of the skills and training required of facilitators. However one key finding of this research is that facilitation, notably constant facilitation (by a knowledgeable facilitator), is a crucial element of scenario development workshops for four reasons. The first is that constant facilitation would eliminate, or at least substantially reduce, the obfuscation stage where participants wasted much time in understanding the specifics of tasks, and the operational meaning of terms commonly used in the scenario process such as ‘driving forces’, ‘uncertainties’ and ‘predeterminеds’. These and other terms bandied about by scenario planners not only have no universally accepted definitions, but they are confusing and complex concepts and raise many questions, as evidenced in the group discussions.

The second reason is that it is essential to recognise that there is a congealing stage in the process at which point no new ideas are accepted by group members. This congealing stage which it appeared is attributable to time-pressures, means that the exploration stage of the process is basically over, no new ideas are likely to be entertained, what the groups have at this point is what they will then work with to develop the scenario storylines with an escalating commitment. Recognising when groups are approaching this congealing point is crucial, and is only possible when the facilitator is in full-time attendance. This was clearly demonstrated when KvdH (unknowingly) approached the groups once they had already

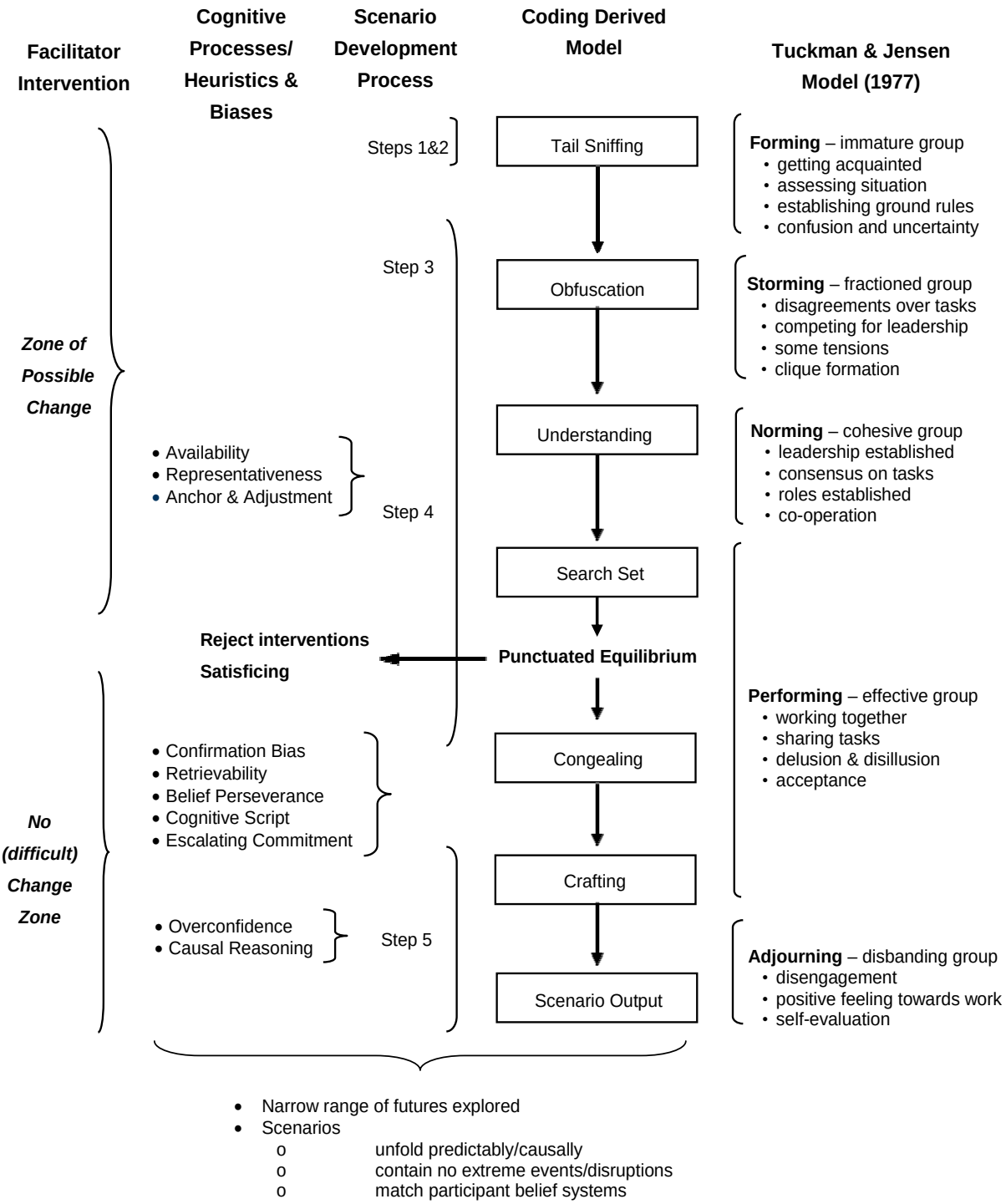
reached the congealing stage and made a number of suggestions. Not only were the suggestions rejected by the groups, but following KvdH's departure from the rooms the groups appeared to have an escalating commitment to continue to develop what they had already started to develop prior to the intervention.

The third reason for full-time facilitation is to ensure that the thinking of the scenario group is pushed, particularly at the search set stage, to challenge pre-conceptions and to mitigate the effects of biases such as anchor and adjustment, representativeness, availability, confirmation and predisposition to single outcomes biases, amongst others. Although admittedly not an easy task, an experienced and competent facilitator, working full-time with a group can achieve this by for example, taking on the role of devil's advocate, engaging the group members in a dialectic discussion process, and acting as a catalyst stimulating the emergence of new ideas. The final reason is that it is essential that someone maintain the momentum throughout the workshops, while also ensuring that time constraints are managed, that all participants are given the opportunity to contribute to the discussion, that contradictory ideas are not glossed over and so on, and this is best done by a competent facilitator. Following from this, it is argued that not only should the facilitator be in full-time attendance, but should ideally be external to the group. Having a group member assume the role is not ideal in that it is difficult for most individuals to effectively maintain the role of a group member engaged in the process, while simultaneously remaining sufficiently detached to facilitate the process.

As indicated in the Conclusions section of Chapter 2, although there is a well-developed body of literature on the significance of facilitation in the context of area of group decision support and group model building, this does not yet appear to have migrated to scenario planning. However given that it may be argued that working with groups to develop scenarios has much in common with the challenges of model building, problem structuring and group decision support in general, it is likely that the facilitation issues of each will have much in common. This being the case, the literature on facilitation in the area of group decision support should be applicable and useful in the context of scenario planning. As an example of this, many of the 'Workshop Stage' learning points developed by Ackermann (1996, Table 1, p.95) from an analysis of interviews of participants who had engaged in Group Decision Support Systems workshops, are directly relevant to scenario planning workshops.

In reviewing these findings, the Scenario Process Journey map developed in Chapter 6 (Figure 6.1) has been revised, identifying the cognitive processes and heuristics and biases observed in the development process in this case study, and is shown below in Figure 7.1.

Figure 7.1: The Scenario Process Journey Revised



There are as discussed in Chapter 2, numerous descriptions in the scenario literature of the scenario development process; there are also bodies of literature on group developmental

sequences, facilitation, and on cognitive processes, heuristics and biases. What this research has attempted to do is to pull together these three strands into an integrated model of the 'scenario process journey, as depicted in Figure 7.1. The initial step arising from coding of observations of groups engaged in developing scenarios, was to develop a group development sequence model - 'Coding Derived Model' - which shares many similarities with the Tuckman and Jensen (1977) model in terms of stages and interpersonal and task-activity realms, but includes two interrelated elements not discussed in the Tuckman and Jensen, model, namely a point of 'punctuated equilibrium' and a 'congealing stage'. Once the punctuated equilibrium point is reached, groups congeal on ideas and enter into a 'no change zone', in which interventions by a facilitator are rejected. The significance of this from a scenario development perspective is that this occurs in Step 4 of the scenario development process at which point the groups are engaged in developing the framework for the subsequent development of the scenario storylines and should be exploring a wide range of options.

The second step, again arising from coding of observations, was to identify a range of cognitive processes, heuristics and biases which appeared to affect the scenario development process. Cognitive process is an extremely complex area and the intention of this figure is not to identify every heuristic and bias or cognitive process affecting the scenario development process or the precise point of the process at which they occur as the literature indicates that they essentially permeated the whole human mental reasoning process and by extension, would have an impact on the whole development process. The objective is simply to illustrate that a range of these were observed in the groups. For example, as indicated in Chapter 5 (Section 5.1.2.2), it was observed that in identifying potential driving forces in Step 4 of the scenario development process, the participants invariably raised issues which were prominent in the media at the time, for example technology growth, the rise of China and environmental concerns – issues which were readily available (*availability and heuristic*); and when it was demonstrated to the groups that there were potential flaws in their ideas as in the case of Pneumonia/diarrhea being responsible for more deaths than AIDS/HIV, the groups failed to adjust them mental anchors to accommodate this (*anchor and adjustment*); and in searching for information, there were several observed instances of the groups searching for information which confirmed their ideas (*confirmation bias*) as indicated by statements such as 'No, I found nothing new'. The consequence of these cognitive processes is that they determine what information is searched for and how it is interpreted, significantly impacting the content of the scenarios, ultimately determining the effectiveness of the scenarios.

Thus Figure 7.1 combines the findings from the coding of observations into an integrated staged model of the scenario development process, which shows that there was a group development sequence, and that there were a range of heuristics and biases evident in the scenario development process, both of which had a significant impact on the scenarios developed by the groups.

7.2 EVALUATION OF SCENARIOS

The lack of evaluation of scenarios has long been noted as a concern in the practice of scenario planning (Chan and Kapsalis 2001; Chermack et al. 2001; Gerogantzas and Acar 1995; Phelps et al. 2001). It is clear from the analysis of outcome variables that scenario planning aims to change managers' mind-sets and improve decision making; but the evidence that scenario actually achieve this is anecdotal (Wack 1985a), as there have been few attempts to measure such claims. Part of the problem may result from the fact that as Chermack (2003) contends, in the context of improved decision making and performance, scenario planning is usually applied without having first established a performance need, making subsequent evaluation of the scenario exercise very difficult.

There is little in the literature as regards retrospective examination and evaluation of scenarios, although there has been some recent work in this area, in particular in examining the predictive success of climate and emissions scenarios e.g. the work of van Notten et al (2005), Van Vuuren and O'Neill (2006), Rahmstorf et al (2007), and Pieke et al (2008). In evaluating national climate scenarios, Hulme and Dessai (2008) note that determining the success criteria of scenarios depends on the advocated use of scenarios, namely scenarios as a product or scenarios as a process. In the case of scenarios as a product, evaluation criteria revolve around the predictive success of the scenarios i.e. in retrospect how successful was a set of scenarios in describing the future as it actually transpired? However in the case of scenarios as a social process, evaluation criteria focus attention on whether or not the scenarios resulted in the occurrence of better decisions in the case of decision-focused scenarios, or how effectively they enabled participation and mutual learning in the case of scenarios undertaken as an organisatonal learning process.

There are as Hulme and Dessai (2008) point out, problems with evaluating both these scenarios types: firstly, evaluation can only be done retrospectively and this is a major issue when the scenarios are focused on a horizon year of 15-20 years or more; secondly determining what evaluative criteria to use is not an easy task. For example, in predictive scenarios questions arise as to whether to measure the accuracy of a single scenario, a family of scenarios, or a set of probalistic scenarios. In the case of decision scenarios, they

submit that evaluation can only be based on a counterfactual scenario i.e. what would have happened if the decisions had not incorporated modifications stemming from the scenarios. Equally however, one cannot rule out the possibility that alternative group interventions in the same environment could have produced equally satisfactory decisions, or that alternative decisions could have achieved better results than those prompted by the scenarios. They conclude that there is a double irony in retrospectively evaluating scenarios; the more scenarios are examined, the greater is the appreciation of their limited predictive ability; however, this realization is not a hindrance to their use. Although their arguments are made in the specific context of evaluating climate change scenarios, they are equally applicable to other scenario work.

O'Neil and Nakicenovic (2008, p.1) suggest that while numerous scenario projects in the global climate change field have taken place over the last two decades and have "likely had substantial benefits for participating modeling teams and produced insights from individual models, learning from the experience as a whole has been more limited". The issue they contend is that little in the way of resources has been invested in assessing the results of the scenario production process in more detail at the time the scenarios are undertaken, severely limiting the potential for organizational learning. Additionally more is required they suggest, in terms of synthesizing the assessment of a wide range of models, which would facilitate understanding the differences in scenarios and which of these arise from differences in factors such as assumptions, modeling techniques and developmental processes.

In general terms, there are many issues regarding evaluation of scenarios, beginning with the question, should scenarios actually be evaluated given that they are not supposed to be predictions, they are not reproducible by independent experimentation, evaluation can only be done retrospectively, there is no comprehensive approach or widespread agreement on what the evaluation criteria should be other than very broad and general criteria, and there is always the issue of self-altering prophecies to contend with. The response to this is that while acknowledging the above, there already exists a body of validation approaches and criteria which taken together provide a reasonable evaluation criteria set. For example, there are Harries (2003) states, already established taxonomies for the evaluation of judgment and decision making, which include both model verification and method validation. Chermack (2006) meanwhile proposes that the 'six senses' *('design', 'story', 'symphony', 'empathy', 'play'* and *'meaning'*) developed by Pink (2006) as the foundations for success in an age of innovation and creativity, resonate with the objectives and instruments of scenario planning. Accordingly they provide pragmatic criteria for evaluating scenarios and a basis for the

development of a comprehensive evaluation methodology, albeit applicable only in developed countries where basic human needs have already been met.

Following from the above, a second issue is that of access to scenarios and organisations undertaking scenario work. Although there are many scenario reports available in the public domain, Harries (2003) suggests there is likely much more scenario activity that is not publicly reported because companies are reluctant to reveal their internal strategic processes on the basis that this may be regarded as being potentially detrimental to their competitive advantage. At the same time publicly available scenario accounts generally report success with scenario techniques, again understandable as few organisations are prepared to publicly reveal the failure of one of their business processes; the result Harries (2003) suggests is that publicly available reports represent a biased sample. Additionally, scenario planning is a complex process, and at the operational research level there is an issue in terms of unraveling and making sense of the many causal relations between the organisation, methods used and the environment in an organizational group process (Harries 2003).

In summary, while there has been some relatively recent activity in attempting to evaluate scenarios, the area has been largely neglected in the literature and currently no widely accepted and applied criteria for evaluating any of the three outcome variables of scenario planning exist. While there are theoretical and practical issues associated with their evaluation, including the cost of undertaking large scale evaluations, it is axiomatic that in the absence of some robust and reliable form of quality control, scenarios will inevitably have lower credibility, especially in the scientific and academic communities. This may not however curtail their continued use as Hulme and Dessai (2008) have noted, perhaps because as Chermack (2003) reminds us, there is in fact an empirical indicator of the success of scenarios, this being that the organisations proclaiming the success of scenario planning are still thriving.

What then does all of the above mean in terms of the definition of scenario purpose criteria? The proposition in this thesis is that the definition offered in Chapter 6, although an initial attempt, remains valid in that it clearly identifies outcome variables for determining the purpose and criteria for judging the success of scenario planning. This alone however is insufficient, to increase the utility of the definition it requires the qualification that achieving these outcome variables is dependent upon developing effective scenarios, and the foundation for developing effective scenarios is the design and execution of the process, which should include the elements shown in Figure 6.3. Adding this increase the length of

the definition, but results in a more robust definition in that it includes both outcome and process variables for evaluation.

7.3 KEY CONTRIBUTIONS OF THIS RESEARCH

In Chapter I, three research questions were postulated as underpinning this research, namely: what are the success criteria of scenario planning?; what are the fundamental requirements, in terms of the scenario process, necessary to achieve these criteria?; and what factors impact the scenario development process, ultimately affecting the achievement of the success criteria? Having described and discussed the scenario planning process observed in this research the question that arises is, so what does all of this mean relative to the research questions, what exactly is the key contribution being made? The answer to this that the contribution comes from a combination of the synthesis of the literature and empirical data from the research, as follows:

7.3.1 Research question related to the success of scenarios

The key contribution with respect to this question derives from analyzing and synthesizing the scenario literature, I extracted and developed three fundamental purposes of scenario planning these being: to understand the causal processes and logical sequences which determine how events move to shape the future; to challenge conventional thinking, reframe perceptions and change mindsets; and to improve organizational decision making and strategy development. With this finding I then developed an integrated model of the three purposes establishing that they are interrelated and combine to form a higher learning purpose, namely that of collective organizational learning as depicted in Figure 6.2. Previous models have emphasized one or other of these purposes but have not shown a full integration of the three. The cornerstone purpose is that of ‘understanding’ and it follows that if this is not met, meeting the other two (challenging conventional thinking and improving decision making) are unlikely to be achieved to any great extent. Having established the purposes of scenarios, the success criteria revolve around the extent to which the purposes are achieved.

7.3.2 Research questions related to process design

There are four significant contributions with regard to the questions of effective process design and factors impacting the process, these being:

- from the data a staged model of the scenario development process was developed which approximates the well-known Tuckman and Jensen (1977) model, but includes two important elements absent from their model, these being a '*congealing point'* and the phenomena of '*punctuated equilibrium'*:
    - a congealing point describes a point at which a group in engaged in the scenario development process 'congeal' on ideas they have been working on, developing them with an escalating commitment and dismissing any new ideas. The congealing stage appears to be attributable to time-pressures, and the significance of it is that once it is reached by a group, further interventions by a facilitator to introduce and explore new ideas are rejected.
    - punctuated equilibrium is the phenomena described by Gersick (1990) whereby periods of inaction in groups is 'punctuated' by periods of intense and dramatic changes in group behaviour, induced by the recognition of time availability remaining to complete a task.
- the group process of developing scenarios is a *far more demanding, messier, complex and time-consuming* task than is generally recognized in the literature, and the staged model developed from the data in this research indicates that the process *requires a trained full-time facilitator*. While there is almost no discussion in the scenario literature on facilitation, this research points to the relevance of a large body of literature on facilitation of Group Model Building exercises discussed in Chapter 2 (Section 2.10) which share many of the same characteristics as scenario building exercises. At the same time, evident from the data in this research is the *impact that workshop facilities*, in particular room size and design, have on the process. While this element of the process receives scant attention in the scenario literature, there is again a relevant body of literature on the subject in the context of Group Model Building which is applicable to the scenario development process as discussed in Chapter 6 (Section 6.2);
- in keeping with the notion that the scenario process is considerably more complex than is given out in practitioner's accounts, empirical evidence from the cognitive sciences identifies a range of cognitive processes, heuristics and biases which operate at the subconscious level and impact human judgment. With few exceptions however, this literature has not migrated to the context of scenario planning. The key contribution in this respect is that firstly, the literature on cognitive processes, heuristics and biases has been synthesized in the thesis and a model developed in Figure 3.1 which attempts to show how, *in combination, the range of cognitive processes, heuristics and biases represent mutually reinforcing mechanisms which*

impact scenario development processes and diminish the potential for scenario planning interventions to meet the success variables. Secondly, the findings from the research data provides empirical evidence of *a range of these cognitive processes having an impact on scenario development* as seen on Figure 7.1 discussed earlier. .

- the final key contribution is that from the literature, in particular the work of Wack (1985a; 1985b), a *map has been developed of the essential elements necessary to develop useful scenarios* (Figure 6.3) in order to meet the success criteria. This includes elements such as the identification of predeterminеds and the inclusion of stakeholder analysis in the process, both of which receive negligible attention in the scenario literature.

The contention is that the most important contribution this thesis makes is that it disproves the accounts in the literature which suggest that scenario development is a relatively simple and straightforward task. As Grinyer (2000, p.32) notes “the apparent simplicity belies, however, the considerable skills required by its practitioners”. Support for this comes from van Asselt et al (2010, p.11) who indicate that most of the accounts of the process in the literature are relatively short descriptions of the main steps, consequently “choices, considerations, discussions, struggles, compromises, unproductive steps, flaws, practical adjustments, experiments, difficulties, challenges and local solutions are concealed”.

The key original contributions discussed above also contribute to scenario practice in that to achieve the success outcome variables, practitioners need to understand that:

- attempting to complete the scenario development process in a condensed time period is likely to result in shallow and superficial thinking, the end product of which are scenarios comprising little more than combinations of obvious uncertainties which will be of no benefit to decision makers;
- effective scenario development requires a well-designed and iterative group process which should focus significant attention on the exploration of variables considered predetermined. It should also include consideration of stakeholders given that it can be assumed that future will largely be a product of human activities (Eden and Ackermann 1998), and a fundamental determinant of how the future unfolds will revolve around human motivation and self-interest (Wright and Goodwin 2009).
- continual as opposed to episodic facilitation of the process is vital and aside from the obvious facilitation skills, the facilitator should have an understanding of the cognitive processes and heuristics and biases which impact and generally limit participant thinking, and how to mitigate their effects in scenario groups; and finally

- the physical environment in terms of room size and seating in which groups work has an impact on how the group functions and its effectiveness.

7.4 LIMITATIONS OF THIS RESEARCH

As with most research, the research described in this thesis is not without problems and can be criticized on a number of fronts, these being:

7.4.1 Research Group and Sample Size

It is acknowledge that although the scenario development process used in this research exercise was closely modeled on a well-established and widely used one and the participants were post-experience, postgraduate students, the situation was still an artificial one. As such it ignores two potentially important factors, the first of which is that by using students much of the context one would find in an organisational setting in the real was removed, thus there is no accounting in this research of the way in which the past may have influenced the way individuals worked in the present. Secondly the students had no commitment to the future in terms of the scenarios developed, consequently the extent to which a commitment to the future might influence the way in which individuals work and think in the present, is ignored in this research.

A second limitation is that detailed observations were made of only three groups and there was no formal control group. However, given that the research was a longitudinal study of a lengthy and broken process rather than continuous one-off event, it is unlikely that studies of this nature could be undertaken with very large sample sizes.

Although I have addressed these issues in the discussion on methodology, there must nevertheless be some question as to whether or not the research findings are wholly generalisable to scenario processes in real-world situations. This does not mean that the effects observed in this laboratory setting cannot contribute significantly to the understanding of process issues and cognitive limitations in real-world scenario planning, and provide a basis for suggesting to practitioners, useful ways in which the process may be improved.

7.4.2 Investigator Bias

The issue of investigator bias is usually inherent in all qualitative research, but particularly in qualitative research using observation methods where the researcher assumes the roles of both ‘judge and the jury’. Although I have presented cogent arguments supporting the choice

of the approach used in this research project, the ultimate findings are heavily dependent upon my interpretation of observed events and as such, will almost inevitably have introduced a degree of bias, making it difficult to rule out the possibility that alternative interpretations of my observations are possible. One solution proposed in the literature to mitigate this is to have a second, independent researcher review the data collected and the analysis. In the case of this research, this suggestion was not feasible as it would not have been possible to get anyone willing to devote the time and effort required to review the many hours of tape, and several hundred pages of transcripts and coding comprising the findings.

7.4.3 Completeness of Data

The fact that this research project was based on videotaped observations of students in workshops sessions at the Business School, means that the account given in the findings is not a complete record of everything that transpired in the process; there are no observations or recording conversations that undoubtedly took place outside of the syndicate rooms. However this is an inevitable consequence when undertaking longitudinal process research in which the process is intermittent.

It should also be noted that the findings discussed above focus largely on one particular set of cognitive phenomena operating at the individual level, it does not directly address equally important group dynamic phenomena such as groupthink (Janis 1982) which have proved of significance in process research in other domains, such as strategy development.

7.4.4 Process

An inherent limitation in this project is that fact that as indicated in Chapter 2, there are three distinct schools of scenario planning, and this research focus on one particular school (ILS) and within this school, only on the RDS/GBN methodology which is the most commonly discussed methodology, although there are a multitude of alternative scenario development processes within the ILS school.

The reason for selecting this particular process is that firstly, it is the most commonly discussed methodology in the literature and is heavily influenced by the work of Wack; secondly the MBA scenario course was designed and facilitated by van der Heijden, a former Head of Group Planning at RDS and colleague of Wack's who is acknowledged as one of the leading practitioners and writers on the subject of scenarios, and who alongside Wack, has arguably had the most profound impact on the practice of scenario work through

his book – Scenarios, the Art of Strategic Conversation (van der Heijden 1966). However it is acknowledged that the inevitable consequence of this is that the process used in this research was influenced by van der Heijden not only in terms of process design but also in his role of facilitator of the process.

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7.4.5 Lack of Quantitative Evidence

The qualitative nature of this research means it was not possible to produce hard numerical evidence of the observations. For some reading this research report, this will be problematic as numbers infer precision, notwithstanding the fact that in many cases it is simply an illusion.

A possible final limitation is that I have missed one or more vital publications which change the arguments presented in this thesis. This I suggest is unlikely, there are of course many articles that I have not discussed or reference in this thesis, but it should not be inferred from this that I have not read them.

7.5 FUTURE RESEARCH AREAS

As has been stated repeatedly in the literature, scenario practices are under-researched and under-theorised, which means that there are many directions offering rich prospects, in which research could be undertaken. Building on the suggestions offered by Burt and Chermack (2008), the following are some of the interrelated gaps identified in the literature which need to be addressed through research, to provide a well-founded empirical base for the future development of scenario planning:

7.5.1 The Use of Scenario Planning in Practice

The last comprehensive surveys of scenario use in the US and Europe were those conducted by Linneman and Klein (1983), Malaska (1985) and Meristo (1989), which are now 20-30 years old. While there have been more recent studies of scenario use, for example Hodgkinson et al. (2006), Rigby and Bilodeau (2007), Ramirez et al. (2008), and Varum and Melo (2010), all of which indicate a growth in the use of scenarios, there are largely based on inferences and extrapolation and do not represent solid and reliable survey evidence of the growth and use of scenarios. At the same time, there has been little in the way of comparative studies of scenarios, Ringland (1998; 2002a; 2002b) and Fahey and

Randall (1998) have provided some case studies of scenario use but these were largely anecdotal and are now outdated. The most recent and comprehensive analysis of scenario use is that of van Notten et al (2003; 2005) from which it is evident that there has been a substantial volume of scenario work undertaken in the Netherlands, particularly related to policy in the governmental and related sectors. More research into who uses scenarios in both the private and public sectors, and the motivation for undertaking such scenario work, would be useful.

7.5.2 The Effectiveness of Scenarios

Varum and Melo (2010) note that there is little in the literature on the impact of scenarios on organisational performance, in fact there are currently only two articles in the literature which I am aware of, which attempt to relate the effects of scenarios on organisational performance. The first by Phelps et al. (2001) was an exploratory study of two UK firms, one in the water industry and the second in the IT/Consultancy industry, and the preliminary conclusion of the study was that there does appear to be a link between scenario planning and improved financial performance. However the study was based on only two companies, the results were not conclusive and Harries (2003) has criticized the research on several fronts. Following on from the work of Phelps et al. (2001), Visser and Chermack (2009) undertook a qualitative inquiry of nine executives/senior managers from seven national and/or multinational companies to examine the link between organizational performance and scenario planning. The results based again on a small sample, were also inconclusive in that while there appeared to be a perception that scenario planning is useful and does contribute to organizational performance, none of the companies from which the respondents came had any formal assessment in place to determine the success rate of scenario planning.

If improved decision making and organizational learning are indeed core outcome variables of scenario planning, then it is essential that tools be developed to measure changes in organisational performance which can be attributed to scenarios, facilitating the development of criteria for discerning the effectiveness of scenarios and scenario processes. This, along with the learning gained from research with organisations in terms of how scenarios are used and the outcomes of these uses, would benefit practitioners and enhance the credibility of the literature (Burt and Chermack 2008). While access to scenarios and organisations is an issue, the work of Phelps et al and Visser and Chermack demonstrate that it is possible to get this access.

7.5.3 Scenario Project Failures

Van der Heijden (2005) suggests that the main reason why scenario projects fail is the failure to establish a clearly defined purpose of the scenario work with the client prior to embarking on the scenario work, the consequences of which are that inappropriate scenario methodologies and techniques are employed and client expectations are not met. No evidence is offered to substantiate this sweeping claim. As has been mentioned previously, there is also currently only one article in the literature on a failed scenario project, more case studies detailing both failures and successes in scenario interventions in organisations from which lessons can be learnt, are required.

7.5.4 Cognitive Processes

Van der Heijden (1995) and Shoemaker (1993) indicate that by widening perspectives and stretching cognitive frames, scenarios have a debiasing effect, in particular they reduces the overconfidence bias and overcomes the framing bias of decision makers. While there is a substantial body of literature on these and numerous other biases, most of which involve laboratory experiments with students, they are not widely acknowledged in the strategy or scenario planning literature (Burt and Chernack 2008); research focused on pre and post scenario planning interventions is required to assess their impact on mental models and the scenario process. The same applies to claims that scenarios facilitate organisational learning and improve strategic decision making; more hard science is required to gain a deeper understanding of the processes involved and the effects of inherent cognitive phenomena. As Burt and Chermack (2008) note, while there is anecdotal evidence in the literature as to the ability of scenarios to "affect decision makers' view of reality" the issue of "precisely how this happens and can be consistently achieved is still a mystery" (Burt & Chermack 2008, p.291). However, a recent paper by Franco et al. (2012) provides a potential basis for further research in this area by developing "a theoretical framework to inform the investigation of the role of cognitive style in scenario planning interventions". At the same time, the combination of the increased global focus on risk management and the attention drawn to heuristics and biases by recent best-selling books such as Ariely's (2009) "Predictably Irrational" and Gardner's (2011) "Future Babble" may act as catalysts for further research in these areas.

7.5.5 Scenario Team Composition

Given that scenario development is generally a team effort, an obvious area for future research revolves around team composition not only in terms of diversity of the standard

personality types, but also of the behavioural aspects and effects on the scenario process of the cognitive styles of individuals. As Franco and Meadows (2007) note, the literature on managerial cognition has long recognized the association and significance of cognitive styles on group decision making processes. There is however no empirical evidence that I could find in terms of the effects of cognitive styles in scenario planning practice, the few suggestions in the scenario literature in this area are based on anecdotal evidence. Hodgkinson and Healy (2008) have made a start in this area by "bringing a design science perspective to bear on scenario planning" and they have developed detailed "practical design propositions grounded in generative mechanisms deduced from theory and evidence located in the wider social and organizational sciences" to inform the selection of scenario team members, and the adaptation of facilitation techniques to suit the "personality composition of the scenario team" (Hodgkinson and Healy 2008, p.451). However the propositions which they have produced now need to be tested in real-world scenario planning settings.

7.5.6 Scenario Construction Processes

Scenario construction processes which are usually characterised by highly personalised practices, offers a wide area for possible research in terms of the many facets of the development processes. For example, the contentions by Jungermann (1985a) and Wright and Goodwin (2009) that using forward or backward inference as opposed to causal thinking, produces qualitatively and quantitatively different scenarios which are more likely to lead to the discovery of new options, has yet to be tested in the real-world. Equally, while Wright and Goodwin's (2009) suggestions of enhancing scenario methods by including 'frame analysis worksheets' and crisis management techniques to explore a wider range of uncertainties to reduce frame blindness may have merit, neither the practicality nor the effectiveness of these techniques have yet been tested in the domain of scenario development.

To summarise the discussion on future research areas, in terms of the scenario planning, process the fundamental issues are that there is currently no widely accepted best practice model, there is a lack of understanding of the impact of cognitive barriers on the process, and there are no precise methods or criteria to distinguish between effective and ineffective scenarios and scenario processes. As has already been noted, this is largely because practice leads research. One possible way to resolve this is for academic researchers and practitioners who understand "psychology, systems and economic theories" to collaborate to better understand the scenario process enabling them to "guide and influence resolution to the major issues and research problems" (Burt and Chermack 2008, p.292).

7.6 REFLECTIONS ON THE RESEARCH JOURNEY

It has often been said that the objective of doctoral research is to serve as an apprenticeship for aspiring researchers. This has been a long apprenticeship journey. In fact it has been an incredibly long journey to complete this thesis simply because other 'more important' issues continually diverted my attention, justified in my mind as critically important issues that had to be dealt with as a matter of urgency, but once dealt with, I would continue with the thesis. Inevitably these critical important issues never subsided, justifying the continued delay in completing the thesis. There has been some benefit to this however, in that I have continued to read the growing volume of literature on scenario planning, which I still do and enjoy. At the same time I have continued to teach scenario planning and write course materials, to publish, and have engaged in many scenario planning workshops and projects, all of which have deepened my understanding of scenarios, undoubtedly benefited my practice, and fueled my ongoing curiosity in both the practitioner and academic aspects of the futures subject area.

In answer to the question what would I do differently if I was to start the whole process over again, there are several things I would change. The most obvious is that I would of course ensure that I completed the write-up of the thesis in a considerably shorter timeframe. I have learnt from experience that not all important issues have to be attended to immediately, in fact some disappear altogether if ignored. I have also learnt the difference between 'problem solving' versus 'problem finishing' (Eden 1987), a concept I learnt on my MBA programme, but never really understood (or applied) until much later in my career. The second change is that while I thoroughly enjoyed the process of video data collection of observation the experience resulted in two valuable lessons; the first was that at the time of deciding my research approach I had not sufficiently thought through the practicalities of transcribing and analyzing so much video data. The second was that while I was able to clearly see what the people were doing and saying when in one group, when the groups broke into working sub-groups, trying to follow the conversations and activities of each of the sub-groups was an exceptionally difficult task. However, the benefit of being able to repeatedly watch and listen to the recordings of the groups on my laptop as they progressed through the process was invaluable in the coding of the observations. There is no doubt in my mind that had I observed the groups as a one off face-to-face exercise rather than capture the process on video, I would have missed a number of important observations which only emerged from repeated viewings of the video footage.

At the conclusion of the elective I did in fact have all of the participants attending the elective complete a questionnaire and I interviewed eight of the group members. Although I found the information that came out of this very useful, unfortunately neither the questionnaires nor interviews were sufficiently well done to include them in this thesis. In reviewing the completed questionnaires and transcripts of the interviews, it was obvious that I had not asked the right questions to explore the process deep enough with the participants, the consequence of which is that the data collected was largely superficial and provided no in-depth insights into process issues. However, the one useful piece of data that did emerge from both the questionnaires and interviews was that all of the participants indicated that the one change required in the process was for constant rather than roving group facilitation. Nevertheless, further analysis suggested that a redesign of the questionnaire was not going to be enough to enable me to explore my research questions in enough depth and it became clear that video material was likely to be the only satisfactory way of exploring the questions in depth. Thus if I were to do it again, I would certainly think about using interviews and questionnaires, which although difficult in their own right, are more readily amenable to quantitative analysis through a range of well-known tools, and from observations of other doctoral students, appears to be a somewhat faster approach to data analysis.

7.7 CONCLUSIONS

Schwartz is credited with having said that “scenarios making is not rocket science”. As I hope the foregoing discussion proves, scenario making is indeed not rocket science, it is actually far more complex because unlike rocket science, it deals with human beings and a host of mostly unpredictable exogenous variables. The overall conclusions from the findings is that firstly, the scenario planning process is not that straightforward, there is obviously substantially more going on in the process than is generally ascribed to in the literature. Secondly, the findings from the cognitive literature in terms of phenomena impacting thinking, information searching, and processing have the potential to severely limit the content and learning in scenario processes. Practitioners at large however, appear generally unaware of, or at best only vaguely aware of these phenomena and their ramifications on the scenario developmental process. This is evidenced by the fact that few of the articles on scenarios in the anecdotal, experienced-based literature make references to these phenomena; and in advocating particular methodologies only a small number cite supporting empirical evidence. As Whaley (2008) notes after 40 years involvement in scenario planning, his experience is that “practitioners are vague about where their scenarios come from … they allude to a process, people working behind the scenes, giving the impression of expertise. But hard facts of what is done to create the scenarios, what data is processed and how, is not generally set out”. The issue he suggests, is that no theory can be applied or

arise from this. (Whaley 2008, p.310) Part of this no doubt is attributable to the fact that as Eden and Ackermann (1988, p.150) note, scenarios are popular and this has a tendency to produce “experts out of thin air”.

While developing a theory would have been an exceptional achievement, this research was an exploratory one and as such the intention from the outset was not to develop a theory of scenario planning per se, but to make a contribution to both practice and theory. As with much research, it has probably raised more questions than it has answered but it is hoped that the combination of elements of the literature review and the findings have in combination, met the doctoral requirement of an original and credible contribution to knowledge. It is however the readers of this thesis who will ultimately determine whether or not this has been achieved.

Finally I have been very critical of the scenario literature in this thesis. I remain critical of it; it is too full of practitioner first-hand accounts of their (unsubstantiated) successes with scenarios, and the complexity of the process is vastly understated. However I recognise that the literature always lags several years behind professional practice, and there are indications that changes are taking place. For example, recent publications such as *Foresight in Action: Developing Policy-Oriented Scenario*s (van Asselt et al. 2010) suggests that there are groups of academics undertaking research aimed at providing “re-consultable, empirically informed reflection on foresight practices” by disclosing “manners, activities, pitfalls and challenges that usually become concealed or overlooked in stylized self-accounts and methodological-epistemological discussion” ((van Asselt et al. 2010, p.3).

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Appendix 1: Syndicate Group Members

Appendix 1.1 Pilot Study: Syndicate Member Details

Appendix 1.2 Full-time Group 1: Syndicate Member Details

Appendix 1.3 Full-time Group 2: Syndicate Member Details

Appendix 1.4 Open-Learning Group: Syndicate Member Details

Appendix 1.1

Pilot Study: Syndicate Member Details

	Gender	Age	Occupation	Nationality
Syndicate A				
Kathleen McKillion	F	26	Social Worker	UK
Collette Fillipi	F	29	Accountant	UK
Andrew Jamieson	M	27	Electrical Engineer	UK
William Cairns	M	44	Solicitor	UK
Ian Burt	M	34	Production Engineer	UK
Syndicate B				
Nauala Boyle	F	28	Administrator	UK
Kevin Page	M	27	Electrical Engineer	UK
John Anderson	M	33	Accountant	UK
Nick Zappia	M	41	NHS Administrator	UK
Syndicate C				
Morayo Scanlan	F	34	Administrator	UK
John Young	M	29	Marketing	UK
David McIntyre	M	34	Engineer	UK
David Loudon	M	35	Administrator	UK
Gerald Byron	M	38	Electrical Engineer	UK
Syndicate D				
Jane Cook	F	37	NGO Administrator	UK
Thomas O'Hara	M	32	Mechanical Engineer	UK
Angus Robinson	M	29	Mechanical Engineer	UK
Gerard Slater	M	31	Computer Engineer	UK
Syndicate E				
Angela Connor	F	26	Design Engineer	UK
Patricia Wilson	F	29	Accountant	UK
Richard Hyde	M	41	Planning Engineer	UK
Scott Lee	M	27	Banker	UK
David Reid	M	43	Marketing	UK

Appendix 1.2

Full-time Group 1: Syndicate Member Details

	Gender	Age	Occupation	Nationality
Syndicate A:				
Maxime Bonpain	F	25	Sales	France
Rajiv Mehrishiiv	F	38	Civil Servant	Indian
Lisani Manjombolo Ndaba Botswana	M	32	Mining Engineer	
Charles Smith	M	27	Engineer	UK
Mau Wa Peter Wong	M	31	Sales	Hong Kong
Michael Cheung Hong Kong	M	25	Hotel Mgmt	
Syndicate B:				
Ian Gordon Beetham	M	36	Lawyer	N/Zealand
Sarit Khanna	F	26	Marketing	India
Michael Nungu	M	45	Accountant	Tanzania
Linda Peters	F	37	Advertising	USA
Edward Jonathan Skinner	M	27	Mgmt Consultant	UK
Syndicate C:				
Kenny Kandodo	M	32	Accountant	Malawi
Clemente Lowe	M	25	Sales	Hong Kong
Mira Mehrishi	F	40	Civil Servant	India
George Papiotis	M	26	Production Engineer	Greece
Noel McAuliffe	M	32	Accountant	UK
Syndicate D:				
Kofo Akinugube	F	27	Marketing	Nigeria
Leslie Anne Mackenzie	F	27	Accountant	UK
Injeti Srivas	M	33	Civil Servant	India
Weng Toh	M	37	Engineer	Malaysia
Manos Zakinthinakis	M	24	Sales	Greece
Syndicate E:				
Tse Ming Chung	F	27	Hotel Management	Hong Kong
Gavin Lawson	M	27	Solicitor	UK
Michael Katsinas	M	25	Sales	Greece
Narsingh Saxena	M	39	Geophysist	India
Uche Chibututu	F	29	Engineer	Nigeria

Appendix 1.3

Full-time Group 2: Syndicate Member Details

	Gender	Age	Occupation	Nationality
Syndicate A:				
Zaki Bayoud	F	38	Engineer	Libya
Paul Grant	M	24	Accountant	UK
Panayotis Katiforis	M	26	Sales	Greece
Eric Fennic	M	31	Engineer	UK
Simon Duggan	M	28	Marketing	UK
Syndicate B:				
Peter Corvi	M	37	Research Scientist	UK
Malcolm Paterson	M	29	Optician	UK
Constantine Spyropoulos	M	24	Sales	Greece
Antonio Dias	M	26	Sales	Portugal
Rachel Wilson	F	27	Engineer	UK
Syndicate C:				
Alastair Wyllie	M	39	Marketing	UK
Alexander MacPherson	M	28	Accountant	UK
Agapi Petraki	F	26	Sales	Greece
Man Kwong Pun	M	28	Accountant	Hong Kong
Michael Mather	M	33	Banking	UK
Syndicate D:				
Robert Ferguson	M	33	Finance	UK
Leslie Weir	F	26	Accountant	UK
Kleanthis Palaiologos	M	27	Marketing	Greece
Mohammed Ellam	M	27	Banking	UK
Mutijanto	M	39	Civil Servant	Indonesian
Syndicate E:				
Craig Sunderland	M	28	Marketing	UK
Brian Smith	M	28	Accountant	UK
Sherman Cheung	M	28	IT	Hong Kong
Antoine MacGabham	F	26	Engineer	UK

Appendix 1.4

Open-Learning Group: Syndicate Member Details

	Gender	Age	Occupation	Nationality
Syndicate A:				
Christopher Edmonds (Dr)	M	44	Systems R&D	UK
Richard Smith	M	35	Operations Manager	UK
Robert McGregor	M	34	Marketing	UK
Kenneth McGowan	M	28	Engineer	UK
Ute Beck	F	34	Marketing	Germany
Syndicate B:				
Barry Sturman-Mole (Dr)	M	42	Product Development	UK
Philip Leighton	M	37	Geologist	UK
Peter Taylor	M	44	Sales Coordination	UK
Patrick Travers	M	37	Accountant	UK
John Harrison	M	31	Financial Planning	UK
Syndicate C:				
Robert Tinlin	M	41	Local Government	UK
Dave Tomlinson	M	34	Accountant	UK
Bryan Johnson	M	36	R&D	UK
Philip Jordan	M	40	Technical Sales	UK
Campbell Boyd	M	38	Engineer	UK
Syndicate D:				
David Williams	M	46	Finance	UK
Ross O'Malley	M	34	Product Planner	UK
Paul Taggart	M	37	Quality Surveyor	UK
David Marsh	M	30	Marketing	UK
Simon Stevens	M	27	NHS Administrator	UK
Anna Price	F	35	Accountant	UK
Syndicate E:				
Ashok Patel	M	47	Accountant	India
Brian Cox	M	30	Systems Analyst	UK
Godfrey li	M	37	Banker	Hong Kong
Robert Murrells	M	35	Commercial Manager	UK
William Bell	M	38	Compliance	UK
Syndicate F:				
Jeremy Smith	M	37	Engineer	UK
Aleksander Patlewicz	M	50	Accountant	Poland
Kevin Tolson	M	36	Bus Development	UK
Bruce Scambler	M	38	Patents Officer	UK
Stephen Wright	M	32	Engineer	UK

Appendix 2: Scenario Process Development Instructions:

Appendix 2.1: Step 1 Instructions

Appendix 2.2: Step 2 Instructions

Appendix 2.3: Step 3 Instructions

Appendix 2.4: Step 4 Instructions

Appendix 2.5: Step 5 Instructions

Appendix 2.1

STRATHCLYDE GRADUATE BUSINESS SCHOOL

RISK MANAGEMENT & SCENARIO PLANNING

Syndicate Exercise 1: Defining Client Issues

STEPS

1. Each syndicate member introduces him/herself to the rest of the syndicate, giving details of their professional/work situation in an organisational context.

2. Ask for volunteers to play the "client" role in this exercise. Discuss the strategic issues of each of the volunteer clients. Focus on the strategic issues related to the external business environment rather than internal issues which are under the client's control.

3. Select a client who is familiar with the strategic issues of his/her organisation or the organisation for which you will ultimately be developing scenarios.

4. Discuss the client's strategic issues in some detail. Select a horizon year for scenario purposes. This horizon year should be appropriate to the strategic issues and should be somewhere between 5 and 20 years hence.

5. Prepare an overhead slide identifying as clearly as possible, the client's strategic issues. Identify the horizon year and the reasons for selecting it.

Appendix 2.2

STRATHCLYDE GRADUATE BUSINESS SCHOOL

RISK MANAGEMENT & SCENARIO PLANNING

Syndicate Exercise 2: Interviewing the Client

STEPS

1. Attach 4 flipchart pages to the wall to use as a post-it display area.

2. Appoint one syndicate member to be lead interviewer. All members should feel free to participate in the interview but the session should be chaired by the lead interviewer.

3. Interview the client using the "7 Questions" tool as a framework. Ask additional questions as required. All syndicate members should take notes during the interview. This is a critical part of the scenario process - it is imperative that you have a clear understanding of the strategic issues which are of concern to the client as the scenarios you develop should address these concerns. GOOD LISTENING & NOTETAKING IS CRUCIAL.

4. All members should underline key words in their notes. Transfer these ideas in your interview notes to post-its as short bullet point statements (less than 9 words). Transfer post-its to the wall display area.

5. When all members are finished, remove all obvious duplications and separate the internal (under the client's control) from the external (business environment) issues. Cluster the remaining external business environment issue post-its as you see fit.

6. The first clustering will not be ideal. Iterate until all members agree that the clusters are well-structured (clear logic within each cluster/clear separation between clusters).

7. Find a name for each cluster which identifies the common element bringing together the post-its within the cluster. Add the clusters to the slide containing client's strategic issues, prepared in Exercise 1.

Appendix 2.3

STRATHCLYDE GRADUATE BUSINESS SCHOOL

RISK MANAGEMENT & SCENARIO PLANNING

Syndicate Exercise 3: Identifying Driving Forces

STEPS

1. The "client" role can now be abandoned. Review the "clusters" developed in Exercise 2. These clusters now become your scenario themes. Display the clusters where all syndicate members can see them.

2. Think about the world in the period between now and the horizon year and the "driving forces" which will shape the future. Brainstorm on ANYTHING that comes to mind which seems relevantly related to any of the scenario themes. Use team diversity to the maximum. Draw on personal knowledge you have of the issues, including anything that comes to mind from subjects previously studied in the MBA that might have a bearing. The objective is to open up as wide a range of variables as possible.

3. Record the driving force ideas on post-its as short bullet point statements. Transfer post-its to the wall display area.

4. Cluster the post-its. The initial clustering attempt may not be ideal. Iterate until you have clusters which are well-structured. Find a name for each cluster which identifies the common element linking the post-its within the cluster.

5. Review the clusters. Determine what additional research might be appropriate in terms of adding new knowledge and novelty to the issues.

6. Determine who/what/how/when this new knowledge development will be achieved by the next session.

Appendix 2.4

STRATHCLYDE GRADUATE BUSINESS SCHOOL

RISK MANAGEMENT & SCENARIO PLANNING

Syndicate Exercise 4: Scenario Construction

STEPS

1. Report on any research done since the last session. Highlight any new information/novel ideas that have surfaced.

2. Repeat the brainstorm (Exercise 3) in light of the research findings/new knowledge. Re-cluster as required.

3. Review the posit-its in each cluster and clearly identify the "predetermined" and the "key uncertainty" elements in each cluster. Draw a "Importance/Predictability" matrix chart and transfer key uncertainty post-its to the chart until there are roughly equal numbers of post-its are displayed in each quadrant.

4. Consider the post-its in the "more important/less predictable" quadrant of the chart. Try to identify the main dimensions underlying these. Discuss this in terms of the following questions:-
   - in what respect are the key uncertainties interdependent.
   - identifying a lesser number of mutually independent variables which express the same uncertainties at a deeper level.

   Having done the above identify which 2 of these would really make a difference for the client and create a scenario matrix.

5. Using one of the structuring devices discussed, identify the "end-states" (state of the business environment in the horizon year) expressed in the scenario dimensions identified in the step above. Name the endstates using short, catchy names which capture the essentials of the situation in the horizon year.

6. Brainstorm (individually on post-its, then display and discuss) on elements of scenario story lines. These should be a series of causally inter-related events which might play a role in one of the scenarios..

7. Allocate elements to the end-states and prune/add new ones until a reasonable story line has developed connecting the present with end-states in the horizon year. Display the scenarios on the wall by means of a series of post- its giving scenario elements. Review the story lines to ensure the scenarios are plausible, recognisable etc...

Appendix 2.5

STRATHCLYDE GRADUATE BUSINESS SCHOOL

RISK MANAGEMENT & SCENARIO PLANNING

Syndicate Exercise 5: Concluding the Scenario Exercise

STEPS

1. Revisit the scenarios prepared in Exercise 4 to consider whether they address the client's strategic issues. If any of the scenarios do not seem to make any difference to the overall variables, consider revising/abandoning them.

2. Discuss the strategic implications across and within the scenarios for the client and the options the client should consider.

3. Select a few important strategic options and discuss the outcome of each of these in each of the scenarios developed. Consider the robustness of the individual options in terms of the different outcomes across the scenarios. If the range of outcomes is unacceptable in one or more scenarios, discuss the ways in which the client might have to modify the option to reduce the scenario dependence.

4. Discuss how you will organise the scenario presentation. Allocate preparatory work to members of the syndicate.

5. Prepare scenario presentations. Use slides. Minimise use of word slides, maximise use of pictures, diagrams etc..

6. Present the client's strategic issues in the context of the scenarios. Discuss the strategic options considered and conclusions reached. Make sure the audience has a clear "road map" of the presentation at any time.

Appendix 3:

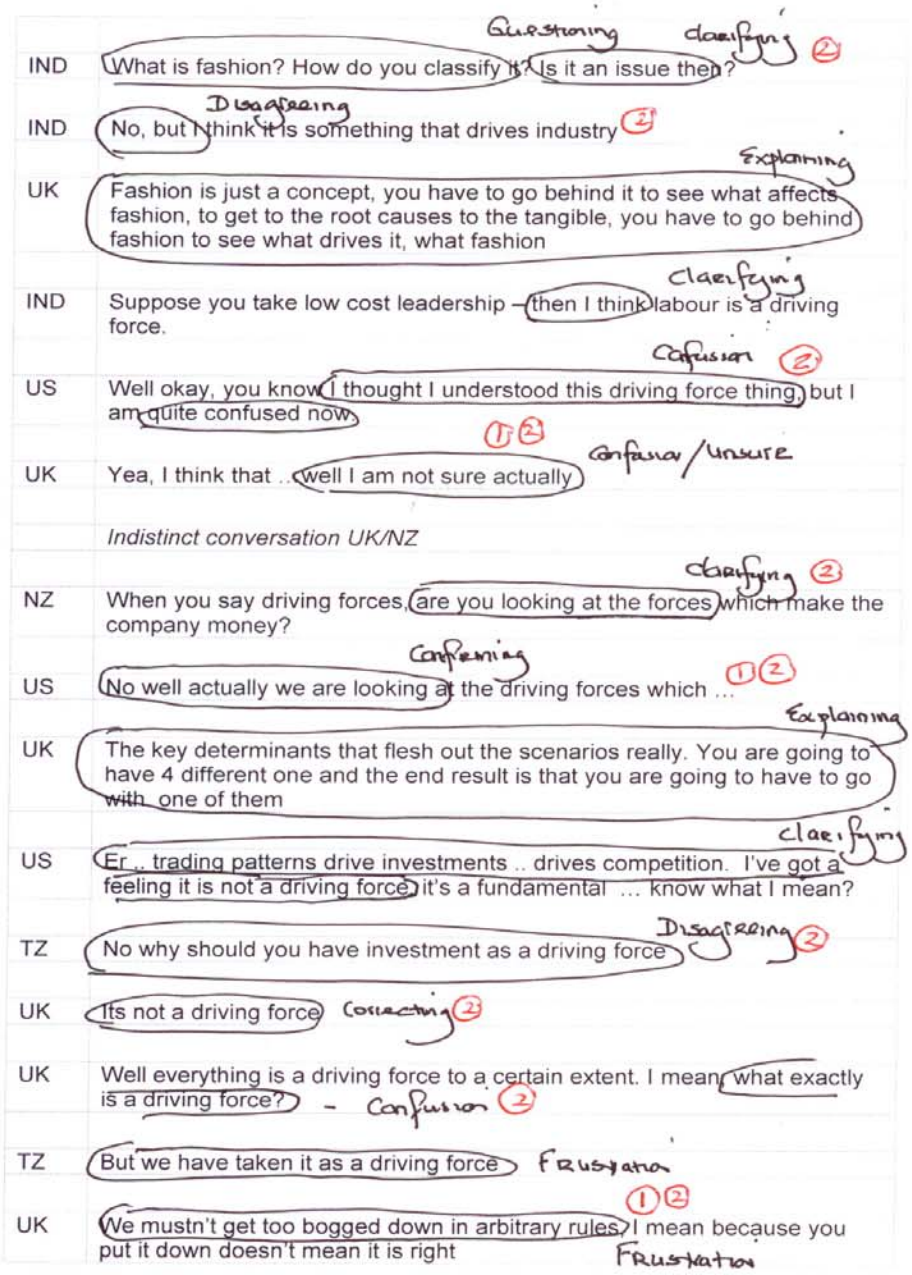
Examples of Transcript Coding and Categorisation

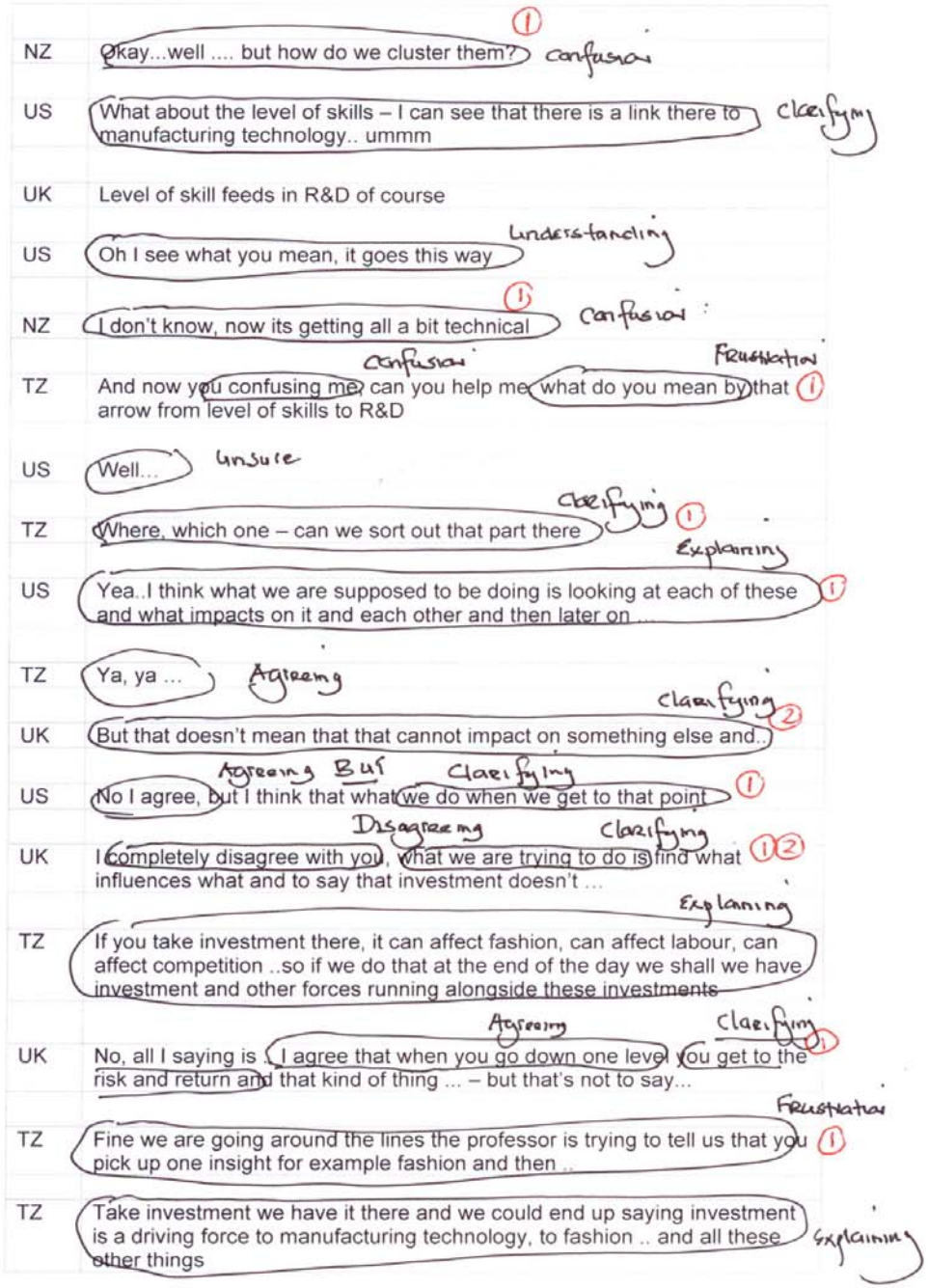
Full time Group 1
Session 3 (0900-1700): Driving Forces-Scenario Development

		(Disk 1/Tape 2) 0.28
	All standing around the whiteboard/flipchart	
IND	So these are the driving forces, and what have we got here ... do we do this first and then go onto Yea, these are the predetermined elements	Seeking clarification (1)
US	Can I be clear at where we are at now.	Seeking clarification (1)
IND	What we have up there are issues, not driving forces it is a jumble of everything	Disagreeing (2) Confusion (2)
TZ	Are we on the right track, what was he (KvdH) talking about?	Clarifying (1)(2) Confusion (2)
UK	Well if we start to look at the high ground around these topics ..and they will tie together quite a lot, then the driving forces will fall out	Explaining
US	I think it would be a good idea to pull out the main ones .. these ones (1)	Suggesting
UK	Yes, then pick up the main driving forces ... I think this what he (Kvdh) was saying (1)	Agreeing
US	And then start to work on the driving forces and see how...	Agreeing
TZ	Labour, what about labour?	clarifying (2)
IND	But these are not driving forces	Disagreeing (2)
TZ	No, no, no, we are not talking about the driving forces yet	Disagreeing (1)
IND	But you have to start with the driving forces	Objecting/clarifying (1)
US	No, you start from that (the client issue) and then look at the driving forces	Disagreeing (1)
IND	What about fashion then, what is it? Is it a driving force?	Clarifying (2)
UK	What are the driving forces behind fashion – nationalism, globalism?	Clarifying (2)
TZ	Yes, they are driving forces	Agreeing (2)

(1) = Confusion as to process
(2) = Confusion as to definitions

Confused State ↓ OBFUSCATION !


Questioning
clarifying
IND What is fashion? How do you classify it? Is it an issue then?
Disagreeing
IND No, but I think it is something that drives industry
Explaining
UK Fashion is just a concept, you have to go behind it to see what affects fashion, to get to the root causes to the tangible, you have to go behind fashion to see what drives it, what fashion
Clarifying
IND Suppose you take low cost leadership – then I think labour is a driving force.
Confusion
US Well okay, you know I thought I understood this driving force thing, but I am quite confused now
UK Yea, I think that .. well I am not sure actually
Confusion/Unsure
Indistinct conversation UK/NZ
Clarifying
NZ When you say driving forces, are you looking at the forces which make the company money?
Confirming
US No well actually we are looking at the driving forces which ...
Explaining
UK The key determinants that flesh out the scenarios really. You are going to have 4 different one and the end result is that you are going to have to go with one of them
Clarifying
US Er .. trading patterns drive investments .. drives competition. I've got a feeling it is not a driving force it's a fundamental ... know what I mean?
Disagreeing
TZ No why should you have investment as a driving force
UK Its not a driving force
Correcting
UK Well everything is a driving force to a certain extent. I mean what exactly is a driving force?
Confusion
TZ But we have taken it as a driving force
Frustration
UK We mustn't get too bogged down in arbitrary rules, I mean because you put it down doesn't mean it is right
Frustration


NZ Okay...well .... but how do we cluster them?
US What about the level of skills – I can see that there is a link there to manufacturing technology.. ummm
UK Level of skill feeds in R&D of course
US Oh I see what you mean, it goes this way
NZ I don't know, now its getting all a bit technical
TZ And now you confusing me, can you help me what do you mean by that arrow from level of skills to R&D
US Well...
TZ Where, which one – can we sort out that part there
US Yea..I think what we are supposed to be doing is looking at each of these and what impacts on it and each other and then later on ...
TZ Ya, ya ...
UK But that doesn't mean that that cannot impact on something else and..
US No I agree, but I think that what we do when we get to that point
UK I completely disagree with you, what we are trying to do is find what influences what and to say that investment doesn't ...
TZ If you take investment there, it can affect fashion, can affect labour, can affect competition ..so if we do that at the end of the day we shall we have investment and other forces running alongside these investments
UK No, all I saying is , I agree that when you go down one level you get to the risk and return and that kind of thing ... – but that's not to say...
TZ Fine we are going around the lines the professor is trying to tell us that you pick up one insight for example fashion and then ..
TZ Take investment we have it there and we could end up saying investment is a driving force to manufacturing technology, to fashion .. and all these other things

40

Appendix 4:

Examples of Transcript Text Indicating Heuristics and Biases

Heuristic/Bias: Availability/Retrievability/Confirmation

- *And there's a lot of worry in the industry about China who at the moment is stock piling raw materials. Now they have an immense labour force. They use convicts in prison so they have absolutely no labour costs … and the worry is they, from an unfair cost base, will split the market with cheaper fabrics. This is a very real worry. One of the quotes that I saw was that this would de-industrialise first world countries …*
- *Actually I read something about that in the FT, I think it was yesterday, the Chinese will take over the world because of their cheap labour.*
- *Yea, I think there was a BBC documentary about that just the other day… China ruling the world. I believe it.*
- *Remember we talked about this last time as a driving force.* Well, *something I picked up yesterday in my trial and error here and there from the FT of yesterday - textile industry which is somewhere. I had a … it did not have that TV appeared here … ah okay, here it is, considerable over capacity. Now this one… internet a few days ago .. textile mill in Northern Ireland suffering from considerable overcapacity…I was thinking perhaps we should really incorporate this in our scenarios.*
- *Yup, I agree, but isn't technology itself quite predictable?*

  Well…well.. yes, I suppose so. Yes.

  But it is such a big thing in the world, you read about it everywhere. So it's predictable?
- *Yes, I saw something about that exact thing in the papers, not sure when it was, I'll see if I can find it.*
- *Wasn't there something like that on TV a few weeks ago, did you see it.*
- *I think we kind of lost sight of our thinking. Last week the European Union was driving the competition by making money available. I think somehow in the darkest recesses of our mind it's still there but we don't say it anymore, because everything we read has told us really that the situation is not going to change till at least the end of the century.*
- *Funny, but I was talking to someone from the group down in the end room before we started, just to see where they are at you know, and she said that they have some of*

the same ideas as we do and she said she had a bunch of articles which showed that we are on the right track … so … uhm …so what are we going to do next?

Heuristic/Bias: Escalating Commitment

- *Well they could be independent. If it was something like import controls or something like that. Or control for investment then the two would be independent.*

  Okay, you know he is right, we could go on and on, and we are running out of time, so why not use economy and competition? I mean, I can see it working.

  Yea, okay, I go for this.

  So we all agree?

Heuristic/Bias: Anchor & Adjustment

- *Well we know what's going to happen, in 2005 the multi-fibre agreement will be phased in across Europe.*

  But the EEC won't change before then?

  No.

  Well that might come out of the summit.

  Definitely not, no, it will come in 2005, no question about it.

- *It's very easy to say the strategy should be to invest, but where are they going to get the money to invest? Remember I know this company, this would just not work for them, no way at all.*

- *They seem okay to me, so what's the problem?*

  Okay, I hear what you are saying, and I am not saying they are not good options, but believe me, they would not work in this company, I just know it. .

- *… and make it work. You've got to make every expenditure very controllable and very variable. And avoid fixed costs because the scenarios themselves have an uncertainty attached to them. But the investment will happen, take it from me, I know the company inside out.*