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The Role of MS/OR in Strategic Management: A NZ/UK Comparative Evaluation

A thesis
submitted in fulfilment
of the requirements for the Degree
of
Doctor of Philosophy
at the
University of Waikato
by

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University of Waikato
1994

Abstract

In this thesis the role of MS/OR in Strategic Management has been examined in an original multi-disciplinary, comparative, empirical investigation. Focussing primarily on tool usage for a series of core strategic tasks by practitioners in both the MS/OR and the Strategic Management disciplines enabled the MS/OR contribution to be evaluated in a strategic context. In addition, this was the first broad-based empirical study of Strategic Management tool usage linked to specific strategic tasks, and the first investigation of strategic tool selection.

To provide a structure for the evaluation, a normative framework of strategic tasks was developed. A multi-method research design was chosen to collect descriptive and explanatory data. The empirical study was replicated in New Zealand and in the United Kingdom using postal questionnaires and semi-structured interviews. The target populations were the practitioner members of the Operational Research Societies and Strategic Management Societies in both countries.

Cross-country comparisons in both disciplines showed a very high level of similarity in tool user proportions for the strategic tasks. The results demonstrate the current strategic involvement of MS/OR practitioners and confirm the ability of MS/OR to make a contribution at the strategic level; formal recognition of strategic level MS/OR is proposed. Potential strategic application areas for MS/OR in future have been identified, along with a series of strategic roles for MS/OR practitioners.

The contributions of this research include new evidence on (1) the current status of MS/OR tool usage in Strategic Management in New Zealand and in the United Kingdom, (2) the current status of Strategic Management tool usage in New Zealand and in the United Kingdom, and (3) the factors affecting strategic tool selection. New theoretical developments include the Strategic Management framework, a Strategic Management tool typology and an overview level model of the strategic tool selection process. The research also provides a methodological template for future multi-disciplinary comparative research, and a rich source of follow-on research projects including new tool developments.

Acknowledgements

I wish to express my appreciation to Associate Professor John Scott for making time throughout this thesis project for regular discussions on content and process issues. Thanks for your endorsement of the UWRC funding application which lead to assistance with the UK and NZ field expenses. Thanks for always being positive and patient, and for providing advice and encouragement when it was needed. Your suggestion to celebrate the milestones along the way, proved invaluable!

I am also grateful to Professor Mike Pratt for advice, support and encouragement received throughout the project. Without your positive reaction to my research proposal, this project would not have been possible. I thank you. ☺

I wish to acknowledge the co-operation which I received from the officers of each of the four Societies in approving the research, and also for assistance received with the empirical surveys:

Operational Research Society, United Kingdom

Operational Research Society of New Zealand

New Zealand Strategic Management Society

Strategic Planning Society, United Kingdom

I am especially grateful to all of the participants from these Societies who shared their experiences to provide the data for the project. Without your help this research would not have been possible.

I received assistance from many other sources and wish to acknowledge the major contributors:

Mrs Sue Johnson, from the Audio Visual Services Unit at Loughborough University, for assistance with the UK surveys;

Nan, Michael and Richard Whitman, from Enfield, for providing accommodation and friendship during the UK data collection period;

Dr Ray Littler, from the Waikato Centre for Applied Statistics, for statistical advice;

Associate Professor David Taylor, for technical advice on SPSS^x and for regularly expressing interest and offering personal encouragement;

Dr Charles Crothers, University of Auckland, for statistical and technical advice on

SPSS^x;

Theresa Reed and Shirley Hodgson, for secretarial assistance with interview transcription;

Pauline Hudson, for graphic artwork on the SM model;

Ross James, for developing a random generator for sample selection and a counter program, and for assistance with Quattro Pro graph formats; thanks also for acting as a sounding board for ideas during *many* discussions throughout the project, and for proof reading in the final phase;

John Creek, Chris Jennings and Monica van Oostrom, for computer services support;

University of Waikato Research Committee, for financial assistance;

Department of Management Systems, University of Waikato, for additional funding.

Last, but by no means least, I am eternally grateful to my personal support team, Chris and Greg. Thanks for taking on extra chores at home so that I could be free to pursue this project. Your love, encouragement, and patience has enabled me to achieve this major personal goal. Thanks * 10⁶.

"...what one knows always becomes clearer by knowing what one doesn't know."

(Edmunds, 1982)

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Chapter 1 Introduction

1.1 Introduction

Strategic Management is concerned with the management of strategic change within organisations in order to improve their future prospects (Johnson, 1987). Given the continually changing environmental context, Strategic Management is not only an extremely complex process, it is also vitally important for all organisations. This thesis focusses on the use of techniques, tools and approaches within Strategic Management as potentially they perform a significant support role. The use of techniques, tools and approaches in practice for a series of core strategic tasks was investigated in a comparative evaluation of two disciplines: Management Science/Operational Research and Strategic Management. Furthermore, the empirical study was simultaneously replicated in New Zealand and in the United Kingdom.

This introductory chapter provides an overview of the thesis. First, the topic of the research will be discussed, and then the methodology will be described. Next, the importance of the research will be considered, followed by a discussion of the major limitations and key assumptions involved in the research. Finally, a brief outline of the chapters of the thesis will be presented.

Throughout this thesis the following abbreviations have been used:

MS/OR	Management Science/Operational Research
SM	Strategic Management
SP	Strategic Planning
UK	United Kingdom
NZ	New Zealand

In addition, the word "tool" has been used as a generic name for any of the techniques, tools, methods or approaches of the disciplines under study. Definitions of the basic SM terminology are provided in Appendix I.

1.2 Research Topic

The major research theme for this thesis was to investigate the role of MS/OR in Strategic Management. Linked to this central theme, two additional research objectives were included; these concerned SM tool usage and strategic tool selection. Each of these research topics will now be introduced.

1.2.1 The Role of MS/OR in SM

MS/OR has traditionally been applied to well-structured problems in operational areas (Cyert, 1981) such as resource allocation, scheduling, distribution and transportation; providing modelling support to improve efficiency and performance. However, the predominantly quantitative techniques have been supplemented in the 1980s with new qualitative tools including the 'soft OR' approaches (Chapman, 1992; Finlay and Marples, 1991; Taket and White, 1993), and the discipline has expanded into new areas such as Community OR (Chapman, 1992; Ritchie, 1993). During this period advances in the availability and capability of computers have significantly increased the analytical capacity within firms, and the modes of computer usage; hence the scope for technological support has expanded (Cornford and Doukidis, 1991). At the same time the SM discipline has evolved and the importance of strategic decisions has become more widely recognised (Whipp, Rosenfeld, and Pettigrew, 1989).

From the early 1960s there have been advocates for more MS/OR involvement with decision support for top management (Miser, 1963; Tomlinson, 1974, 1983; Rosenhead, 1986; Eilon, 1989). The ability of MS/OR to contribute to strategic projects has been advocated by some authors (Tomlinson, 1983; 1989; Lesourne, 1989; Eilon, 1989; Kirkwood, 1990), questioned by others (Lawrence, 1979; Preedy and Bittlestone, 1985; Finlay and King, 1989), and ignored by major disciplinary reviews in both the UK (Commission on the Future Practice of Operational Research, 1986) and in the USA (Committee on the Next Decade in Operations Research, 1988). The question of the contribution of MS/OR to SM appears to be a conundrum. There appears to be only partial recognition of strategic level MS/OR within the formal activities and publications of the discipline (as evidenced in chapter 2); however, that does not preclude MS/OR strategic activity taking place. This thesis will address the question of the viability of MS/OR at the strategic level by examining evidence of current MS/OR practice.

A preliminary literature analysis was conducted and a significant sample of theoretical and applied publications for a range of MS/OR techniques in strategic contexts was found (Clark, 1992). This provided the stimulus to proceed with this research topic: to investigate the role of MS/OR in SM; primarily by the collection and evaluation of evidence of current levels of MS/OR tool usage for a series of core strategic tasks.

Collecting directly comparable evidence by simultaneously replicating the empirical study

in the SM discipline, provided both a benchmark for comparison of the MS/OR results and served as a second major objective of the research; this will be discussed next.

1.2.2 SM Tool Usage

A literature review of the use of tools in Strategic Management found that most of the empirical studies reporting tool usage have included only one or two questions on tools as part of a major study of strategic planning processes (described in chapter 3). Although the normative literature emphasises the integrative nature of SM, typically researchers have focussed on a small set of similar approaches. None of the previous empirical research had reported the linkage of tools with specific strategic tasks. However, this gap was able to be addressed in this parallel tool evaluation project. The second major objective of the research was the identification of current SM tool usage practices for the same series of strategic tasks; this provided a benchmark for comparison of the MS/OR tool usage results, as well as new evidence for the SM discipline. A larger, broader sample of SM tools was also evaluated in this project.

1.2.3 Strategic Tool Selection

Inextricably linked to this research topic of strategic level tool usage is the process by which tools are chosen for their strategic decision support role. As no studies were found on strategic tool selection, an exploratory investigation was planned as the third major research objective for this thesis: to identify and evaluate the factors which are involved in strategic tool selection. To pursue this objective, two concurrent investigations were conducted. In addition, the relationships between the general types of factors were considered to develop an overview level model of the strategic tool selection process.

1.3 Methodology

This thesis has examined the role of MS/OR in Strategic Management using an empirical investigation of current practice. Focussing primarily on tool usage for a series of core strategic tasks, the multi-disciplinary research simultaneously identified the approaches used by practitioners in the MS/OR and the SM disciplines; this enabled the MS/OR contribution to be evaluated in a SM context. In addition, the research was comparative as the empirical study was replicated in both NZ and in the UK.

To provide a structure for the evaluation, a normative framework of strategic tasks was developed. A multi-method research design was chosen to facilitate both breadth of scope

and depth of inquiry in this exploratory investigation. A postal questionnaire was designed and quantitative evidence was obtained from four samples: (1) UKOR, (2) NZOR, (3) UKSM, and (4) NZSM. Concurrently, sixty one semi-structured interviews were conducted to obtain qualitative explanatory data.

Exploratory and confirmatory data analysis techniques were used to provide descriptive statistics and significance values. Cross-country comparisons and inter-disciplinary comparisons were performed. For the interviews, the inductive cross-interview method was applied and Krippendorff's (1980) content analysis method was conducted to identify strategic tool selection factors.

The research investigation was exploratory as this was the first empirical study of MS/OR at the strategic level, and the first broad-based empirical study of SM tool usage linked to specific strategic tasks. In addition, the strategic tool selection concept has not previously been considered.

In summary, the central research theme for this thesis on the **role of MS/OR at the strategic level** provided the primary objective of the research: *to identify and evaluate current involvement by MS/OR practitioners at the strategic level*. This was addressed by simultaneously considering the following related series of major research objectives:

- (1) to identify the current status of MS/OR tool usage at the strategic level,
- (2) to identify the current status of SM tool usage, and
- (3) to investigate the factors involved in strategic tool selection.

1.4 Importance of the Research and its Findings

This examination of the potential strategic role for MS/OR is important as it contributes to the general debate on the future of MS/OR and to the specific issue of MS/OR applicability at the strategic level. Further, both the SM tool usage and the strategic tool selection investigations add value by augmenting current knowledge in the SM discipline.

Strategic Management is important in all organisations as it "creates the potential for an organisation's future" (Schendel et al., 1980). Therefore tools which can assist in this SM process perform a major and significant role. As tools constitute a fundamental component of the MS/OR and SM disciplines, identification of current tool usage practices is useful not only as a descriptive summary, but also for the new insights and theoretical

development which ensue.

This research design responds to the challenge by Reisman (1988) to use multi-disciplinary research strategies as a means of identifying new horizons for MS/OR in the future. As Strategic Management covers an extensive range of areas, it offers in prospect an important new source of potential applications for MS/OR practitioners and MS/OR tools.

Further, as recent studies in New Zealand (Hooley and Franko, 1990; Crocombe et al., 1991) have identified strategic thinking as one of the major areas of weakness of NZ managers, this SM tool research is timely, relevant and significant. Tools perform an essential support role within the SM process (Dyson, 1990), serving a number of different functions (Langley, 1988, 1991; Day, 1986); thereby providing a mechanism for improving the quality of strategic thinking (Webster, Reif and Bracker, 1989).

This thesis addresses a series of significant research questions and the research outputs will contribute new evidence, firstly on the current status of MS/OR at the strategic level in NZ and in the UK, secondly on the current status of SM tool usage in NZ and in the UK, and thirdly on the factors affecting strategic tool selection. New theoretical developments from the thesis include the SM framework, the SM tool typology and an overview level model of the strategic tool selection process. The research also provides a methodological template for future multi-disciplinary comparative research, and a rich source of follow-on research projects including new tool developments.

In terms of practical relevance, the research scores positively on the criteria proposed by Thomas and Tymon (1982) for evaluating the usefulness of research to practitioners. Furthermore, the findings create opportunities and include actionable guidelines for practitioners in both disciplines.

1.5 Limitations and Key Assumptions

There are inherent delimitations, limitations and assumptions involved with any research study. The following discussion of the major limitations and assumptions of this research project will serve to elucidate weaknesses and make explicit key factors in the underlying rationale for the research.

To examine tool use in two disciplines necessitates an overview level project. This "top

down" approach is appropriate as it reveals the 'big picture' rather than focussing on a single narrowly defined aspect of the topic; the later approach will be suitable for the follow-on research projects. It was not operationally feasible for the research to cover all aspects of tool usage; therefore, this project has not included the mechanics of tool implementation, the quality of tool implementation by the practitioners, or the linkage of tool use and organisational performance. Further, the inclusion of additional countries in the study was primarily precluded by operational constraints.

The target populations for this research are assumed to be specialists or comparative 'experts' in their field, therefore the tool user proportions cannot be generalised to a general management population in the respective countries. Specialist target populations are more likely to reflect the 'leading edge' practices; they are comparable with other corresponding 'expert' populations.

It is assumed that the practitioner samples are representative of the disciplines in each country, and therefore the findings reflect the capabilities of the discipline. Further, for the purposes of the SM tool usage results, it is assumed that the tools used for strategic tasks within SM are SM tools. This implies that SM tools include a wider range of approaches than those which are developed specifically within the SM discipline. It is assumed that MS/OR includes the MS/OR modelling process, the traditional 'hard' or quantitative techniques, and the newer 'soft' or qualitative approaches which have been developed and promoted within the MS/OR community and literature (Appendix II).

The unit of analysis for this research is the individual. This is based on the assumption that tools are implemented by individuals acting alone or as part of a team. Tool selection is primarily a function of personal choice. Therefore, this research has focussed on the behaviour of individuals, their work practices, backgrounds and their perceptions of their employing organisation and its external environment.

The generic limitations associated with postal questionnaires are acknowledged. Although every effort was made in the iterative question design process to ensure clarity, the perception of the questions by the respondents is unknown; however, it is assumed that the responses match the intended meaning of the questions. To assist with this, definitions were provided for key terminology. In addition, in the SM surveys an appendix was provided with a brief definition of each of the thirty tools in the tool familiarity question;

this was assumed to be necessary because of the broad range of tools which were involved and anticipation of significant proportions of newly appointed SM practitioners (based on discussions with NZ managers).

Finally, as this project has involved a major empirical investigation, it has generated a large volume of detailed results. This thesis contains only a selection of the key findings from this empirical investigation in order to comply with the degree requirements on size. Further analysis and additional publications are planned to utilise *all* of the data collected.

1.6 Thesis Outline

The literature on MS/OR involvement in Strategic Management is reviewed and the principal research theme is identified in chapter 2. Next, the literature on Strategic Management tools and tool usage is reviewed and additional research objectives are established in chapter 3. Details of the research methodology and methods are then outlined in chapter 4. The Strategic Management framework which was developed to provide a structure for the empirical research is described in chapter 5. The SM tool usage results are described and discussed in chapter 6, with the same format followed in chapter 7 to present the MS/OR tool usage results. In chapter 8 the results from the strategic tool selection investigations are outlined. External comparisons with previous research and internal inter-disciplinary comparisons are presented in chapter 9. Finally in chapter 10, conclusions and contributions are discussed, and recommendations for further research proposed.

Chapter 2 MS/OR Literature

2.1 Introduction

Management Science/Operations Research (MS/OR) is a scientific approach to solving management problems with a modelling methodology and a systems perspective which originated in military operational projects (Ackoff and Sasieni, 1968; Pidd, 1977; ORSNZ, 1989). The traditional domain of MS/OR has been in the operational area as the discipline has been most successful with well-structured problems (Cyert, 1981). In this chapter the literature on the role of MS/OR at the strategic level will be reviewed. First, the literature on MS/OR involvement in strategy will be examined. As the focus of this research will be on the United Kingdom and New Zealand, the literature on MS/OR tool usage in each of these countries will be discussed. To conclude, the major research issue which has arisen from this review will be outlined.

2.2 MS/OR Involvement in Strategic Management

In this section the literature on MS/OR involvement in SM will be reviewed. First, an overview of the literature on the future of MS/OR will be presented, as it provides the context for this topic. The key papers which advocate MS/OR involvement at the strategic level will be discussed, and the MS/OR tools which can potentially be applied to strategic decisions will be identified. The strategic tasks which can be addressed by MS/OR will be described, and the roles which MS/OR individuals and groups can perform at the strategic level will be proposed. Finally, the potential strategic role for MS/OR will be compared with the current status of strategic work within the discipline.

2.2.1 SM: an Opportunity for MS/OR ?

The future of MS/OR has continually been the topic of discussion and debate within the discipline. There have been warnings that the existence of MS/OR is threatened (White, 1991; Zahedi, 1984), that the profession is underperforming in the market place (Thornton, 1990), or, in danger of losing its identity (Bonder, 1979; Miller and Feldman, 1983). Others adopt a more optimistic view - seeing increased demand and opportunities for MS/OR arising from the dynamic economic and technological business environment (Geoffrion, 1983; 1992).

A major UK report on the Future Practice of Operational Research (1986) concluded that the future will be evolutionary, in response to the changing needs of clients:

OR in the future will continue to be like OR in the immediate past, responding to issues that arise and developing and introducing new methods as and where appropriate. p.851

This implies a need to stay "in tune with emergent ideas" (Tobin et al., 1980). However, Tomlinson (1989) advises that it is not just "a matter of improving the detail and complexity of our models", as the type of analytical support which managers need now is different. There is a danger of intensification which occurs when the "drive to repeat previous successes" leads to "the over-refinement of techniques that are already adequate, while ignoring new problems and new challenges" (Lee, 1976). To tackle different problems, MS/OR needs a "much wider range of techniques" and a "more refined methodology" (Tomlinson, 1974; 1989).

There is scope to significantly increase both the application areas and the tools of the discipline (Rivett, 1974): Rosenhead (1986) suggests that MS/OR needs to expand its range of clients; technological advances can also be utilised to extend the capabilities of the MS/OR toolkit and to enhance tool performance (Geoffrion, 1983).

The expansion of MS/OR can be summarised using two distinct options (Miser, 1989):

- (1) "to advance within its present boundaries by extending its frontier", or
- (2) "to expand its boundaries to include a much wider spectrum of phenomena and problems".

Many of the proposals for MS/OR development fall into the first of these categories; they "appear to accept the status quo ... and extend the models to encompass more of its complications and detail". Examples of this include the special issue of the *Journal of the Operational Research Society* (volume 44(4)) on New Research Directions, and the report of the USA Committee on the Next Decade in Operations Research (CONDOR, 1988). However, the major opportunities for MS/OR expansion are in the second category. Miser (1989) believes that strategic issues represent one of the most important opportunities for MS/OR. These have traditionally been perceived to be beyond the scope of the MS/OR discipline for reasons such as: strategic problems are too large and complex for MS/OR to model (Lawrence, 1979), the lack of credibility for MS/OR models (Gass, 1983), strategic issues are primarily qualitative (Finlay and King, 1989), senior management don't operate in rational quantitative ways (Preedy and Bittlestone, 1985), the strategic environment is not conducive to a methodical approach (Preedy and Bittlestone, 1985), MS/OR skills and competences don't match senior management skills (Finlay and King, 1989) or learning style differences between the two groups (Scott, 1990). In the next

section, the literature advocating MS/OR involvement in strategic level decision support will be reviewed.

2.2.2 Advocates for MS/OR in SM

From the early 1960s there have been advocates for more MS/OR involvement with decision support for top management. In this section the key papers which have advocated the expansion of MS/OR into the strategic domain will be discussed.

Harris (1978) advocated more MS/OR involvement in corporate planning and used a four quadrant classification of corporate problems to identify the areas where MS/OR can contribute. Table 2.1 summarises the modelling types which are appropriate for each of the problem types.

Table 2.1 Classification of Corporate Planning Decisions

Level of Understanding	Implementation of Change	
	1	3
	Small Incremental Change High Understanding <i>problem solving</i> <i>modelling</i>	Large Change High Understanding <i>qualitative models</i> <i>future scenarios</i>
	2	4
	Small Incremental Change Low Understanding <i>empirical analysis</i> <i>simulation</i>	Large Change Low Understanding <i>"crisis" situation</i> <i>little control</i>

Harris proposed that MS/OR can assist with decisions of types 1-3 inclusive. However, when Newton (1984) applied this classification to the decision support role for MS/OR, he suggested that only type 4 decisions are strategic (types 1-3 he defines as tactical). Accordingly, he proposed that strategic decisions provide the "greatest challenge" for MS/OR as they are beyond the "existing boundaries" of theory and practice. Nevertheless, Newton advocates MS/OR involvement in decision support systems for strategic decision support.

Lawrence (1979) warns that "Planners have dismissed the role of Operational Research Groups and OR techniques" and he decries the use of sophisticated models: "super-optimising company planning models are a daydream". As the corporate planning process

is highly judgmental, he advocates only simple techniques to provide timely analytical support:

what is appreciated in the planning field is very straightforward modelling of familiar situations speeding the process of the analysis up and permitting exploration of many more alternatives and pushing back the boundary step by step as new options and problems are identified. p.781

Lawrence then suggests improvements for MS/OR to enable a better performance in this area: to improve the quality and clarity of presentation, to improve the display of alternatives rather than to optimise, and to focus on "perceived and real problems for which answers are actually awaited".

Tomlinson (1983) drew on his industrial experience to "claim that analysis can provide an important aid in the process of strategic planning". In another paper co-authored with Dyson (1983), a strategic process model based on a control system planning approach was developed, to consider the use of tools in the planning process. This led to a strong conclusion:

The very fact that tools have a contribution to play at every stage of the planning process indicates that the strategic planning process must necessarily be deficient if it does not make use of them. In the absence of such analytical tools, the planners are driven to use cruder and less reliable forms of analysis, or to ignore analysis altogether in favour of hunch and opinion. As a corollary to this, if planners are to make effective use of the tools they should know what they are and have some information as to what they can do. p.775

Thus the analyst has a "specific and irreplaceable service role to play" in Strategic Planning.

Eilon (1980, 1989) has taken a forthright look at the discrepancies between MS/OR's potential contribution at the strategic level and the current realisation. One of the constraints on MS/OR is that it is treated by many organisations as a specialism:

Specialists are expected to examine narrow issues in some depth; they are not considered to be adept at tackling ill-defined problems, they are rarely credited with having a sufficiently wide knowledge and experience of business as a whole and they are regarded as ill-suited to make a contribution to the formulation of policy. p.24-25

The objectives of top level management and the intrinsic difficulties of strategic decision making are contrasted with the skills of the typical MS/OR analyst to further explain the limited access to strategic problems. Nevertheless, Eilon very strongly advocates greater MS/OR involvement at the strategic level; he recommends a proactive approach and a specific strategic OR group. The pre-requisites for this 'mature OR' group include:

- * good knowledge of the operations
- * confidence of the CEO
- * reporting at a Director level
- * counselling skills

- working "with", not "for"
- reliability
- wisdom
- maturity
- ability to communicate
- * taking initiatives (being pro-active)
- * good reputation in the organisation

These qualities provide the credibility which is crucial for MS/OR acceptance and involvement at top management level (Gass, 1983).

Lesourne (1989) outlines six propositions for the successful introduction of MS/OR into strategic planning.

In a turbulent environment:

1. no strategic process may be pursued without a strict management of every day activities.
2. there is no successful strategy without a permanent adaptation of the strategic process.
3. the 'strategic OR' team must see to it that the manager totally assumes the responsibility of action.
4. the 'strategic OR' team cannot adapt permanently its action processes without a constant reference to a precise methodology:
 - step 1: retrospective analysis
 - step 2: definition of scenarios
 - step 3: judgement based on evaluation of scenarios
5. more than in a stable environment it is essential to monitor the coupling of OR (or thinking) and action.
6. the more desirable is the existence of a strategic OR team. p.286-289

Here Lesourne is using the process definition of MS/OR. He advocates a strategic MS/OR team for situations involving external fluctuations and uncertainty in order to "guarantee the elaboration and the implementation of a long term strategy". This team would help management to balance short term immediacy problems with long term strategic issues. Paraphrased by Tomlinson (1989), Lesourne's prescription for the strategic MS/OR team states:

Good OR at the strategic level can only be built on good tactical [sic] OR, just as good strategy needs to go hand in hand with good managerial control systems. Strategy lies mostly in the minds of the managers; since they retain the responsibility for action, OR must learn how to couple its analysis with management thought and action, above all it must adapt to change. Then, but only then, will OR be a vital part of the strategic process. p.271-272

The "concepts and vocabulary" of MS/OR have become such a "pervasive part of the thinking" of industrial managers that they now constitute an "international language for business strategy". This view of MS/OR modelling was proposed by Wagner (1988). He believes that "MS/OR models are playing important roles in informing management decisions"; using a MS/OR model is a disciplined approach to examine alternatives, prepare for contingencies and reassess strategy as required. Furthermore, he maintains that

MS/OR models have helped managers to "keep pace intellectually with the growing size and complexity of the enterprises they run".

MS/OR can play a "useful role in analysing strategy" and bring "clarity and quality" to improve strategic decision making. Kirkwood (1990) adopted this stance in response to comments by several leading operational researchers that MS/OR "addresses lower level operational problems successfully but not the strategic issues of top management in business and government". He discusses ten strategic application papers (including five finalists from the Franz Edelman Award for Management Science Achievement) to support the argument that "a considerable amount of current OR analysis *does* address strategy". Kirkwood concludes by exhorting the OR community to recognise and support this strategic work:

Studies to support operational decision making will continue to be the lions share of the work done by OR practitioners. However, we should encourage those who are applying OR approaches to strategic problems. p.750

MS/OR groups need to control their mix of strategic and tactical projects. Ward (1991) proposes that involvement with strategic projects builds awareness of the real value of MS/OR, which provides scope for future studies, expansion of the MS/OR function, and enhances job security. Ward therefore advocates an increase in strategic projects for "strategic" reasons. This view that "it helps both job advancement and job security if OR has something useful to say about strategy" is also promoted by Kirkwood (1990).

There is no reason for MS/OR to abandon the field of long term planning in spite of the "multiplicity of conflicting criteria" involved. This was the conclusion reached by Lootsma (1991) in his case study of two production allocation projects for the Phillips Company. Whereas MS/OR has traditionally been strong in the objective evaluation of alternatives, new methods of analysis of qualitative aspects are now available. As examples of these, Lootsma discusses multiobjective programming, multicriteria analysis and scenario analysis.

In this section the key papers which have advocated the involvement of MS/OR in strategic level decision making have been reviewed. In summary, there is a role for quantitative and qualitative MS/OR modelling (Harris, 1978; Newton, 1984; Lootsma, 1991) and analysis (Tomlinson, 1983; Tomlinson and Dyson, 1983) to support strategic planning and decision making. Simple techniques are preferred (Lawrence, 1978) to

evaluate and explore alternative strategies (Wagner, 1988). A proactive approach (Eilon, 1989), a mix of strategic and tactical projects (Ward, 1991), and a specific Strategic OR team are advocated (Lesourne, 1989; Eilon, 1989). Some of the difficulties for MS/OR involvement at the strategic level were also considered (Lawrence, 1979; Eilon, 1980; Eilon, 1989; Kirkwood, 1990; Lootsma, 1991), but support for MS/OR involvement remains.

2.2.3 MS/OR Tools in SM

MS/OR as a discipline has a strong tool focus particularly in the educational sector. To further evaluate the interface of MS/OR and Strategic Management, the MS/OR tools which can be applied to strategic level decisions will be considered. A literature search was conducted for a chronological review on the future of MS/OR; this resulted in 97 papers. From these papers, and from papers on the strategic involvement of specific tools collected in the preliminary literature analysis project (Clark, 1992), the MS/OR tools which have been proposed as potentially suitable for strategic level applications were identified. Table 2.2 summarises the MS/OR tools which have been proposed as suitable for strategic level MS/OR involvement.

This sample of MS/OR tools contains both the traditional 'hard' techniques such as decision analysis and linear programming, and some of the newer 'soft' approaches including soft systems methodology and strategic choice. It includes some of the newer technological tools, for example decision support and expert systems, which many MS/OR practitioners are now involved with (Carter, 1987).

Finding that such a wide range of the basic MS/OR tools have been advocated for strategic application, suggests that MS/OR can potentially make a significant contribution at the strategic level. However, no empirical studies on the use of MS/OR techniques for strategic decision making were found.

If tools have been advocated, what are the strategic tasks for MS/OR involvement and what evidence is there of strategic applications? These questions will now be considered.

Table 2.2 MS/OR Tools in SM

Tools	Author(s)
Analytical hierarchy process	Newton (1984)
Cognitive mapping	Rosenhead (1986), Thornton (1990)
Decision analysis	Corner & Kirkwood (1991)
Decision support systems	Newton (1984), Eom & Lee (1990), Thornton (1990)
Expert systems	Beerel (1987)
Forecasting	Capon & Hulbert (1985, 1987)
Game theory	Clark (1987)
Goal programming	Batson (1989)
Linear programming	Hirshfeld (1983), Wagner (1988)
Mathematical programming	Hirshfeld (1984, 1990), Wagner (1988), Lootsma (1991)
Multiobjective programming	Lootsma (1991)
Multi-criteria analysis	Lootsma (1991), Eom (1989)
Scenario analysis	Lesourne (1989), Lootsma (1991)
Simulation	Harris (1978), Wagner (1988), Lootsma (1991)
Soft systems methodology	Rosenhead (1986), Thornton (1990), Patching (1990)
Strategic choice/AIDA	Rosenhead (1986), Friend (1989)
Strategic options development and analysis (SODA)	Eden (1989), Eden & Simpson (1989)
System dynamics	Morecroft (1984)

2.2.4 Strategic Tasks for MS/OR

Another way to assess the contribution of MS/OR at the strategic level is to consider the strategic tasks, activities or decisions which MS/OR can potentially assist with. The general and specific strategic tasks which have been proposed for MS/OR involvement will be presented. Other sources of strategic tasks such as case studies and application literature reviews will also be discussed.

Cyert (1981) proposed that MS/OR move into the top management areas of strategic planning and organisational design. Specifically he identified the evaluation of alternative strategies as the strategic task which MS/OR could support and have a "tremendous impact" on. Likewise Wagner (1988) suggested that MS/OR models provide "a significant advance over relying on hunch and guesswork" for this same task of assessing strategic options. The need to formulate strategies more thoroughly arises, according to Wagner, from the "heightened aggressiveness" in the global economy. To cope with increased organisational and environmental complexity "a whole variety of tools have been

developed ... which enable one to develop alternative scenarios, explore alternatives and generally conduct experiments with the future" (Tomlinson, 1983). Further, Lootsma (1991) proposes that classical MS/OR tools can be combined with other approaches, such as multicriteria and scenario analysis, to evaluate alternatives:

Within the overall framework of scenario analysis, the familiar mathematical programming and simulation techniques are successfully used to design and screen a number of alternative strategies. p.82

Apart from the general task of evaluating alternatives, there are other specific strategic tasks to which MS/OR can potentially be applied. Gotcher (1977) suggested that MS/OR could contribute in a number of areas which include: defining product mix, determining optimum time horizons, forecasting, and the development of models. However, his survey of Strategic Planning in European multinationals found that MS/OR groups are "little used and seldom called upon by the planners". In this sample most of the companies were new to planning, they were still in the process of establishing systems, and they were reliant upon financial planning for their strategic planning.

Tomlinson and Dyson (1983) examined the contribution of analysis in the Strategic Planning process. They suggested that strategic modelling work generally falls into two areas: internal and external. The internal models focus on activities within the organisation such as production, financial, market and personnel; whereas the external models focus on environmental factors such as the economy, an industrial sector, or a particular market.

Further indications of specific strategic tasks and decisions which MS/OR has contributed to, are reported in publications of individual case studies. Examples of publications of this type include the UK National Coal Board (Tomlinson, 1983; Ormerod, 1983), British Airways (Tobin et al., 1980), and Phillips Corporation (Lootsma, 1991).

There are also literature reviews which report significant strategic applications. These include application surveys on decision analysis by Corner and Kirkwood (1991), and decision support systems by Eom and Lee (1990). In a literature analysis of MS/OR tool use in Strategic Planning, twenty four percent of the sample of 766 papers were classified as applications (Clark, 1992).

However, no overview level normative or prescriptive papers were found on the strategic tasks or the types of strategic decisions that MS/OR techniques can support. No empirical

studies of strategic tasks for MS/OR were found, although many operational level surveys which include tasks have been conducted (Morgan, 1989; Pearman, 1987; Kathawala, 1988; Harpell, Lane and Mansour, 1989; Alpar and Reeves, 1990; Tcha, 1991; Kurtulus, 1983; Lane, Mansour and Harpell, 1993); the UK and NZ operational surveys will be discussed in sections 2.3 and 2.4.

2.2.5 Roles for MS/OR People in SM

Another perspective on MS/OR in SM is to consider the possible roles performed by MS/OR people working individually or collectively in groups, as described in the literature.

To consider the role for MS/OR groups at the strategic level, Eilon (1980) selected two key research worker archetypes: puzzle solvers and change agents. While most MS/OR workers see themselves as *puzzle-solvers* "devot[ing their] efforts to finding a solution to a well-structured, often mathematical or logical, problem", Eilon suggests that too few are prepared to accept the role of *change-agents* who "sees it as [their] mission not only to gain an understanding of a given system, but also to change it". He further distinguished between *technicians* and *advisers*: defining the *technician* as a specialist, with a limited and well-defined role, distinct techniques and an analytical approach; while the *adviser* is a generalist, with a less well-defined role whose premises and recommendations are more likely to be questioned, and who use an approach based on synthesis. With this rationale Eilon observed:

this divide ... has led me to regard the *puzzle-solvers* as *technicians*, albeit very good ones, who concentrate on perfecting their tool-kit and who spend all their time on tactical problems, while the *change-agents* act as *advisers*, with a commitment to tackle strategic, ill-defined, messy problems, the solution of which is more likely to have a significant and lasting impact on the system than the solution of tactical problems. p.22

Commenting on the criticisms that MS/OR has "failed to make any significant contribution to decision making at the strategic level", Eilon proposed more involvement as *advisers*. Further, he advocated that there should be two types of MS/OR, "one at the tactical level and the other concerned with strategy". In a later editorial Eilon (1989) reiterated this call for two MS/OR groups and identified the prerequisites for a mature OR support function at the top level. He explained the absence of MS/OR at the strategic level in terms of the discrepancy between the typical OR analyst and the nature of top level objectives and decision making:

The make-up, the background and the aspirations of most OR analysts are not in tune with the messy and unstructured environment that prevails at the strategic decision-making level.
p.7

In spite of Eilon's negative assertions, there is some evidence in the literature of MS/OR groups providing support for corporate strategic groups of UK organisations (Ormerod, 1983; Tomlinson, 1983; Tobin et al., 1980; Lootsma, 1991).

The indications of a strategic role for individual MS/OR practitioners in the literature will now be discussed.

In the traditional analyst role, the MS/OR specialist performs a service function providing input to the planning team. However, depending on personal and organisational factors, the MS/OR person may also become a member of the top management team "in his own right" (Tomlinson and Dyson, 1983). This will extend his/her involvement and the nature of the MS/OR contribution to the strategic decision making process. Moreover, this interdisciplinary team member role was a distinctive feature of the earliest MS/OR developments (Miser, 1963; Mintzberg, 1978; Müller-Merbach, 1984).

Thornton (1990) discussed a consultative role for MS/OR in which the focus is "on working with problem-owners to help them understand the nature of the problems which confront them and the value systems of the various stakeholders." This approach, which potentially increases the scope of MS/OR application areas, is facilitated by a "battery of approaches and techniques...such as cognitive mapping, soft systems analysis and decision support". However, Thornton reported that potential clients perception of classical hard MS/OR was strong compared with areas involving a problem-structuring, facilitating role. This implies that demand for this type of work will be limited as it is not a recognised area of expertise.

Preedy and Bittlestone (1985) contend that the people who rise to the top of organisations do not operate in a rational, quantitative way as they are not "normally analytically minded" and "their environment is not conducive to such a methodical approach". They propose that MS/OR can contribute by participation in the development of electronic boardroom information systems. Similarly, Finlay and King (1989) advocated MS/OR involvement in implementation of decision support and knowledge-based expert systems. This is a technological role for MS/OR which builds on their modelling skills and technical competencies.

In addition to the personal and group contributions of MS/OR at the strategic level, the

profession serves as a training ground for some individuals who will ultimately reach top management level via promotion. MS/OR thereby provides a stepping stone to other management positions and responsibilities (Ormerod, 1983; Newton, 1984). In this way the experience, knowledge, skills and understanding of the MS/OR professional provides the implicit basis or background for strategic decision making. This is a metamorphosis role for MS/OR which occurs via upward mobility.

2.2.6 Strategic MS/OR ?

The literature on the potential contribution of MS/OR at the strategic level has been reviewed. When compiled like this, there appears to be quite a convincing normative case for strategic level MS/OR. However, many of the proposals have not been confirmed or substantiated as they have not been investigated empirically. What is the current situation in practice?

To gauge the current status of MS/OR involvement in the strategic area, the activities and publications of the Societies were scanned:

- * there are no study or special interest groups in strategy in the US or UK societies.
- * the UK ORS offers a Strategic Planning stream in its annual conference, but does not always receive enough papers to go ahead with it (e.g. withdrawn in 1992) and some of the contributions are only partially related to strategy. However, the USA TIMS/ORSA conference does not appear to have a regular strategy stream. The latest triennial conference of the International Federation of Operational Research Societies, IFORS 93, included only five Strategy papers (one of them mine!) even though the conference theme was "Expanding Horizons" for MS/OR.
- * Strategic Planning is a keyword for the *Journal of the Operational Research Society* (UK), but it is not an approved keyword in *Operations Research* published by ORSA or the *European Journal of Operations Research* published by IFORS. The *International Abstracts in Operations Research* has Planning in its Process Oriented division and also in the Subject index, but has no strategy/strategic classification.
- * The journal *Interfaces* has a Strategic Management editor and has published two dedicated issues on Strategic Management (volumes 14(3) and 18(3)). The TIMS journal *Management Science* published a focussed issue on Strategy Research in 1990 (volume 36(10)). The British ORS newsletter, *OR Insight*, appointed a Strategy editor in 1990, and has since included some articles on strategic work.
- * Blumstein's 1992 presidential letter to all International Federation of Operational

Research Societies advocated the expansion of MS/OR and reported that MS/OR "penetration at the strategic level is still only minimal".

This pattern indicates only partial recognition of strategic work by the profession. At this point it appears that the discipline has not formally adopted and embraced Strategic MS/OR.

Therefore, this research project will include **an empirical study to identify current levels of MS/OR involvement in Strategic Management**. As this research will focus on MS/OR in two countries, New Zealand and the United Kingdom, the MS/OR literature from both of these countries will be considered. In the next section the literature on the status of MS/OR tool usage in the United Kingdom will be examined.

2.3 MS/OR in the United Kingdom

The literature on the status of MS/OR tool usage in the UK will now be examined. Each of the survey papers which include some areas of MS/OR tool usage will be discussed. Table 2.3. summarises the recent UK surveys including the authors, sample sizes, response rates and the focus of each survey.

Table 2.3 MS/OR Tool Surveys

Author(s)	Size n	Rate %	Focus
Carter (1987,1988)	1436	42.5	ORS membership
Doukidis & Paul (1990)	265	25.5	AI techniques
Cornford & Doukidis (1991)	209	20.8	Computer usage
Mingers (1991)	45	68.2	MSc OR courses
Naude, Stray & Wegner (1991)	639	42.6	Statistical techniques
Jones, Kristensen, Madsen, Ostergaard & Wisniewski (1994)	104	16.5	Quantitative techniques

Carter's survey (1987, 1988) provides a comprehensive profile of the UK OR Society membership; it was initiated and sponsored by the Society for this purpose. Although conducted in 1985, it provides the most recent descriptive information on the UK Society. In addition to details on personal backgrounds and the members employing organisations, information was collected on the areas of modelling involvement and computer usage. Carter reported "a reduction in use of some of the classical OR techniques, while showing

an increase in such areas as financial modelling and corporate modelling"; this he related to the "high involvement of respondents with senior management". He also found significant use of decision support and expert systems.

Doukidis and Paul (1990) surveyed one third of the ORS members on their involvement with artificial intelligence (AI). They found 21.5% of respondents were involved with AI; 8.7% were only using AI, and the other 12.8% were involved in some development of AI; with expert systems being the major AI tool under development or in use. Growing confidence in AI benefits and increased anticipation of greater participation were reported.

The use of computers within MS/OR was investigated by Cornford and Doukidis (1991) using a survey of ORS members. They found that 87% of the respondents used computers regularly, and 61% developed computer applications. Computer support for eleven MS/OR tools and the diffusion of these tools to non-specialists with the aid of software was considered. The majority of respondents considered that "an OR background was not essential" to use the tools, apart from mathematical programming and queueing theory.

To examine the content of MSc OR courses, Mingers (1991) targeted the Heads of OR Groups from the OR Society's list. The results reflect those of previous tool usage studies:

Overall, the results are unsurprising in that they emphasise the practical and process of OR at the expense of techniques. A live project was considered the most important element. They also favour the traditional, e.g. traditional OR methodology and Fortran, rather than the new, e.g. soft OR or expert systems. They confirm the importance of computing and particularly spreadsheets and database. Simulation is seen as the most important traditional technique. p.381

Mingers also noted that the respondents "may not be fully aware of the latest developments in OR and computer technology". This has to be a key factor affecting tool usage.

The use of statistical techniques by MBA graduates in the UK was surveyed by Naude, Stray and Wegner (1991). The Association of MBAs was used as the sample frame, so the sample includes graduates from 1969 to 1988. This has to be a major methodological weakness of the study, as the emphasis and content within the courses will have changed during this twenty year period. Nevertheless, they found 66% of the sample were using some of the statistical techniques. The "awareness" results conform to the 80:20 rule, as 27% of the users of statistics were aware of 85% of the tools. The mean usage values were almost all low, with the exception of Data Collection and Presentation which was scored on average as "frequent usage". Naude et al. (1991) argue against teaching only

the tools which rate highly on a frequency of use criterion, as it precludes the introduction of new techniques.

A series of comparative surveys of the awareness and use of MS/OR tools was started in 1989 by a team from the UK, Denmark, Scotland and Greece. Known as the European Management Science Survey (EMSS) project, the team aims to conduct cross-country comparisons in European countries simultaneously to produce comparable results. An initial study of Denmark, Scotland and the UK (Jones et al., 1994) found broadly similar results in all three countries. The proportion of quantitative tool users in the three general management samples were: Denmark- 57%, Scotland- 70%, and UK- 81%. In terms of awareness of the tools, only 8-10 of the 30 quantitative techniques listed were known by over half of the samples; and frequency of use correlated with awareness of the tools. Support from top management was the most important single factor contributing to the successful use of these tools in this study.

In this section the surveys on MS/OR tool usage in the UK have been discussed. Although four of the surveys use the OR Society as the sample frame, each focusses on a different set of tools, so they are not directly comparable. The awareness and usage of specific tools can be quite low, even in a survey in which the percentage of tool users is comparatively high. This indicates that the incidence of tool use in a population, which is reported as an aggregate tool user proportion, needs to be interpreted carefully to avoid over-stating the actual position. This signals the need for researchers to collect and report more detailed tool usage statistics. While the level which is usually reported shows tool usage percentages for specific tools, linking tool usage with specific tasks would provide generate more detailed information; this would be useful for establishing tool/task profiles.

None of the surveys included any specific questions on MS/OR tool use for strategic purposes; although Carter (1988) described applications for each management area. Benefits and constraints on tool use were briefly considered in three of the surveys (Doukidis and Paul, 1990; Naude et al., 1991; Jones et al., 1994); but the selection of tools was not included in any of these research projects.

2.4 MS/OR in New Zealand

The literature on the status of MS/OR tool usage in the New Zealand will now be examined. First, to establish the context, details on the OR Society will be provided.

Then the two survey papers which have included tool usage will be discussed.

The Operational Research Society of NZ has 150 members including 10 corporate members; it has three regional branches in Auckland, Wellington and Christchurch. The Society holds an annual conference, and publishes a conference proceedings as well as a newsletter twice a year. In conjunction with eight other South Pacific OR Societies it publishes a journal called the *Asia-Pacific Journal of Operational Research* (2 volumes per year).

The penetration of MS/OR into NZ management was investigated by Daellenbach in 1974 (Daellenbach, 1975). Questionnaires were sent to 401 large firms and public sector organisations, and 205 usable response were received (51% response rate). Of the organisations represented, 17% had MS/OR staff, while 43% of the organisations have used MS/OR. The three most frequently used MS/OR applications were Inventory Control, Sales Forecasting, and Production Planning and Scheduling. Daellenbach also found that "almost one third of all OR users are engaged in applying OR for company-wide or organisation-wide planning, including investment and financial planning".

The use of ten forecasting or modelling techniques in corporate planning in 138 NZ companies was reported by Wright (1981). This survey also examined the status of corporate planning in these organisations. Wright presented the results at the OR conference and called these MS/OR tools, but most of them are not traditional OR tools per se. The most frequently used tools were Market Research (48.9%) and Trend Projections (45.5%); each of the remaining eight tools were used by less than 25% of the sample. A correlation between company size and tool use was reported:

In larger organisations the evaluation of alternatives plays a much greater part in the preparation of Long Range Plans. As a result more sophisticated techniques are required to evaluate and select alternatives. In smaller companies this expertise is not available.
p.89-90

These two surveys are only of historical interest now, but no other MS/OR surveys have been published on New Zealand organisations. The future of MS/OR was considered by several speakers (Daellenbach, Buchanan, Easton) at the 25th annual ORSNZ conference in 1989, but they did not address the relationship of MS/OR and Strategy or present information on specific tools. It is time to examine the current status of MS/OR in NZ!

2.5 Conclusion

This literature review has examined the role of MS/OR at the strategic level. While the potential MS/OR involvement in strategy has been proposed, the formal activities and publications of the discipline reflect only partial recognition of strategic level MS/OR. As there have been no empirical studies on MS/OR in strategy, there is little indication of current levels of strategic work by MS/OR practitioners. Therefore it is not possible to determine whether this work is being done while not being formally recognised by the discipline, or whether it is performed by such a small minority of the profession that it does not really warrant formal recognition.

This issue will be addressed in this research project by collecting evidence of MS/OR involvement in Strategic Management; an empirical study will be conducted to determine current strategic levels of MS/OR involvement. Specifically, it will look at what is happening in practice in order to identify the strategic tasks which MS/OR can address, and to investigate the MS/OR tools which can be used at the strategic level. The factors which are involved in strategic tool selection will also be identified. Details of the research methodology will be outlined in chapter 4; in the next chapter, the literature on Strategic Management tool usage will be reviewed.

Chapter 3 Strategic Management Literature

3.1 Introduction

In this chapter the literature on Strategic Management tools and tool usage will be reviewed. First, the status of SM tool usage will be considered by examining a sample of international SM surveys. As the focus of this research will be on the United Kingdom and New Zealand, the literature on SM in each of these countries will be discussed in detail. The normative literature on SM tools will then be considered to identify gaps in the status quo. To conclude, the major research issues which have arisen from this review, will be outlined.

3.2 SM Tool Usage

The literature on SM tool usage will be reviewed in this section using the partitioning advocated by Hooley (1984). First, the research into the extent of formal Strategic Planning will be considered using a sample of international surveys. Second, the application of specific tools will be discussed. The adoption and role of Strategic Planning is important as it provides the context for the application of specific tools.

The term "SM tools" will be used as a generic name for the techniques, tools, methods and approaches which are used in Strategic Management.

3.2.1 International SM Practices

The status of SM was investigated by examining a sample of twelve surveys describing state-of-the-art SM practices from different countries. Table 3.1 summarises details of these surveys including the authors, sample sizes, response rates and the research method used for data collection.

The focus of the surveys was to identify current SM practices so the topics included: the nature of the Strategic Planning systems/procedures, time horizons for planning, the age of the Strategic Planning systems and the degree of planning sophistication. The surveys also report basic details on the company such as size and principal industry, as well as information on the staff involved with Strategic Planning. Table 3.2 shows the frequency of the main topics covered in this sample of international surveys.

Table 3.1 International SM Surveys

Country	Author(s)	Size n	Rate %	Method
Australia	Christodoulou (1988)	63	61	interviews
Belgium	Caeldries & van Dierdonck(1988)	124	-	questionnaire
Canada	Rule (1987)	109	40	questionnaire
Denmark	Ackelsberg & Harris (1989)	12	-	questionnaire
Germany	Scholz (1984)	21	-	interviews
New Zealand	Wright (1982)	138	74	questionnaire
Nigeria	Fubara (1986)	44	88	questionnaire interviews
Singapore	Wee, Farley & Lee (1989)	223	29.8	questionnaire
South Africa	Woodburn (1984)	518	13.7	questionnaire
United Kingdom	Bazzaz & Grinyer (1981)	48	-	interviews
UK and Japan	Kono (1984)	74	15	questionnaire
		226	25	questionnaire
USA	Kukalis (1988)	174	43.5	questionnaire

Note: The response rate is not provided in all of the publications.

Table 3.2 Topics in International SM Surveys

Topic	Frequency n	Percent %
Planning Staff:		
Who	11	92
Numbers	5	42
Separate group/dept	9	75
Company Details:		
Size	10	83
Principal industry	10	83
Subsidiary/ownership	7	58
Nature of planning systems/procedures	10	83
Planning time horizons	10	83
Planning sophistication	7	58
Age of planning systems	7	58
Reasons for introducing SP	7	58
Environmental factors	7	58
Comparison with another country	6	50
Revision of Strategic Plans	5	50
Planning approach (top down/bottom up)	4	33
Planning tools and concepts	4	33
Planning activities involved	4	33

The surveys provide an interesting overview of the international SM scene. The degree of planning sophistication varies within and between countries: while some of the countries acknowledge the novelty of the SM approach (Denmark, Nigeria); the US firms are recognised as the trend setters (Bazzaz and Grinyer, 1981; Wee et al., 1989). Kono's UK/Japan study is the only comparative paper in the sample, however comparisons are made within some of the other papers with results from previous surveys. There are strong cultural impacts on the type of planning systems used which is evidenced by the comparisons with Japan (Kono, 1984; Wee et al., 1989).

Attempts to analyse the surveys in more detail reveals sampling and other methodological differences which compound the analysis including: timing, sample size, and terminology. Each survey provides a snapshot of current practice at a point in time. The sample was restricted to surveys published post-1980 as these are the most recent surveys available, yet this still represents a wide time span through to the present (1994). Furthermore, given the time lag in the publication process, the most recent survey from a country may no longer represent "current" practice by the time it is published. Also, there have been many new theoretical and conceptual developments in SM which would not have been available at the time of the earlier surveys e.g. Prahalad and Hamel's (1990) Core Competency / Strategic Fit approach, or the development of Strategic Alliances (Hamel et al., 1989).

Half of these surveys are small in a statistical sense, as they involve less than seventy five companies. The results from these small samples would not necessarily be generalisable. Furthermore, the statistical significance of specific results within the surveys is often not reported. Most of the surveys used questionnaires for data collection, because of the nature of the information sought and the time involved in the data collection. However, three of the surveys are based on interview data; only one of the surveys, as reported in these publications, used a combination of interviews and a questionnaire. In general, the larger samples tended to represent lower response rates; however response rates were not provided in four of the publications. Comparisons between the surveys are difficult, if not dubious, when consistent definitions of terminology have not been used by the researchers. This analysis therefore signals the need for improvements in methodological rigour in order to increase the utility of the research findings (Terpstra, 1981).

The focus of the surveys was to examine the introduction of systems and procedures for SP. In many countries the systems are predominantly based on financial measures which

Gluck et al. (1980) suggest indicates an early stage of SP maturity.

In the next section the survey papers which included the application of specific SM tools will be discussed.

3.2.2 International SM Tool Usage

Only four of these international surveys reported on the use of tools in practice; each of these surveys will now be discussed and the SM tool usage frequencies will be compared.

Bazzaz and Grinyer (1981) surveyed UK companies which were actively involved in strategic planning. They reported on the use of evaluative techniques for comparing alternatives including DCF, Payback, Computer Financial Simulation Models, and also a series of Forecasting methods. By comparison with previous UK surveys (by Hewkin and Kempner, 1968; Taylor and Irving, 1971), they concluded that there had been "an extension in the use of more sophisticated techniques for forecasting and evaluation, coupled with a healthy scepticism".

The study of Singapore firms by Wee et al. (1989) reported on familiarity and usage of three approaches: BCG, McKinsey and PIMS. As they found that 80% of the sample were using "no formal planning tools at all", they suggested that "the various modern planning tools and concepts have had relatively little impact". Further, they observed that the planning procedures in Singapore "have apparently been developed by the firms for their own use rather than taken from the shelf".

Ackelsberg and Harris (1989) found that very few of the Danish firms were "technique oriented". Most of the firms were emphatically "opposed to techniques which they considered to be too rigid or quantitative", as they "view planning as an exercise in conceptual thinking". This study reported the number of firms using Scenarios, Life Cycle Analysis, BCG Portfolio Analysis, Simulation, and Gap Analysis. The results showed that the "three most frequently used tools were all non-quantitative".

The Belgian survey by Caeldries and van Dierdonck (1988) reported usage frequencies for a much larger sample of nineteen different tools. They found that the most frequently used tools were Competitor Analysis, SWOT, and Industry Analysis, and linked this to the importance of these techniques in the strategy formulation literature. Limited use of

Portfolio Models was related to the small numbers of firms in the Belgian sample with multiple business units. The low incidence of alternative strategies in the sample (37%) was assumed to be related to the resources required. They linked the relative importance of financial tools to the maturity of the SP system, based on the evolutionary model of SP by Gluck et al. (1980).

Caeldries and van Dierdonck (1988) observed that "only a small number of firms are using the more sophisticated analytical techniques and concepts." However, their examples of sophisticated tools are Key Factor Analysis and Mobility Analysis, which are different from the financial approaches referred to by Bazzaz and Grinyer (1981). They observed that theoretical developments appear to be "far ahead of strategic planning practice" and postulated on the reasons for this as follows:

"Why are firms not using these planning tools?" Could it be that developing new concepts and techniques only increases redundancy? Could it be that new developments are so marginally important to firms that they decide not to implement them? If so, it would seem that more attention ought to be devoted to developing a more effective use of existing concepts and techniques. p.45

Three of these surveys reported on only a small number tools, 3-5, which were typically a group of similar techniques. Caeldries and van Dierdonck (1988), who investigated a much larger sample of tools, also attempted to provide explanations of their results in terms of the other information they had collected from the respondents. A summary of the SM tools which were investigated in these surveys is listed in Table 3.3, along with the respective survey authors. This list illustrates the range of tools which are available in the SM domain.

Table 3.3 SM Tools Reported in Surveys

Tools	Survey Authors
Alternative strategies	Caeldries & van Dierdonck (1988)
BCG growth share matrix	Ackelsberg & Harris (1989); Caeldries & van Dierdonck (1988)
Budgeting	Caeldries & van Dierdonck (1988)
Competitor analysis	Caeldries & van Dierdonck (1988)
Corporate Models	Caeldries & van Dierdonck (1988)
DCF	Bazzaz & Grinyer (1981)
Delphi	Caeldries & van Dierdonck (1988)
Directional policy matrix	Wee, Farley & Lee (1989)
Economies of scale	Caeldries & van Dierdonck (1988)
Forecasting techniques	Bazzaz & Grinyer (1981); Caeldries & van Dierdonck (1988)
Gap analysis	Ackelsberg & Harris (1989)
Industry analysis	Caeldries & van Dierdonck (1988)
Investment planning	Caeldries & van Dierdonck (1988)
Key factor analysis	Caeldries & van Dierdonck (1988)
Learning curve	Caeldries & van Dierdonck (1988); Wee, Farley & Lee (1989)
Market segmentation	Caeldries & van Dierdonck (1988)
Mobility barriers	Caeldries & van Dierdonck (1988)
OR techniques	Bazzaz & Grinyer (1981)
Payback period	Bazzaz & Grinyer (1981)
PIMS study	Wee, Farley & Lee (1989)
Portfolio models	Caeldries & van Dierdonck (1988)
Product Life Cycle	Ackelsberg & Harris (1989); Caeldries & van Dierdonck (1988)
Scenarios	Ackelsberg & Harris (1989)
Simulation	Ackelsberg & Harris (1989); Bazzaz & Grinyer (1981)
Strategic groups	Caeldries & van Dierdonck (1988)
Strategic issue analysis	Caeldries & van Dierdonck (1988)
SWOT analysis	Caeldries & van Dierdonck (1988)

The actual usage percentages which were reported for the five tools which appear in at least two of these international surveys are shown in Table 3.4. Except for the Bazzaz and Grinyer survey, the usage frequencies are all quite low (less than 34%). The higher results from the Bazzaz and Grinyer survey reflects the more experienced sample as they specifically targeted companies which were actively involved in SP.

As the interests of the researchers vary, they focus on a different set of SM tools. The information available on specific tools is limited which means that it is difficult to be definitive about the status of SM tool usage. The variability in the surveys, discussed above, further complicates comparative analysis.

Table 3.4 International SM Surveys: Tool Usage Percentages

Tools	Ackelsberg & Harris	Bazzaz & Grinyer	Caeldries & van Dierdonck	Wee, Farley & Lee
BCG Growth Share Matrix	25	83% > 3tools 46% > 5tools	23	5
Forecasting			28	
Learning Curve			12	5
Product Life Cycle	33		30	
Simulation	8	65		

As this research will focus on SM in two countries, New Zealand and the United Kingdom, they will now be considered in turn, starting with a review of the United Kingdom SM literature.

3.3 SM in the United Kingdom

The literature on the status of SM tool usage in the UK will now be examined. Each of the survey papers which include some areas of SM tool usage will be discussed and compared.

Taylor and Irving (1971) looked at the introduction of corporate planning in a small sample of twenty seven large, progressive UK companies. They found that corporate planning "is neither as well developed nor as fully accepted as one might expect", and postulated that "Increasingly, in the future, the use of the computer and quantitative techniques will be major influences in the development of planning".

Six years later, when Higgins and Finn (1977a) surveyed fifty six companies from the Times Thousand Companies on their corporate planning practices, they concluded that corporate planning "is extremely common in major UK businesses". Higgins and Finn (1977b) also looked at the use of seven broad categories of computer-based models in planning and strategy formulation which included: Forecasting, Financial, Corporate, Marketing, Personnel, Production Planning and 'One-off' Models. They reported that the "larger and presumably more complex companies tend to make more use of models"; this appears to support Taylor and Irving's prediction of the increasing role of computer support. However, Higgins and Finn observed that computers are not indispensable: "many companies, particularly large companies, have and use models, but while they find

them *useful* they do not appear to find them *essential*".

The review paper by Wills and Beasley (1982) focussed on the use of four SP tools in the UK: Experience Curve, Growth Share Matrix, Directional Policy Matrix and the PIMS approach. Only twenty eight (55%) of their sample of fifty one usable responses were using one or more of these four tools. The proportion of the sample who were "still using" each of the tools was much less than those who "had used" each tool. The reasons for discontinuing use of tools were not considered in this paper, however these results signal the dynamic nature of SM tool usage.

Hooley (1984) evaluated the awareness and usage of seven SP tools using four categories: use it regularly, have tried it, heard of but never used, and never heard of/no reply. This question was part of a very large survey on marketing planning which was addressed to senior marketing executives from the mailing list of the *Marketing* magazine. Hooley included the four tools surveyed by Wills and Beasley (1982) and SWOT Analysis, Product Life Cycle, and Marketing Audit. Although only fourteen percent of the sample responded to the questionnaire, a large sample of 1775 responses was received. Hooley found that "the tools which are used on a regular basis tend to be those that have been available and familiar for some time, such as SWOT Analysis, the Product Life Cycle and the Marketing Audit". He noted that many of the "new" SP tools (e.g. PIMS and DPM) are "seldom heard of, let alone used." Hooley's percentage of regular users was on average 7% less than Wills and Beasley's percentage of respondents who "still use" each of the tools. Based on the results for the use and awareness of these SM tools, Hooley observed that practice "lags behind the discussion and prominence of these techniques" in the literature. However, he noted that the better performing companies are "more likely to use the techniques." Hooley concluded that "Current levels of usage and awareness, however, of all but the most basic SP tools are very limited".

Similarly, Houlden (1985) found a "lack of awareness ... of even the existence of some concepts/techniques that others have found useful" in his study of one hundred and five UK corporate planning units. He uses the analogy of a carpenter "who decides not to use a chisel on a particular job ... [will] at least know what it is, and what it can and cannot do!". Houlden thereby expresses his concern at this situation and warns of the risks of failure to keep up with changes. He hints at problems with applying some new techniques which are conceptually strong, and warns of the need to recognise the qualitative factors

that aid judgement. This survey was replicated in 1992; Houlden found that there had been a shift in the types of techniques which are seen to be useful from mathematical (involving Statistical, Forecasting, Modelling) to process type techniques (e.g. Benchmarking, Core-process Redesign, Value Chains). The other major change which he observed was the perceived value of tools has been de-emphasised in favour of the development of skills associated with key aspects of the competitive situation (recognising the "elephant" issues, creativity, making sure that top line management is pro-active, implementation etc) (Houlden, 1994).

Apart from the survey by Bazzaz and Grinyer (1981) discussed in Section 3.2, the UK literature on SM practice in the UK also includes a book by Hussey (1983) which includes a collection of survey and other papers on Corporate Planning. The surveys are primarily focussed on the introduction of SP processes in the UK in the 1970's; they include: Denning and Lehr (1971, 1972), Grinyer and Norburn (1974), Grinyer and Wooller (1975), Grinyer et al. (1980), and Bhatti (1981).

There do not appear to be any other recent UK-based SM tool survey publications in the literature. However, it is important to note here, that in addition to academic research on SM processes and tools, other surveys are initiated and conducted by consultancy firms usually for their clients. The results of these surveys do not often appear in the published literature, however they may be disseminated in part within a professional conference or newsletter. For example in 1992 OC&C Strategy Consultants surveyed twenty five UK companies on their SM processes. As this was a client-sponsored project the results remain confidential.

Another type of practitioner survey is that conducted by professional organisations; these are usually targeted at their own members for a specific purpose. In 1993 the UK Strategic Planning Society conducted a survey of its members on their expectations of the Society; however this did not include any tool questions per se.

In conclusion, the UK SM tool surveys have reported on a small set of similar SM tools. They have all reported low usage of most of the tools included, and a high level of unfamiliarity with many of the tools. The focus on a small set of tools is the standard approach adopted by the researchers; given the breadth of tools which are now available, would seem to be unrepresentative and therefore inadequate as they ignore the rest of the

SM toolkit. Apart from Houlden's replicated study on corporate planning processes, the most recent UK tool survey data was collected in the mid 1980s, so the results can only be regarded as of historical interest now (1994). This suggests that it is time to re-look at current SM tool usage and familiarity: to investigate a broad range of tools and discover which tools are being used now in SM, and to consider the linkage of tools with specific strategic tasks.

Next, the New Zealand SM literature will be reviewed.

3.4 SM in New Zealand

In this section the literature on the status of SM tool usage in the New Zealand will be examined. Each of the publications which report on some areas of SM tool usage will be discussed and compared.

Wright (1982) investigated the introduction of formal corporate planning in 138 listed NZ companies and found that external environmental pressures have driven the development of Strategic Planning programmes and systems. Formal planning teams were found in only 21% of the companies; the majority of these were large companies employing over 1000 people. He concluded that the inhibitors to formal Strategic Planning include

"the relatively small size and limited resources of local companies, together with non-professional executive teams which frequently own or control the organisation. These factors, together with an overall lack of strategic alternatives, create an environment in which management tends to shy away from, or actively resist, new concepts and techniques." p.130

Wright also suggested that external pressures would motivate "NZ managers to increase the level of sophistication of [their] planning activities in order to survive the 1980s."

As a part of this research, but published separately, Wright (1981) looked at the use of a set of ten forecasting or modelling techniques within planning including: Market Research, Trend Projections, Scenario Analysis, Leading Indicators, Moving Averages/Exponential Smoothing, Life Cycle Analysis, Econometric Models, Regression Models, Delphi Method, and Other techniques. Again he observed a correlation between company size and tool usage and concluded that the "evaluation of strategic alternatives" using more "sophisticated techniques" plays a much greater part in the SP of larger organisations. From a methodological perspective one sentence from this report provides a caveat for SM tool researchers of the need to target the most appropriate respondents: "executives were

not always aware of the technique that had been used in the preparation of the Long Range Plans".

Strategic and financial decision processes used by senior managers in sixteen NZ listed public companies were investigated by Singer (1985). Structured interviews were used to obtain information on investment and divestment decisions, dividend policy and "risk". Comparisons were made with an earlier American study to highlight differences in the approach adopted by NZ managers. Singer reported instances in which financial analysis was "not deemed to be necessary or important" for significant capital investment, and where the "strategy actually over-ruled a negative financial appraisal". Although financial analysis was performed for some types of divestment decisions (e.g. below-target ROI), "the strategic logic or immediate opportunity was perceived as sufficiently compelling to make a detailed analysis unnecessary or inappropriate" for many other types of divestment decisions. Definitions and understanding of "risk" were perceived in terms of specific threats or potential weaknesses by the NZ managers, rather than in terms of probability or variance. Specific tools for supporting these types of strategic and financial decisions were not reported in this paper.

Van der Walt, Lysonski, Queree, Harper, and Hales (1989) examined the status of marketing planning practice in NZ and its impact on performance using a modified version of Hooley's (1984) UK approach. This was a large scale questionnaire-based project in which responses were received from 522 senior managers (42% response rate). The results however failed to indicate a positive relationship between planning and corporate performance which previous studies have confirmed (Hooley, 1984; Armstrong, 1982).

As these NZ results differ from those of previous overseas studies, commentaries were sought on this paper and they were published in the same issue of the *New Zealand Journal of Business*. Some of the criticisms of this research, which provide lessons for other researchers, include:

- * the need for definitions (e.g. marketing planning- Armstrong, 1989)
- * the use of gross profit margin as the performance criterion - should be replaced by a measure of return on capital (Armstrong, 1989); or use gross profit margin within industries (Bridges et al., 1989)
- * the deficiency of using mid-point values of profit and revenue to calculate gross profit margin (Hooley and Lynch, 1989)

- * the need to include performance relative to major competitors (Hooley and Lynch, 1989)
- * the need to obtain more information on the planning processes used, the situation each firm faced, and the impact of planning on key stakeholders (Armstrong, 1989)
- * need to follow questionnaire with in-depth interviews (Hooley and Lynch, 1989)
- * the role of time frame (lead/lag effects) which links planning and performance (Bridges et al., 1989)
- * the details on the respondents should be reported.

Van der Walt et al. (1989) also examined the awareness and use of six planning aids including SWOT, Product Life Cycle, BCG, Marketing Audit, Simulation, and Statistical Experimentation; four of these six tools were included in Hooley's 1984 UK survey. The NZ results showed that "there was a clear lack of awareness of even the most basic planning aids" and "the use of planning aids was not associated with higher levels of performance". The pattern of non-familiarity and low usage of tools is consistent with other NZ and UK studies, if we can accept these results in spite of the methodological weaknesses in the research.

A major survey of NZ managers was conducted by Hooley and Franko (1990) to identify priorities for management education and development. The status quo position reiterates Wright's (1982) earlier findings and emphasis:

Largely as a result of difficult economic conditions of the recent past, where survival has been the name of the game for many companies, a short term, financial orientation is characteristic of many New Zealand companies and their senior managers. Many senior managers lack adequate external perspective and are deficient in strategic planning and leadership (as distinct from administrative) skills. p. iv

Hooley and Franko indicate the strategic skills needed by managers in the future:

A number of personal skills will be needed to deal with the opportunities and threats presented in the coming decade. Central to these will be the ability to think strategically, to look further ahead than the immediate problems of today and to develop long term organisational goals. p.28

Furthermore, they propose a mix of analysis and creativity as the pre-requisites for strategic thinking:

Long term, strategic thinking, requires a sound analytical base, the ability to assimilate and assess a wide variety of information. Creativity and innovation, built on sound analysis but not constrained by it, will become increasingly important as will be the flexibility to deal with a changing world. p.28

The competitive position of NZ firms was investigated in a major study known as the "Porter Project" (Crocombe, Enright and Porter, 1991). As with Hooley and Franko they reported deficiencies in the strategic thinking capabilities of NZ managers:

...New Zealand firms tend to have a mindset that is not well aligned to the requirements for competitive success in the global economy. This mindset is typically characterised by a short-term, static perspective of competition. Such a perspective is inadequate in a world where competition has become profoundly dynamic and where success depends on continuous improvement in all parts of the business.

This static view of competition is widely held in New Zealand business. It limits the range of strategic options for New Zealand firms. Many focus on improving performance within current constraints, rather than devising strategies that change the constraints and build new sources of advantage. p.127

One of the contributing factors here is that NZ has a very strong emphasis on law and accounting professions which "leaves New Zealand with managers better trained for administration than creating products, services and strategies". To be internationally competitive requires an external focus which Crocombe et al. (1991) suggest requires a fundamental change in "our goals as individuals, firms and as a nation". The report not only describes perceived current weaknesses, but makes a series of recommendations for improvements including the following changes which relate to SM: to move beyond cost strategies, to seek opportunities where New Zealand's home environment is uniquely favourable, to become more knowledgeable competitors, to have a greater focus on innovation, to invest in human-resource development, to forge closer links with educational institutions, to adopt a more global approach to strategy, to seek international success rather than local dominance, and to develop corporate leadership rather than administration.

There is no explicit mention of tools to improve strategy formulation or implementation in this report; this means that they have dealt with the issues and topics, but ignored the mechanisms or means of addressing the issues. The Porter Project was also criticised by Cartwright and others who believe that the Porter model, which stipulates domestic market success as a pre-requisite to international competition, does not fit New Zealand's resource-based industries (McManus, 1991; Enderwick, 1991). Enderwick (1991) also observed that the strategy being recommended for New Zealand is already being pursued by a number of other developed and newly industrialising economies.

Moving now to the most recent NZ survey which included a question on SM tools. As part of his MBS thesis, Olson (1991) collected information on the use of thirty five tools in the development of corporate strategic plans for 43 companies from the top 200 companies in NZ. This is the largest set of tools which has been investigated empirically to date. However, Olson reported the usage frequencies for each tool without offering any

explanations or interpretive comments; presumably because this was a minor question in his research project.

Another Massey University Strategic Planning research project by Matthew (1992) thoroughly examined Olson's results as well as reviewing the Strategic Initiatives Case Study collection (which has been developed and co-ordinated by Dr Peter Mellalieu). Matthew noted that the most commonly used tools from Olson's survey were "almost as heavily weighted towards accounting based methods ... as strategic methods"; while "several extremely important strategic techniques were only used very infrequently".

Matthew reports that pre-1984 NZ "could be described as having a very low incidence (proportion of users to non-users) and low sophistication of strategic planning." After examining the impacts of deregulation he looks at the current status of SP and gives NZ another "low incidence and low sophistication" rating. To evaluate the sophistication of an organisation's strategic planning, Matthew uses three core components: paradigm, process and techniques/methods. These three elements were also used to structure recommendations for improving strategic planning sophistication in NZ, as follows:

1. A *paradigm* shift away from reactive, short term, crisis oriented management, to purposive, proactive, long term, environment oriented, strategic planning.
2. The adoption of a systematic approach to applying the strategic planning *process*.
3. The incorporation of appropriate strategic planning *techniques* and *methods* into the organisations decision making processes. p.7

The major difficulty with Matthew's conclusions is the reliance upon other sources which in some cases are of questionable value; for example, the tool usage data comes from Olson's (1991) very small sample.

As in the UK, the NZ Strategic Management Society has surveyed its members in 1993 to gauge expectations of the Society, and information on timing and topics for their Seminar series; however no specific tool questions were included or reported.

In conclusion, it seems that all of these studies have identified the same basic weaknesses in the practice of Strategic Management in New Zealand. But is the situation in the 1990s as bad as Matthew proposes? If so, why has there been no significant improvements over the past decade? How do top managers in New Zealand make their strategic decisions? Which, if any, of the SM tools do they use? These questions still need to be answered. Although Olson's 1991 survey results may provide some indication of recent usage, they

are at a very superficial level; for example, there is no indication of what the tools were used for, how they were used, why they were used, and how they were chosen.

3.5 Strategic Management Tools

So far in this chapter the literature on SM practices, which is predominately survey research, has been reviewed. The focus has been on the surveys which have included some reference to SM tools. In this penultimate section, the normative literature on the nature of SM tools will be examined to enable gaps in the status quo to be identified. This will assist with the development of a research agenda for this and future research.

There is currently no definitive summary of SM tools in the literature. This section will provide an overview of the nature of tools which are available for use within Strategic Management. First, the role of SM tools will be discussed, then the sources of information on SM tools will be described. The types of SM tools which are available will be considered and a new SM tool typology proposed. The literature on the comparison of SM tools will be presented, and to conclude the development of new SM tools will be discussed.

3.5.1 The Role of SM Tools

There is not a strong or recognised tool focus within the Strategic Management discipline. This is evident from the literature and from both professional and academic conference programmes, especially when compared with a discipline like Management Science which has traditionally had a very strong focus on tools. The reason for the apparent lack of emphasis on SM tools, is related to the secondary role that they serve; within Strategic Management a "tool is a means to an end, not an end in itself" (Eilon, 1980). Information on tools is presented in the context of a specific strategic topic or issue; the tool is subservient as it generally contributes to part of the task, rather than addressing/covering all aspects of the strategic issue.

SM tools perform an essential **support** role within the SM process (Dyson, 1990). They perform a number of different functions, sometimes simultaneously. The major functions include the following:

- * to generate information (Langley, 1988, 1991; Day, 1986)
- * to provide a structure for analysis (Day, 1986)
- * to encourage the communication of ideas (Langley, 1988, 1991; Day, 1986)

- * to assist with co-ordination and control (Langley, 1988, 1991)
- * for symbolic purposes (Langley, 1991)

SM tools may be used separately for some issues, but often they are used in combination with others to obtain a better understanding (Prescott and Grant, 1988). Hussey (1992) uses an analogy of a kaleidoscope and advises using "two or three different techniques to let the information fall in different patterns". He also advises that "there is no one right technique for all occasions".

The potential contribution from SM tools should not be under-rated. According to Webster, Reif and Bracker (1989), tools "can raise the level of strategic thinking" in organisations and the "effectiveness of the strategic planning process". Some of the benefits, which they identified, arise as tools:

- * force critical thinking
- * encourage managers to concentrate on the facts
- * call for managers not just to describe situations but to understand them as well
- * provide a more disciplined, rigorous approach
- * emphasise the need to develop and apply decision criteria
- * promote a "be prepared" attitude

The broad nature of SM requires expertise in a range of tools. However, the value of SM tools as an enabling mechanism to improve strategic thinking, does not appear to be widely recognised or acknowledged.

3.5.2 Sources of Information on SM Tools

There are numerous techniques, tools, and approaches which are currently available to support decision making within Strategic Management, and the set is continually expanding. The sources of written information on SM tools which include texts, books, papers will now be described, and the dissemination of this information discussed.

Every major SM text includes a description of some of the basic SM tools (e.g. SWOT Analysis, Porter's Five Forces, Product Life Cycle, Portfolio Models, Generic Strategies). There are also books specifically dedicated to tools: McNamee (1985) describes seven approaches; Dyson (1990) brings together a collection of published papers to provide an overview of analytical techniques; and Porter's books on industry and competitor analysis

(1980, 1985). There are books detailing individual tools such as the outline of the Driving Forces approach for strategy formulation by Tregoe and Zimmerman (1980), the description of Market Segmentation by Bonoma and Shapiro (1983), and the outline of the PIMS Principles by Buzzell and Gale (1987).

While there are many papers on tools in academic journals, there are some techniques which only appear to be described in a single paper: the Assessment of Political and Country Risk by Desta (1985); Reasoning By Analogy by Sullivan and Yates (1988); and Multiple Point Competition Analysis by Karnani and Wernerfelt (1985). These approaches have little chance of becoming widely known or available to most practitioners.

In addition to these formally published sources, information is available from the developers or promoters of some specific tools. For example, the Strategic Decision Group of consultants actively promote Decision Analysis, which is the tool on which they base their SM consultancy services. Similarly, the Gattorna Chorn consultancy group, who have developed the Strategic Alignment approach, allow and encourage the dissemination of their written materials. However, many proprietary approaches developed by consultants remain confidential for competitive reasons. Informally information is also shared by colleagues and personal networking contacts.

In general, the dissemination of information on SM tools is performed by educational institutions and by professional societies. Educational institutions provide information on SM tools as part of their course programmes. Professional societies organise conferences and seminars for their members on new developments in the field which includes new SM tools. There are also organisations which organise conferences (e.g. Institute for International Research) on "high interest" topics; these may include some SM tools or focus on a specific approach (e.g. benchmarking).

3.5.3 Types of SM Tools

Strategic Management is an integrative discipline which incorporates all aspects of an organisation, so the tools which are used within SM reflect this diversity. SM both develops its own approaches and uses the tools which have been developed in other disciplines (Day et al., 1990).

To obtain a broad picture of the tools which are available within SM, Clark (1993)

evaluated a sample of sixty six SM tools (Appendix III) using four descriptive analyses including: the nature, scope, and function of each tool, and the type of analysis involved. For this sample the majority of the tools (74%) were specific in nature, broad in scope (58%), and primarily designed for obtaining information (80%). The predominant type of analysis was quantitative (47%), with 27% of the tools being primarily qualitative, and 26% combining both quantitative and qualitative assessments.

The survey literature described in the preceding sections has illustrated the wide range of SM tools which are available. Table 3.3 lists twenty seven tools from the four international surveys; Olson (1990) used a different set of 35 tools. How to make sense of the wide range of SM tools available has not been addressed as there is no standard typology of tools currently available. Alternative classification systems to fill this gap will now be discussed.

Tools are sometimes grouped according to the type of task which they perform. Prescott and Grant (1988) considered competitive analysis approaches, Higgins and Finn (1977b) looked at computer based models, Wright (1982) surveyed the use of forecasting approaches, and Hooley (1984) focussed on marketing approaches. There are several different approaches for portfolio analysis so they could be grouped together; similarly for the group decision making process approaches. Given that there is overlap of different tools which may be used for the same task, this approach would not readily lead to a distinct set of categories. Further, as the tasks are themselves numerous this approach would potentially lead to a relatively large number of categories.

Hussey (1992) published a glossary of fifty SM approaches which includes a brief description and key references for each technique. He also classified each technique into a set of six categories (which are not defined in the paper) which reflect the nature of the processing involved with each tool. Table 3.5 shows how the sample of tools are spread across these categories.

This classification schema provides a means of grouping similar tools together. However, the distinction between three of these categories (mathematical, quantitative, and empirical relationships) is not clear. Furthermore, the information manipulation category is a general "catch-all" which accounts for the majority of the tools. This set of categories appears to have limited value for operational tool selection purposes.

Table 3.5 Hussey's Classification of SM Tools

Tool Type	Number n	Percent %
Information manipulation	28	56
Financial analysis	14	28
Forecasting method	3	6
Mathematical relationships	3	6
Quantitative relationships	1	2
Empirical relationships	1	2

Another approach for grouping similar tools together is to use the functional areas from which the tools originate. This leads to separate categories for Accounting, Finance, Marketing, Human Resources, Information Systems, Strategic Management etc. The problem with a typology of this kind is that many tools are now used in multiple specialisms, and their origin becomes blurred over time; that compounds classification, and may lead to ownership disputes.

A more holistic approach is to examine the nature of the focal areas that the tools address and establish a smaller set of categories which group similar tools together in a recognisable cluster. This approach may take longer to refine, but can potentially provide a workable framework or structure for a SM tool typology. An overview level typology based on this approach is proposed in Table 3.6.

Table 3.6 SM Tool Typology

Tool Type	Definition	Example
Admin/Planning	for organisational or planning tasks	Mngt by objectives
Financial	focus on financial aspects	Value based mngt
Marketing	focus on marketing aspects	Market segmentation
Technological	focus on technology, technical aspects	Strategic database
Social	participative group processes, people focus	Focus group
Combination	focus in more than one of the above areas	Critical success factors

A combination category is included in this typology to allow for the tools that do not fit exactly into just one of these categories.

The features of this proposed SM tool typology appear to meet all the operationalisation criteria which have been considered in discussing the other classification systems. In terms of size, it has a small set of distinct categories; in terms of scope, it is able to handle any/all approach(es); furthermore, it uses simple, generally recognisable terminology, so it will be readily understandable. The typology offers a way of thinking about and understanding the types of tools which are available/used in SM. It can be further developed in future as a taxonomy by identifying sub-categories within each of the basic categories.

Next, the literature which deals with comparison of SM tools will be considered.

3.5.4 Comparison of SM Tools

Given the vast array of diverse SM tools available, the ability to evaluate and compare different approaches becomes an important issue in tool selection. The tools can potentially be evaluated, or compared, in terms of their own features, or in terms of the tasks which they perform. This type of comparative information is invaluable for practitioners to assist with tool selection. Yet, there have been very few attempts to **provide this type of information or produce guidelines for tool selection.** The papers which do address these areas will now be discussed.

Prescott and Grant (1988) published their evaluation of twenty one competitive analysis techniques as a Manager's Guide. They used eleven dimensions grouped into resource needs, data needs, accuracy constraints, and updating requirements, to develop utilization profiles of each tool. A case example was included to show how the table was used to select three inter-related tools to understand the industry and its relative competitive position.

Similarly, Webster et al. (1989) profiled a more general set of thirty Strategic Planning tools in their FAR contest winning Manager's Guide paper. They used nine dimensions grouped in four categories of outputs, inputs, time, and resource requirements. To show how to incorporate "carefully selected techniques into the planning process", Webster et al. (1989) also indicated which of the tools could contribute to each step of a simple seven step Strategic Planning process model.

A two phase SM process model of nine strategic tasks was used by Day (1986) to show

the potential applications of five tools. Day showed that "the more complex, higher level methods can assume a greater variety of roles", however the usefulness of a method "depends on how readily it can be adapted to a specific setting". He advises that multiple tools which serve the same purpose should be treated as "complements" rather than "substitutes", as "differences in methods permit the examination of the same problem or issue from several perspectives".

Dyson (1990) considered the contribution of fourteen tools using a six step SP process model in the final chapter of his book on SP tools. The results matrix is intended to be useful in indicating which tools can support each process step. If a process element is diagnosed as absent or weak, the matrix signals the approaches which can help to fill the gap.

The process model provides a structured framework for tool comparisons which focusses on key strategic tasks which are well known and familiar. However, each of these process model evaluations has used a different set of tools and tasks. No empirical studies have evaluated SM tool use for specific tasks. While the literature on SM tool comparisons is limited, there has been no research into the factors affecting tool selection. Given the wide range of tools currently available in SM and the importance of SM in determining the future of organisations, it is time these gaps were addressed.

3.5.5 Development of SM Tools

As SM is dynamic, new approaches are being developed all the time. Payne and Lumsden (1987) examined a sample of eighteen SM frameworks to see if the originators were from academia, the business sector or consultancy firms. They found that management consultancy firms were the principal contributors, and noted that the environment within the leading strategy consulting firms is "ideal" for the "creative generation of such frameworks". Companies tend to be concerned with running their own business and usually lack the skills, the internal processes and the culture for developing new concepts. Academics often lack resources, including funding and access to confidential data, so their major contribution has mainly been in the refining and validation of concepts.

There is currently no organisation, process, or individual to act as a clearing house for the evaluation of new tools. This means that there is no systematic approach for introducing new tools. Payne and Lumsden (1987) propose that it is "the acceptance and use of them

in the market place" which is the criterion for usefulness and success of SM frameworks. Furthermore, the tools which are used will be influenced by the background of the leaders or planners, and the nature of the industry, as these affect the areas of strategic interest and bias (McNamee, 1985).

Because of the competitive elements which drive organisations to improve their performance, there is a receptiveness for adopting new methods in some sectors and industries. The life cycle of SM tools has not been formally studied, yet there is evidence that some tools become "fashionable" for a period (e.g. Benchmarking and Business Process Re-engineering in 1992/93), while the basic tools will tend to be used continuously (e.g. SWOT).

3.6 Conclusion

This literature review has shown that there has been limited research on SM tool usage. In general the SM tool questions have been included within surveys on SP processes so there is little explanatory information provided with the results. Lack of consistency between the surveys in terms of the sample population, the time period involved, the tools included, and the terminology used, make comparisons difficult. Apart from the methodological differences, the focus by the researchers on different small sets of related tools provides only snapshots of parts of the whole tool usage picture. This suggests that it is time to examine a broader range of SM tools.

The overall pattern from the survey research suggests that while organisations have established systems and procedures for Strategic Planning, the incidence and sophistication of SM tool usage is low. The complex reasons for this have not been investigated.

This literature review also revealed the lack of a tool focus in SM and the absence of a definitive summary of SM tools in the SM literature; section 3.5 attempts to synthesise the information available to provide an overview level summary.

A number of major gaps in the SM literature were identified including:

- * no studies linking strategic tool use with specific tasks,
- * no systematic evaluation of new/existing tools,
- * limited comparative and evaluative information on tools,
- * no studies on SM tool life cycles,

- * no studies on the factors affecting tool selection or the process of strategic tool selection.

This signals that it is time for more research on SM tools. This project will begin to address several of these research gaps. Specifically, this research will aim to identify the current status of SM tool usage over a broad base, and to explore the rationale for using specific tools. It will move beyond the previous studies by focussing on a larger set of tools and investigating the linkage of tools with a series of specific strategic tasks. This will provide some new comparative information on SM tools. In addition, the project will investigate the strategic tool selection process and seek to identify the factors which are involved in strategic tool selection.

In the next chapter details of the research methodology will be outlined.

Chapter 4 Research Methodology

4.1 Introduction

In this chapter the research methodology details will be presented and the research design will be discussed. This establishes the context for a comprehensive description and discussion of the research methods which were used in the project; these follow. A brief summary of the chapter will be presented to conclude.

4.2 Research Methodology

Organisational research is extremely complex as the context is multifaceted and mobile. However, in addition to the context, it is necessary to incorporate both content and process dimensions, and the inter-relationships between them, to develop organisational theories (Pettigrew, 1988). The study of organisations is anchored in a paradigm which reflect fundamental beliefs and assumptions about the nature of reality (ontology), knowledge (epistemology) and human behaviour. These assumptions define different methodological perspectives which in turn influence the choice of acceptable methods. Burrell and Morgan (1979) have proposed a set of four paradigms which are mutually exclusive. However, as the paradigmatic dimensions actually form a continuum, it has been proposed that the boundaries are permeable, even if the central assumptions of the paradigms are at odds (Gioia and Pitre, 1990). Moreover, Gioia and Pitre (1990) argue that a single research paradigm produces an incomplete view as it is "too narrow" to capture the complexity of organisational reality. They advocate "greater expansion and more accommodation of multiple approaches" and describe bridges which create multi-paradigm approaches.

The methodological perspective adopted for this research is multi-paradigm, but driven by the nature of the central research issues. In the next section, the research questions will be presented and then the overall design of the research will be discussed. The research procedure which was followed to implement the project will then be outlined. This establishes the context for the detailed discussion of the research methods which were used in the project.

4.2.1 Research Questions

The overriding question or research issue which serves as the central theme for this thesis is: What is the role of MS/OR at the strategic level?

This question can be restated in the form of a research objective as follows:

to identify and evaluate current involvement by MS/OR practitioners at the strategic level.

To achieve this primary research objective, a series of related research questions will be considered concurrently. First, it is necessary to identify current MS/OR practice at the strategic level. Second, to evaluate the MS/OR position in the strategic domain, a benchmark or standard is required; this can be provided by simultaneously identifying current SM practices for the same set of strategic tasks, and then making comparisons between the two sets of results. Third, to assist with understanding and interpretation of the strategic level tool usage results, the process by which the strategic tools are selected will also be investigated.

Therefore, this central research theme is a very complex issue which will be addressed by simultaneously considering the following series of research questions:

1. What is the current status of MS/OR tool usage at the strategic level?
2. What is the current status of SM tool usage?
3. What are the factors involved in strategic tool selection?

Each of these three major questions will be addressed in turn by posing a further series of more specific questions. For example:

- * Which tools are being used at the strategic level?
- * Which strategic tasks are they being used for?
- * What proportion of time is spent on strategic work?

As this research problem is complex and multi-disciplinary, it cannot be addressed using a standard research design or procedure. Focussing on a subset of these questions would narrow the investigation, but constrain the research outcomes so that the overriding question was not addressed. Therefore, the scope of the research was kept broad.

This research topic is exploratory as it fits the Phillips and Pugh (1987) definition of "tackling a new problem, issue, topic about which little is known". Therefore the research process will involve examining "what theories and concepts are appropriate, developing new ones if necessary, and [seeing] whether existing methodologies can be used" (Phillips and Pugh, 1987).

4.2.2 Research Design

As the nature of the research problem drives the research design and methods used (Downey and Ireland, 1983; Patton, 1990), an exploratory research project was designed and conducted for this thesis. The overall research design is shown in Table 4.1.

Table 4.1 Research Design

Country	Discipline	
	MS/OR	SM
New Zealand	☺☺☺	☺☺☺
United Kingdom	☺☺☺	☺☺☺

The research design was multi-disciplinary as the MS/OR tools were evaluated simultaneously with the SM approaches. It was comparative as the research was replicated in both New Zealand and the United Kingdom. Further, it was empirical as the research collected both quantitative and qualitative evidence from practitioners working in both disciplines.

A multi-disciplinary design which investigated the same questions concurrently in both disciplines was chosen to ensure that the MS/OR contribution was evaluated in a truly strategic context. This also facilitated comparisons and interpretation of the results as no directly comparable results were available in the literature. To provide comparable samples of individuals with interest and expertise in these two disciplines, the practitioner members of the Operational Research and the Strategic Management/Planning Societies were used as the target population.

The research was conducted in two countries in parallel to avert potential problems arising from small population sizes in New Zealand especially in the MS/OR discipline. The United Kingdom was chosen for the comparison as it has a comparatively strong MS/OR profession, and as many of the newer ‘soft’ MS/OR approaches have been developed there. Time and funding precluded any other countries being incorporated in the project.

An empirical study was used to obtain evidence of tool usage and tool selection. A postal questionnaire was designed to collect quantitative data from each sample, and semi-

structured interviews were conducted to obtain qualitative explanatory data.

The tool focus for the research was considered appropriate as tools constitute a major component of both disciplines. Tools can be matched with specific types of activities and tasks, so they provide a mechanism for a comparative evaluation of this type. Furthermore, a preliminary literature analysis exploring the interface of MS/OR and Strategic Planning had demonstrated the viability of this approach (Clark, 1992).

The focus on individual practitioners as the unit of analysis was necessary for the interdisciplinary comparisons. However, this enabled the tool selection investigation to be included in the project; as tool selection is essentially a function of personal choice it was necessary to examine the behaviours, perceptions and preferences of the individual participants.

A set of strategic tasks was developed to provide a structure for the empirical study. This normative SM framework (described in chapter 5) was based on a SM process model to ensure that the evaluation focussed on a representative set of core SM tasks. This SM framework was tested, prior to the empirical study, by evaluating samples of tools from both disciplines (Clark and Scott, 1992; Clark, 1993).

A multi-method research design was chosen to facilitate both breadth of scope, and depth of inquiry, in this exploratory investigation. Triangulation of data is commonly used in case study research (Yin, 1984; Miles and Huberman, 1984), and triangulation of methods is advocated to improve the quality of the research outputs (Denzin, 1978; Jick, 1983; Patton, 1990). According to Jick (1983)

"triangulation may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge" p.138

Multi-method comparisons which converge increase confidence in the results, whereas divergent results lead to "enriched explanation" (Jick, 1983). Furthermore, Jick (1983) suggests that the qualitative data and analysis "function as the glue that cements the interpretation of multi-method results". In the Strategic Management discipline, triangulation has been used in historical case study research (e.g. Johnson, 1987) and in longitudinal research on the process of strategic change (e.g. Pettigrew, 1988; 1990).

4.2.3 Research Procedure

To implement this research design, the following sequence of research activities was followed:

1. Developing a framework of strategic tasks (described in chapter 5)
2. Development of research instruments
 - to collect quantitative empirical evidence of MS/OR tool usage and tool selection at the strategic level
 - to collect quantitative empirical evidence of SM tool usage and tool selection
 - to collect qualitative explanatory data on MS/OR tool usage and tool selection at the strategic level
 - to collect qualitative explanatory data on SM tool usage and tool selection
3. Pilot testing
4. Data collection
 - conduct MS/OR survey in NZ and UK
 - conduct SM survey in NZ and UK
 - conduct MS/OR interviews in NZ and UK
 - conduct SM interviews in NZ and UK
5. Data entry
 - postcode questionnaires and enter data for SPSS^x analysis
 - complete transcription of interviews
6. Analysis
 - perform analyses to obtain frequency results for each survey
 - perform statistical analyses to identify significant differences between the survey samples (NZ:UK and MS/OR:SM)
 - collate responses for each question from the interviews
 - use content analysis of interviews to identify tool selection factors
7. Triangulation
 - compare results with previous external research and theoretical frameworks
 - compare internal cross-country and inter-disciplinary results
 - compare results from all sources to develop overview level conclusions on the research questions/issues

The framework of strategic tasks which was developed will be described in the next chapter. Details of the survey and interview research methods will be outlined in the remaining sections of this chapter.

4.3 Survey Method

To collect empirical evidence of current tool usage patterns a survey method was used to enable the largest and widest possible samples from both disciplines. To meet the research aim of identifying the state-of-the-art, a large representative sample was needed. To collect quantitative data from multiple samples simultaneously, a postal questionnaire was designed. This information was supplemented with qualitative explanatory data obtained by conducting interviews with individuals from each population.

There were four surveys involved in this research project:

1. **NZOR** Operational Research Society of New Zealand
2. **UKOR** Operational Research Society, United Kingdom
3. **NZSM** New Zealand Strategic Management Society
4. **UKSM** Strategic Planning Society, United Kingdom.

Dillman's (1978) Total Design Method for mail surveys was followed for the development and implementation of the questionnaires. Two adaptations were made to his detailed procedure: different fonts and font sizes were used to upgrade the layout and appearance of the questionnaire; and A3 paper was folded and stapled to produce booklets which fitted standard UK and NZ envelopes (Cragg, 1991).

Other sources which were used in the survey design process include: Alrech and Settle (1985), Sproull (1988), Tull and Hawkins, (1976, 1980), Worcester and Downham (1986), Baker (1991), Seibert and Wills (1970), Oppenheim (1972), Moser and Kalton (1979), and NZ Department of Statistics (1992). Previous surveys in both disciplines were examined and their results reviewed (Appendix IV). Finally, discussions were held with academic staff and others involved with survey design and implementation.

The survey sampling design issues will be discussed in the next section, and then the development and pilot testing of the research instruments will be described. The survey data collection procedures, and the sample characteristics will be outlined; non-response bias, reliability and validity issues will be addressed. To conclude, details of the survey data analysis procedures will be presented.

4.3.1 Sampling Design

The sampling design issues will be discussed in this section. These include the nature of the target population, the survey population, and the sampling frame for each survey. Also the sampling strategy and its linkage with sample size will be explained.

The target population for each survey includes the practitioner members of the Society who are resident within that country. The survey population includes all of the members of the target population for this research. The sampling frame for each survey is the Society membership list which contains the names and addresses of these people.

The Society membership provides a sample of known individuals who can be targeted personally by mail (Dillman, 1978). This avoids the problems of the questionnaire being passed around an organisation until it finds someone with 'free' time, but with perhaps limited expertise in the research area. Similarly, it was felt that job titles are so variable that they would not be adequate for this project, especially in the MS/OR discipline.

The Society membership provides samples of individuals who can be assumed to have an interest in the discipline. In addition, it is anticipated that they will most likely have expertise in the area, and in most cases there may be some overlap with their employment. For this research, a random sample of senior managers is not adequate to identify specialist skills. The Society provides a sample of comparative "experts" or specialists. This approach of looking at the capabilities of an anticipated "advanced" group is similar to Lenz and Engeldow's (1986) field study of 'leading edge' corporations. The Society-based sample will also incorporate a wide range of industries, organisation types, and geographical areas. The focus on individuals as the unit of analysis is necessary to explore the linkages between tool use and tool selection factors. The practitioner sample aims to record current practice; academic members of the Society were excluded as it was not possible to distinguish the academics who are currently involved with tool applications from those with previous or no practical experience.

The main problem with surveys of Society members arises as a result of recent privacy legislation, which precludes the Society passing on names of members unless they have specifically given their permission for this. How this was resolved for each survey will be described in Section 4.3.4.

The sampling strategy which was applied for the two UK surveys, which had large populations of approximately 3000 members, was simple random sampling. However, as both of the NZ populations were comparatively small (ORS 100; SMS 400), a census sample was used for them. The rationale for this strategy was to try to obtain sample sizes which if not similar, would be as large as possible for statistical purposes. For the UK surveys a sample size of 1200 was used which was about 40% of these populations. Further, this sample size was economically feasible and could produce 120 usable returns with a conservative 10% response rate; this would be large enough for sub-group analysis. As the published response rates from previous UK surveys have varied between 11-43%, it was prudent to adopt a conservative approach.

4.3.2 Development of Research Instruments

The development of the research instruments was an iterative process lasting three months. A separate postal questionnaire was needed for each discipline to allow for different tools and terminology; the same structure was followed and wherever possible identical questions were used. Minor differences between the UK and NZ surveys were needed to allow for larger organisation sizes (an extra category for organisation turnover in the UK) and for different currencies (appropriate £/\$ signs).

A copy of the MS/OR Questionnaire is included as Appendix V, and the SM questionnaire is included as Appendix VI.

The questionnaire was designed in 4 sections. Part A collected information on tool usage, Part B concerned tool selection factors, Parts C and D collected background information on the organisations represented and the participants. The main topics in each section were as follows:

Part A: Tool Usage

- To identify the level of involvement with each of the strategic tasks
- To identify the tools which are used for each of the strategic tasks
- To investigate awareness/familiarity/usage with a sample of tools

Part B: Tool Selection

- Organisational factors
- External factors
- Personal factors
- Tool characteristics

Part C: Organisational Background of Respondents

- Organisational size: turnover, employees
- MS/OR, Corporate Strategy, SP groups/sizes
- Strategic position
- Organisation type
- Main product/area of operation

Part D: Personal Background of Respondents

- Work time allocation
- Work experience
- Main area within organisation
- Main role in current position
- Training sources
- Information sources
- Personal performance rating
- Educational qualifications
- Age
- Sex

4.3.3 Pilot Testing

The questionnaires were pilot tested to improve wording of questions/instructions, and to test completion time, response rates, and field/processing procedures (Sproull, 1988; Dillman, 1978; NZ Dept of Statistics, 1992).

A. The MS/OR Questionnaire

The MS/OR questionnaire was pilot tested using a sample of 14 ORSNZ members. As well as receiving completed questionnaires from 86% of this pilot group, half of the sample were contacted for personal discussions about the questions and the instructions. This input was used to improve the clarity of the instructions and the wording of the questions.

B. The SM Questionnaire

The SM questionnaire was pilot tested using a sample of 20 NZSMS members. Completed returns were received from 11 respondents (55%); in addition 10 of the sample were telephoned and discussions on the questionnaire were held with 8 people (one person was unavailable as he was overseas, and another person had just retired). Valuable written comments were also received from several respondents.

During this pilot stage, feedback was obtained from eight academics from the Marketing, Strategic Management and MS/OR disciplines in order to improve the quality of the research instruments. In addition, statistical advice was sought during this development stage.

4.3.4 Data Collection Procedures

The data collection procedures for mail surveys outlined by Dillman (1978) were followed as closely as possible. For physical access reasons the two UK surveys were implemented together, and these were immediately followed by the two NZ surveys.

A. The NZ Surveys

The NZ questionnaires were mailed to all 100 NZ-resident practitioner ORSNZ members and 400 NZ-resident NZSMS members in early November 1992. Non-respondents received a reminder letter 4 weeks later (in December 1992), and a second follow-up letter and copy of the questionnaire in early February 1993.

B. The UK Surveys

The UKSM surveys were printed in New Zealand and bulk mailed on September 3 1992 for postage in the UK to the 1200 randomly selected practitioner SP Society members. Responses were returned by first class mail to the Audio Visual Services unit at Loughborough University using their business reply service mail licence. Individual follow up of this sample was not allowed by the SP Society; constrained by the Data Protection Act, they supplied only one set of mailing labels as a "one-off" exercise, and requested that further contact with members occur via the monthly newsletter. This newsletter option was used to prompt more returns.

The UKOR surveys were printed at Loughborough and mailed by the OR Society to 1200 randomly selected UK-resident practitioner members on about September 10 1992. Again, the responses were returned by first class mail to the Audio Visual Services unit at Loughborough University. Individual follow up of non-respondents to this survey was also disallowed, even though the project had been approved by the Education and Research Committee of the OR Society. Previous surveys had been allowed access to the membership list, but the Society officials were concerned to protect the privacy of their members and to comply with new regulations. Again, the newsletter reminder paragraph was used as a fallback measure to try to increase the response rate.

4.3.5 Sample Characteristics

The number of responses and response rates for each of the four surveys are summarised in Table 4.2.

Table 4.2 Survey Response Rates

Responses	MS/OR		SM	
	NZ	UK	NZ	UK
Responses Received	67	229	230	179
Response Rate	67%	19.1%	58%	14.9%
Usable Responses	39	177	138	161
Usable Response Rate	39%	14.75%	35%	13.4%

In the NZ samples, many people phoned or wrote to explain why they were unable to participate in the survey. There were a variety of different reasons for non-participation such as no longer working in the area (15% of the NZOR sample), moving overseas, changing employer, and time pressures. Other responses were non-usable as the questionnaire was returned with many incompleted questions.

The NZ response rates are higher than the UK surveys; this is primarily due to the additional phases of follow up. Moreover, they reflect the pattern from previous survey-based research in these countries (Appendix IV). In the UK some respondents indicated that they now receive so many surveys that they are unable to contribute to all of them; this problem is also starting to impact in NZ as well (Dau, 1991; Brennan, 1991).

The sample size of the NZOR survey is small, but as all of the members of the defined population were included in the survey, it represents a census sample; so the results are usable. The other three samples are all good sizes and compare favourably with previous survey research (Appendix IV).

In summary, the response rates and sample sizes are equivalent, or better than, the majority of other similar research in both these countries.

4.3.6 Non Response Bias

The problem of non-response bias occurs when the respondents are substantially different from the non-respondents. There are three standard approaches for dealing with non-response: to reduce the non-response itself, to sample non-respondents, and to estimate the effects of non-response (Armstrong and Overton, 1977). These will now be discussed in turn.

To minimise the level of non-response there are various approaches which can be adopted (Kanuk and Berenson, 1975; Dillman, 1978; Lehmann, 1989; Sproull, 1988; Cragg, 1991; Dau, 1991). Many of these approaches were incorporated in the survey process as follows:

- | | |
|----------------------------|--|
| a. Pre-warning | advance notice was given of the research project in Society newsletters |
| b. Reminder letters | individual follow-up letters were sent to the NZ non-respondents, and a reminder was published in the UK Society |

- newsletters
- c. **Return envelope** an addressed pre-paid envelope was included for ease of return
 - d. **Incentives** offer to supply result summary for those who wanted one
 - e. **Confidentiality** assurance of confidentiality of responses was given
 - f. **Sponsorship** indication that the research had been approved by the Society, and was being funded by the University of Waikato Research Committee
 - g. **Questionnaire design**
 - an attractive booklet format was used;
 - clearly labelled sections and questions;
 - tidy and consistent layout;
 - simple and direct wording and instructions;
 - use of bold to highlight keywords and italics for instructions;
 - some definitions were provided;
 - a glossary of SM tools was included in the SM surveys;
 - space was allowed for comments at the end.
 - h. **Interesting** selecting Society members for the survey anticipated respondents would have an interest in the research topic

To sample non-respondents is not feasible when responses are needed for a ten page questionnaire. In this research, access was also a constraining factor as information on the UK Society members was not available.

To estimate the effect of non-response the results of the survey can be compared with known values for the population. Alternatively, subjective estimates of non-response bias can be made using indicators such as the level of education (for consumer surveys) or size of the firm (for industrial surveys). A third approach involves extrapolation and assumes that the non-respondents are similar to those who respond less readily to the survey. Armstrong and Overton (1977) describe three methods of extrapolation: time trends, concurrent waves, and successive waves. The most commonly used method is the successive waves approach which compares early and late responses. This method is simple, inexpensive, and the data is already available. However, the fundamental advantage of this approach, is that it is based on the actual variables which are under investigation in the research.

To test for non-response bias in this project the first and last waves of response were compared for the main tool usage variables in the questionnaire. Chi square tests were used for this (Appendix VII). No significant differences (at .01) were found indicating no systematic differences between these two waves of the respondents; this indicates that non-response bias appears not to be an issue in this research.

4.3.7 Reliability

Reliability refers to "the extent to which measurement is repeatable and consistent; that is free from random errors" (Martin and Bateson, 1993). Reliability can be considered as two components: stability and internal consistency. Obtaining the same or similar results every time a measure is taken indicates stability; while using different types of measures at the same time to obtain the same or similar results demonstrates internal consistency or equivalence.

The basic tests which are used to assess reliability include the test-retest procedure which involves "applying the same measure to the same objects a second time" (Tull and Hawkins, 1976). This test assumes that the variables under investigation do not change in between the two tests, and that the first test will not influence the responses in the second. Apart from operational feasibility problems with this method, these assumptions are tenuous in many social science research contexts.

The tests for equivalence reliability include alternative-forms, split-halves, and internal consistency methods. Alternative-forms involves "applying two "equivalent" forms of the measuring instrument to the same subjects" (Tull and Hawkins, 1976). Apart from the difficulty of constructing two truly equivalent forms, there are operational problems associated with this test. Split-halves involves "comparing the results of half the items on a multiitem measure with the results from the remaining items" (Tull and Hawkins, 1976). This approach applies only to unidimensional characteristics which assumes each item is an independent measure of the same characteristic. As each question measures a different variable in this survey, the split-halves method is not applicable.

Internal consistency is measured using the Cronbach alpha measure. The coefficient alpha measures the average correlation between items within a test (Nunnally, 1978). This approach is recommended as the first reliability measure to use for any multi-item variables in any new instrument (Nunnally, 1978; Churchill, 1979). The coefficient alpha

is a robust reliability measure which is now widely used. According to Nunnally (1978):

Coefficient alpha provides a good estimate of reliability in most situations, since the major source of measurement error is because of the sampling of content. (p.230)

The Cronbach alpha test was used to test the reliability for the additive 'Users' scale which was the only multi-item variable in this research. This scale incorporates five aggregate scores for tool users involved with groups of the SM process tasks: organisational analysis, operating environment, remote environment, strategic analysis and strategic implementation tasks. It was used to compare the results from subgroups of high and low tool users. Table 4.3 shows the standardised alpha results for the 'Users' scale for each of the four survey samples. Although the level of acceptability for the alpha co-efficient is in part dependent on the research type, the standard set by Nunnally (1978) for new measures assumes that "reliabilities of 0.7 or higher will suffice". Therefore, these results suggest that the measures developed here are highly reliable.

Table 4.3 Reliability Results

Sample	Cronbach Alpha
UKSM	.7769
NZSM	.8073
UKOR	.8078
NZOR	.8120

4.3.8 Validity

Validity refers to the extent to which a measurement actually "measures what it is supposed to measure" (Martin and Bateson, 1993). This means that validity is concerned with the extent to which a measurement is free from systematic error (Tull and Hawkins, 1976). According to Nunnally (1978), there are three basic types of validity: predictive, content, and construct validity; each will now be discussed.

Predictive validity indicates the "extent to which particular measures predict other 'criterion' measures" (Dau, 1991). According to Nunnally (1978), after the 'criterion' has been determined, the process is straightforward:

Primarily, it consists of correlating scores on the predictor test with scores on the criterion variable. The size of the correlation is a direct indication of the amount of validity. p.88

As the surveys here are not primarily developed for predictive purposes, this measure of validity was not applicable.

Content validity is primarily concerned with the completeness and appropriateness of the content involved. It requires subjective evaluation, preferably performed by outside "experts", to demonstrate that the measurement "is an adequate measure of what it is supposed to measure" (Nunnally, 1978). Nunnally (1978) stressed the importance of the process of constructing the research instrument:

... inevitably content validity rests mainly on appeals to reason regarding the adequacy with which important content has been sampled and on the adequacy with which the content has been cast in the form of ... items. p.93

Thoroughness in the detailed development of a new instrument is essential to ensure content validity; however, the use of independent specialists and a pilot test will assist with, and provide further assurance of, content validity. This is not determined purely by examination *after* construction of the research instrument.

Construct validity focusses on the accuracy of the theoretical concepts under investigation. It is the most difficult and complex form of validity and requires understanding of the "factors that underlie the obtained measurement" (Tull and Hawkins, 1976). The process of construct validation was described by Nunnally (1978) as involving three major aspects:

1. specifying the domain of observables related to the construct;
2. from empirical research and statistical analysis, determining the extent to which the observables tend to measure the same thing, several different things, or many different things; and
3. subsequently performing studies of individual differences and/or controlled experiments to determine the extent to which supposed measures of the construct produce results which are predictable from highly accepted theoretical hypotheses concerning the construct. p.98

However, Nunnally (1978) pointed out that these steps "are seldom, if ever, purposefully planned and undertaken", and that this sequence is "seldom, if ever, followed". Three different types of construct validity can be defined and measured:

1. Convergent validity occurs when the measure correlates highly with other techniques designed to measure the same construct;
2. Discriminant validity occurs when the measure does not correlate very highly with another measure from which it should differ;
3. Nomological validity occurs when there is a relationship between two measures (M1 and M2) of conceptually related constructs (C1 and C2), as this is accepted as evidence of the relationship between the

two constructs (Peter, 1981; Peter and Churchill, 1986).

These tests for construct validity are designed to apply to multi-item or composite measures. As noted previously, the questions in this survey were measuring separate variables, so they were single item measures. For this reason, these tests were not able to be conducted.

For this research content validity was the only method of validation which was applicable. Every effort was made during the design and implementation of the surveys to ensure that the research instrument would enable a comprehensive investigation of current tool usage and tool selection practices.

4.3.9 Analytic Procedures

The procedures for data verification and analysis will be described in this section.

The coded responses from the questionnaires were entered into a VAX data file for analysis with the SPSS^x statistical analysis package. The accuracy of the data was verified using a series of manual checks of the data file, and inspection of the complete set of coded responses for a sample from each survey. Frequency output tables were also examined to ensure that all of the options were as defined and within the specified range for each variable.

For the survey both exploratory and confirmatory types of data analysis were required (Martin and Bateson, 1993). Initially the four individual surveys were analysed to obtain the descriptive statistics for each sample. These frequency results were collated in table and graphical form in order to identify patterns and trends (Alrech and Settle, 1985). Where appropriate the options were re-ordered in descending order of their proportions to emphasise the sample extremes; this also provided the sequence for profile chart displays. Mean values were used for interval scale data such as the horizontal numerical scale (Alrech and Settle, 1985) which was used throughout the questionnaire for indicating the level of importance of various items/factors.

Confirmatory data analysis was also used to test statistical relationships between variables. Crosstabulations were used when both the dependent and the independent variables were categorical (Alrech and Settle, 1985); the Chi-square statistic and its significance level are included in the crosstabulation output in SPSS^x. Breakdown was used to compare group

means when the dependent variable was an interval scale measure (Hedderson, 1987).

Comparative analysis was also performed between the surveys by looking at the relationships between: the two MS/OR surveys, the two SM surveys, the two NZ surveys, the two UK surveys, and all four surveys. In addition, comparisons were made with previous research results in related topic areas within the two disciplines.

4.4 Interview Method

To collect qualitative explanatory evidence a series of semi-structured interviews were conducted with individuals from each of the target populations in this study. This section will start with a discussion of the interview sampling design issues, and then the structure of the interview outline will be described. The actual interview sample characteristics will be presented, and to conclude the procedures which were used to analyse the interview data will be outlined.

4.4.1 Sampling Design

The sampling design issues for the interview component of the research will now be discussed. The interviews were conducted in the same four target populations as the surveys; so the survey population and the sampling frame are identical to the description in section 4.3.1.

The sampling strategy for interview research methods is known as purposeful sampling (Patton, 1990). The purpose of this type of sampling is to illuminate the questions under study by selecting "information-rich" cases. Patton (1990) has outlined sixteen different purposeful sampling strategies; from this set it is the criterion sampling strategy which provides the closest description of the approach used. In the MS/OR populations, the predetermined criterion which was applied to all the potential interviewees was involvement in MS/OR at the strategic level. Individuals who did not meet this criterion were excluded from the interview sample. Similarly, the criterion for the SM populations was current involvement in Strategic Management/Planning. This approach would be called a "focused interview" by Bouchard (1983) who has described a set of six types of special purpose interview.

There are no standard rules for determining sample size for qualitative interview research (Patton, 1990). According to Patton (1990):

Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility, and what can be done with available time and resources. p.184

It is accepted practice to define a minimum expected sample size at the start of a project for planning and budgetary purposes; while adopting a "flexible and emergent" approach during the fieldwork (Patton, 1990). The primary criterion for stopping is redundancy.

The sample sizes which were initially proposed for this project are shown in Table 4.4.

Table 4.4 Proposed Interviews

Country	MS/OR	SM
New Zealand	10-15	15-20
United Kingdom	15-20	10-15

The slight differences for these populations reflect the population size, operational constraints (e.g. access, time, cost) and theoretical considerations. Details of the actual interview samples will be discussed in section 4.4.3.

4.4.2 Research Instruments

The interview outline (see Appendix VIII for MS/OR outline and Appendix IX for the SM outline) consisted of an initial brief introduction, which was followed by a short series of questions to collect background information on the participants. Most of the interview time was spent on open-ended questions on tool usage and tool selection. To conclude comments/questions were invited before proposing a vote of thanks. The interview was designed to take fifty minutes; where necessary the pace of the interview was changed to suit the amount of time available.

As the interviews were being conducted in conjunction with postal surveys, the same set of personal and organisational background questions were used in the interviews. Using a checklist format for these questions enabled this information to be collected efficiently at the start of the interview. McCracken (1988) advises positioning biographical questions at the start of an interview to elicit descriptive details. Patton (1990) also suggests that the interview should start with "relatively straightforward descriptions", but he advocates keeping this type of question to the absolute minimum. Although he prefers to space this

type of question throughout the interview, Patton concedes "some background information may be necessary at the beginning to make sense out of the rest of the interview". This checklist activity seemed to help to establish rapport between the interviewee and the interviewer; the questions were simple and easy to answer so this helped to relax the interviewee. Where time was limited, the checklist was started/completed by the interviewee while the tape and microphone were being set up.

The standardised open-ended interview approach was used for the main questions in the interviews. The exact wording and sequence of the questions were determined in advance, and each interviewee was asked the same set of questions in the same order. The questions were worded in a completely open-ended format to enable the interviewees "to express *their own* understandings in their own terms" (Patton, 1990).

The sequence of questions started at a general level and then moved to focus on more specific details. Bouchard's (1983) approach, which involves a series of "funnel sequences" with feedback loops, was used. This approach was selected as it matched the research content, but it has additional advantages of maintaining interest and motivation. The more difficult questions, requiring synthesis and projection, were included towards the end of the interview (Patton, 1990).

In the final phase of the interview, an opportunity was provided for the interviewee to offer concluding comments on the research, and/or to ask questions. To conclude the interview, thanks were offered for participation and support of the research.

4.4.3 Sample Characteristics

The number of interviews which were conducted in each of the four populations is summarised in Table 4.5.

Table 4.5 Interview Sample Sizes

Country	MS/OR	SM
New Zealand	14	20
United Kingdom	11	16

Given the small size of the NZOR population and the questionnaire survey being conducted concurrently in the same population, fourteen interviews is a very good sample size. The UKOR interview sample was below the anticipated level, principally because access to the Society membership list was denied at the interview implementation stage. This meant that letters could not be mailed to potential participants prior to my departure for the UK. However, the sample of eleven interviewees were all senior level experienced practitioners so it does represent a high quality sample.

There were no difficulties achieving the SM interview sample sizes. The NZ sample of twenty was at the upper level of the proposed sample size range, and the UK sample of sixteen is one above the predicted number of interviews.

The UK interviews were all conducted in a four week period from mid-September to mid-October 1992. However, the NZ interviews were conducted in November, early December 1992, or February 1993; this extra flexibility enabled interviews to be scheduled at a more convenient time for the NZ interviewees. The names of the interviewees from each of the four interview samples are listed in Appendix X.

As the interviews were all conducted in batches, it was not feasible to completely analyse them simultaneously. However, tallies were kept on the sample composition details in order to ensure that the final sample was representative. In addition, responses for several key questions were monitored to record the variety of responses and hence identify the point at which limited new information was forthcoming. In this way Patton's (1990) redundancy stopping criterion was able to be applied for this subset of the questions.

4.4.4 Analytic Procedures

The analysis of interview responses is facilitated when they have been collected with a pre-determined set of questions (Patton, 1990). In this project the same SPSS^x programme, which was used for the organisational and participant background section of the surveys, was used to aggregate the interview sample background information.

All of the interviews were fully transcribed verbatim and hard copies were printed out. Each of the questions was considered in turn, with summaries of the main points being recorded. Similar responses were grouped together and examined to identify patterns and trends. This is the standard cross-case or cross-interview method (Patton, 1990). The

analysis of the data was inductive as the "patterns, themes, and categories" came from the data rather than being imposed prior to the analysis (Patton, 1990). Comparisons were made of the descriptive results within each discipline. Finally, the significance of the results, and the similarities and differences between them, were considered to generate explanations and conclusions: the interpretation phase.

A separate content analysis of the interview transcripts was also conducted to identify the factors involved in strategic tool selection. Krippendorff's (1980) method was followed for this analysis; however, time and cost considerations precluded the use of a panel of independent coders. As preliminary results from the questionnaire and interview samples showed that the differences between the disciplines were greater than the country differences, one sample from each discipline has been analysed.

4.5 Conclusion

An original exploratory research design was developed to investigate strategic level tool usage and tool selection. It was multi-disciplinary as tools from the MS/OR discipline were evaluated simultaneously with SM approaches. It was comparative as the research was replicated in both New Zealand and the United Kingdom. Further, it was empirical as the research collected both quantitative and qualitative evidence from practitioners working in both disciplines.

To provide a structure for the tool evaluation, a normative SM framework of strategic tasks was developed. A multi-method research design was chosen to facilitate both breadth of scope and depth of inquiry in this exploratory investigation. A postal questionnaire was designed, pilot tested, and implemented to collect quantitative data from each of the four samples. Concurrently, semi-structured interviews were conducted to provide qualitative explanatory data.

Details of the development, validation and implementation of the research instruments have been described in this chapter. The sample sizes and analytic procedures have also been outlined. The tool usage results from the SM discipline will be presented and discussed in the next chapter. This will be followed in chapter 7 by the results from the MS/OR discipline. The tool selection results will be outlined in chapter 8, and inter-disciplinary comparisons will be made in chapter 9.

Chapter 5 Strategic Management Framework

5.1 Introduction

To provide a structure for the identification and evaluation of strategic level tool usage practices a representative set of core strategic tasks was required. In a theoretical evaluation the potential capability of the tools is compared with the requirements of the specific tasks; in an empirical study, tool usage data for each strategic task is collected. As no definitive list of Strategic Management tasks was available for this comparative tool evaluation, it was necessary to develop a suitable framework of core strategic tasks. In this chapter the development of the SM framework will be discussed: by looking at the major options which were considered; by describing the SM framework itself, and how it was evaluated. In conclusion, the capabilities of the SM framework will be reviewed.

5.2 Development of the SM Framework

What are the basic tasks of Strategic Management? This appears to be a simple question, but there is not a single standard list of activities which describes SM tasks; so there is no simple answer. In the absence of a definitive summary from the literature or from a sample of senior SM practitioners, a number of potential approaches were investigated in order to develop a framework. These included the activities involved in the Strategic Planning cycle, Bower's strategic questions, strategic issues taxonomy, the features of tools, and normative SM process models. Each of these potential approaches will now be briefly discussed.

5.2.1 Strategic Planning Cycle Activities

The procedures which are followed by organisations in the development of their annual Strategic Plan potentially provide a set of basic strategic tasks. There are many sources of detailed itemised lists of the activities involved in the annual Strategic Planning cycle. Three examples of these will be considered to see if they are suitable to provide this framework. Naylor's (1980) schedule for Strategic Planning contains eighteen tasks for corporate level planning and nineteen tasks for divisional level planning; these lists are quite repetitive as they include many reviews, approvals or consolidations of plans which are not the types of activities which require tools. Hax and Majluf (1984) describe a set of twelve tasks in their planning process which iterates between the three hierarchical levels of corporate, business and functional level; many of these tasks are repeated at each of the three levels and the tasks are described at a high level (eg formulation of business

strategy, formulation of functional strategy) which are not detailed enough for tool matching. Below, Morrissey and Acomb (1987) present a detailed guide for executives to use in developing their strategic plans; this is the most comprehensive list of tasks, however it was considered to be too long to be used as the framework for this tool evaluation. The strategic tasks need to be in a relatively compact form which is suitable as a checklist for matching with tools.

These lists of SP cycle activities are broad and sequential in order to incorporate the various hierarchical planning levels iteratively. Many of the tasks involve procedural activities, rather than the focussing on the nature of the decisions or the content involved; therefore they do not provide a mechanism for tool matching.

5.2.2 Bower's Strategic Questions

Bower (1982) attempted to operationalise the Harvard Business School concept of strategy using a problem solving process approach. He proposed a series of questions to identify the key activities involved in strategy formulation and strategy implementation. The questions appear to provide a framework for understanding the situation, identifying key functional relationships and focussing on important areas where changes are required. While some of the questions are very specific (what are the aspirations and attitudes toward risk of key company managers?), others are of a general nature (what trends suggesting future change in economic and technical characteristics are apparent?). The questions provide a logical sequence for strategy development, but they are not expressed in a form which enables matching with tools.

5.2.3 Strategic Issues Taxonomy

The management of strategic issues is an extremely important component of Strategic Management. Another potential approach was to focus on a set of specific strategic issues. A literature search found descriptive and prescriptive papers on identifying strategic issues (Murphy, 1989), resolving strategic issues (King, 1982), incorporating strategic issues into Strategic Management (King, 1984; King, 1987), and systems for strategic issue management (Dutton and Ottensmeyer, 1987). There are also explanatory papers on the diagnosis of strategic issues (Dutton and Duncan, 1987b), understanding organisational response to strategic issues (Dutton and Jackson, 1987), and the dimensions of strategic issues (Dutton et al., 1989). While these dimensions provide a mechanism for evaluating or comparing strategic issues, they do not constitute a taxonomy of different types of

strategic issues. Given the complexity and variability of strategic issues it is not surprising that a single taxonomy is not available as yet. Moreover, restricting the framework of tasks to a subset of specific strategic issues would potentially exclude many respondents in the empirical studies.

5.2.4 Features of Tools

Can you evaluate tools in terms of their features? Does this provide a structure for comparison of tools? Prescott and Grant (1988) evaluated twenty one competitive analysis techniques using eleven dimensions grouped into resource needs, data needs, accuracy constraints and updating requirements. Similarly, Webster, Reif and Bracker (1989) profiled thirty SP tools using nine dimensions grouped in four categories of outputs, inputs, time, and resource requirements. Clearly we can differentiate or categorise tools by their features or capabilities.

What is the linkage to tasks? If we can conceptualise that the task requirements will mirror the tool features, then we could assume that the dimension of the tools could be used as a surrogate for the dimensions of the tasks. However, the linkage is esoteric and somewhat tenuous. A more direct linkage of tools with tasks is preferable to provide a structure for this comparative evaluation. As with the strategic issues dimensions above, tool features provide a means of comparing tools, but do not provide a framework of strategic tasks.

5.2.5 Normative SM Process Models

Every major SM text includes a SM process model which outlines the basic activities involved in developing and implementing strategies. These are usually high level descriptions of a series of activities which are represented sequentially for ease of communication, but which in practice will be overlapping and iterative. Although a simplification, the process model provides a framework or structure for thinking through/understanding the nature and essential elements of SM (Johnson and Scholes, 1989).

A sample of nineteen SM process models was evaluated in terms of their basic elements (Appendix XI). Although there is considerable variation in terminology across the sample, each model is internally consistent and cohesive. All of the models address the evaluation of the organisation's current strategic position in some form, however there are

omissions in the areas of Strategic Analysis and Strategic Implementation. Two of the models did not include the generation of alternative strategies, the evaluation of alternative strategies, or the selection of the best strategy (Rowe et al., 1989; Grant, 1987). A further seven of the models do not include at least one of these Strategic Analysis activities (Andrews, 1980; Ansoff, 1986; Boseman and Phatak, 1989; Below et al., 1987; Naylor, 1980; Pearce and Robinson, 1991; Hax and Majluf, 1984). Three of the models do not explicitly include any Strategic Implementation tasks (Ansoff, 1980; Porter, 1980,1985; Hofer and Schendel, 1978). Another three do not have an evaluation/monitoring performance task, within their Strategic Implementation phase (Johnson and Scholes, 1989; Rowe et al., 1989; Below et al., 1987).

As the SM process model summarises the central components of SM, it can potentially be used to provide a representative set of strategic tasks.

5.2.6 The Choice of SM Framework

Three of the options described above provide a mechanism for developing a set of basic strategic tasks: strategic planning cycle activities, Bower's strategic questions, and the normative SM process models. However, the tasks from the first two of these approaches are not expressed in a form which is suitable for tool matching purposes. Therefore, the normative SM process model was chosen to provide a framework of strategic tasks.

The SM process model approach has been used previously for tool evaluation purposes. Webster, Reif and Bracker (1989) used a simple seven step SP process model, in their profile of thirty Strategic Planning tools and techniques, to show which of the tools can contribute to each task. This approach was also used by Day (1986) to show the potential applications of five tools for a series of nine strategic tasks. Similarly, Dyson (1990) used this method in the concluding chapter of his book, to show the impact of fourteen tools on a six step Strategic Planning process model. The approach was also used in an exploratory literature analysis investigating the application of MS/OR tools in Strategic Planning (Clark, 1992).

5.3 The Strategic Management Process Framework

The framework of strategic tasks was developed by producing a SM process model structure and then expanding this to include the basic Organisational and Environmental elements of Strategic Management. First, the SM Process model structure will be outlined.

Second, the basic Organisational and Environmental elements which were included will be described. Finally, the complete SM framework will be presented.

5.3.1 The Strategic Management Process Model

While all of the SM process models attempt to capture the essence of Strategic Management, each one has its own emphasis and terminology. Attempting to decompose a series of different models and re-assembling all of the parts into one all-inclusive model is inappropriate because of the mixture of terminology that results. Therefore instead of an aggregate composite model, the basic activities were identified by synthesis. The basic strategic tasks involved in the SM process include the following:

1. Evaluation of current strategic position
2. Identification of strategic issues
3. Generation of strategic alternatives
4. Evaluation of strategic alternatives
5. Selection of a specific strategy
6. Development of detailed plans to achieve the strategy
7. Implementation of the strategic plans
8. Review/monitoring of strategic performance

These tasks can be subdivided into three groups of similar activities which gives a three phase SM Process model:

Phase 1: Situation Assessment

1. Evaluation of current strategic position
2. Identification of strategic issues

Phase 2: Strategic Analysis

3. Generation of strategic alternatives
4. Evaluation of strategic alternatives
5. Selection of a specific strategy

Phase 3: Strategic Implementation

6. Development of detailed plans to achieve the strategy
7. Implementation of the strategic plans
8. Review/monitoring of strategic performance

Each of these phases addresses one of the fundamental questions of Strategic Management.

Phase 1, Situation Assessment is concerned with finding out "Where are we now?"; Phase 2, Strategic Analysis, deals with "Where are we going?", and Phase 3, Strategic Implementation, focuses on "How do we get there?"

The Phase 1 Situation Assessment requires an evaluation of the internal Organisational resources and features, to be coupled with a review of the external Environmental influences. To allow for these Organisational and Environmental elements to be considered they need to be incorporated in the SM framework as Phase 1 tasks. These elements, which constitute the basic building blocks of Strategic Management, will be outlined in the next section. However, the Phase 2 and 3 tasks do not need to be adapted or expanded as they are already suitable for tool matching purposes.

5.3.2 The Basic Elements of Strategic Management

The basic elements of Strategic Management include the features of the organisation itself and its surrounding environmental influences. We will identify and describe the components within these two categories: Organisational and Environmental.

The Organisational elements include both the tangible and intangible components of the system. Wheelen and Hunger (1986) describe the internal Organisational features as the trio of Structure, Culture and Resources. Bower (1982) and Waterman (1982) also include top management's leadership Style in their set of components. Waterman, Peters and Phillips (1980) add Strategy to the essential Organisational elements. The Mission and Objectives of the organisation will also be included in this analysis (Hax and Majluf, 1984). Nine types of Resources have been identified (Wheelen and Hunger, 1986; Johnson and Scholes, 1989) including: Administrative Systems, Financial Resources, Human Resources, Information Systems, Intangible Resources, Marketing/Distribution, Production/Operations, Physical Resources, and Research and Development (Appendix XII). To do a complete evaluation of the strategic position of the organisation requires consideration of all of these elements.

The Environment includes all the external factors which influence the operations of the organisation directly or indirectly. It can be considered in two areas: (1) the factors in the immediate or Operating Environment (OE), and (2) the more general forces which have an impact on the organisation, known as the Remote Environment (RE).

The Operating Environment includes the Industry, Markets, Competitors, Customers, Suppliers and Stakeholders which affect, or are affected by, the major operations of the organisation. The Remote Environment includes the wider factors such as Economic trends, Govt/Political factors, Legal developments, Social trends, and Technological forces which may impact on the firms operations (Wheelen and Hunger, 1986; Johnson and Scholes, 1989) (Appendix XII). To understand the current strategic position it is also necessary to review the likely impact of all of these potential environmental influences.

Figure 5.1 summarises all of these basic Organisational and Environmental elements. The diagram illustrates the nested relationships between the Operating and Remote Environmental elements and the Organisational factors.

5.3.3 The Complete SM Framework

The complete SM framework now consists of 32 tasks in the form of an expanded three phase SM process model. Figure 5.2 summarises the complete framework of strategic tasks. Phase 1 Situation Assessment consists of evaluating the status of the organisation by considering the fifteen Organisational elements. Phase 1 also involves an Environmental analysis which includes evaluation of the six Operating Environmental elements and the five Remote Environmental influences. Phase 2 Strategic Analysis consists of three tasks; likewise, Phase 3 Strategic Implementation, also involves a set of three tasks.

Figure 5.1 SM Elements Model

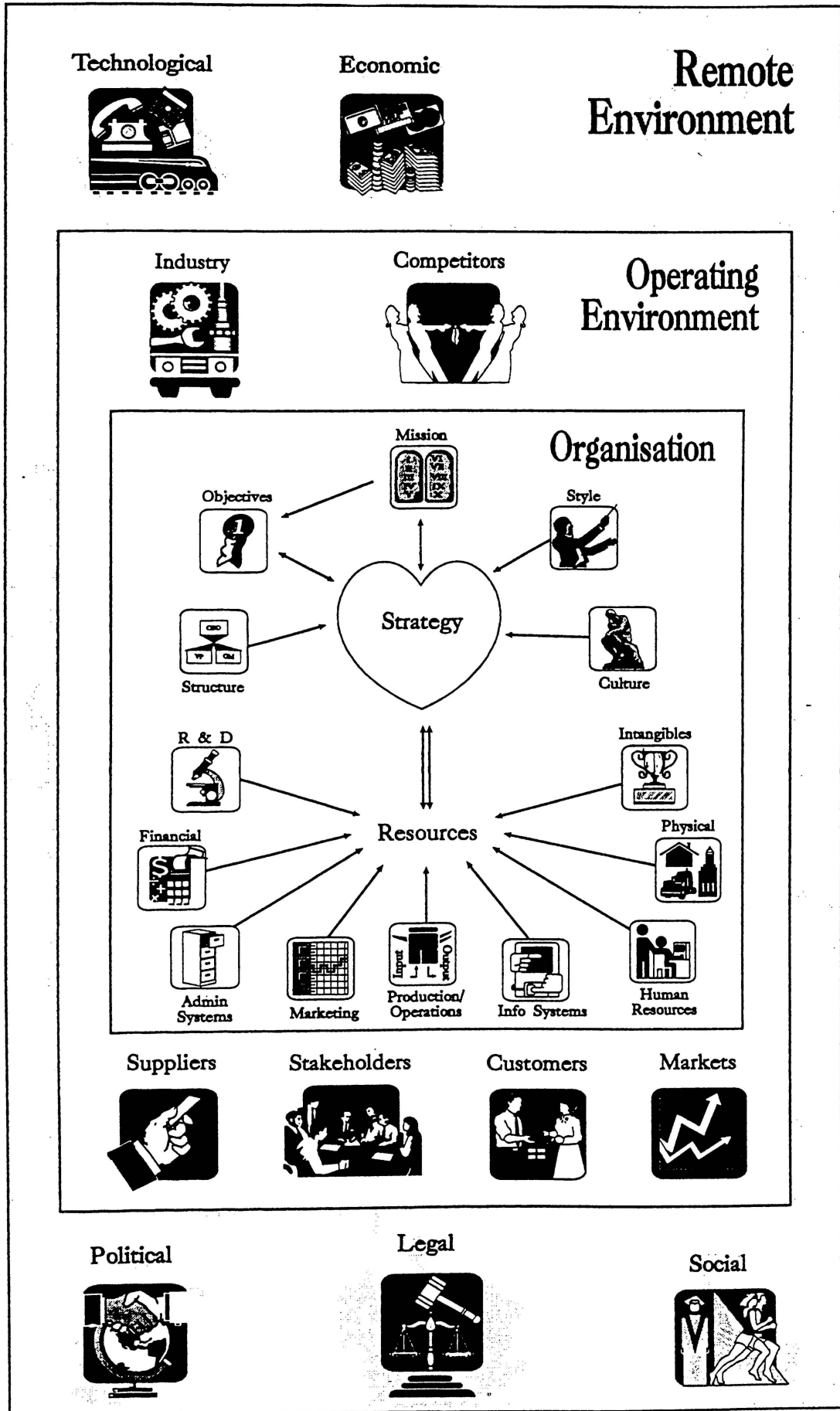
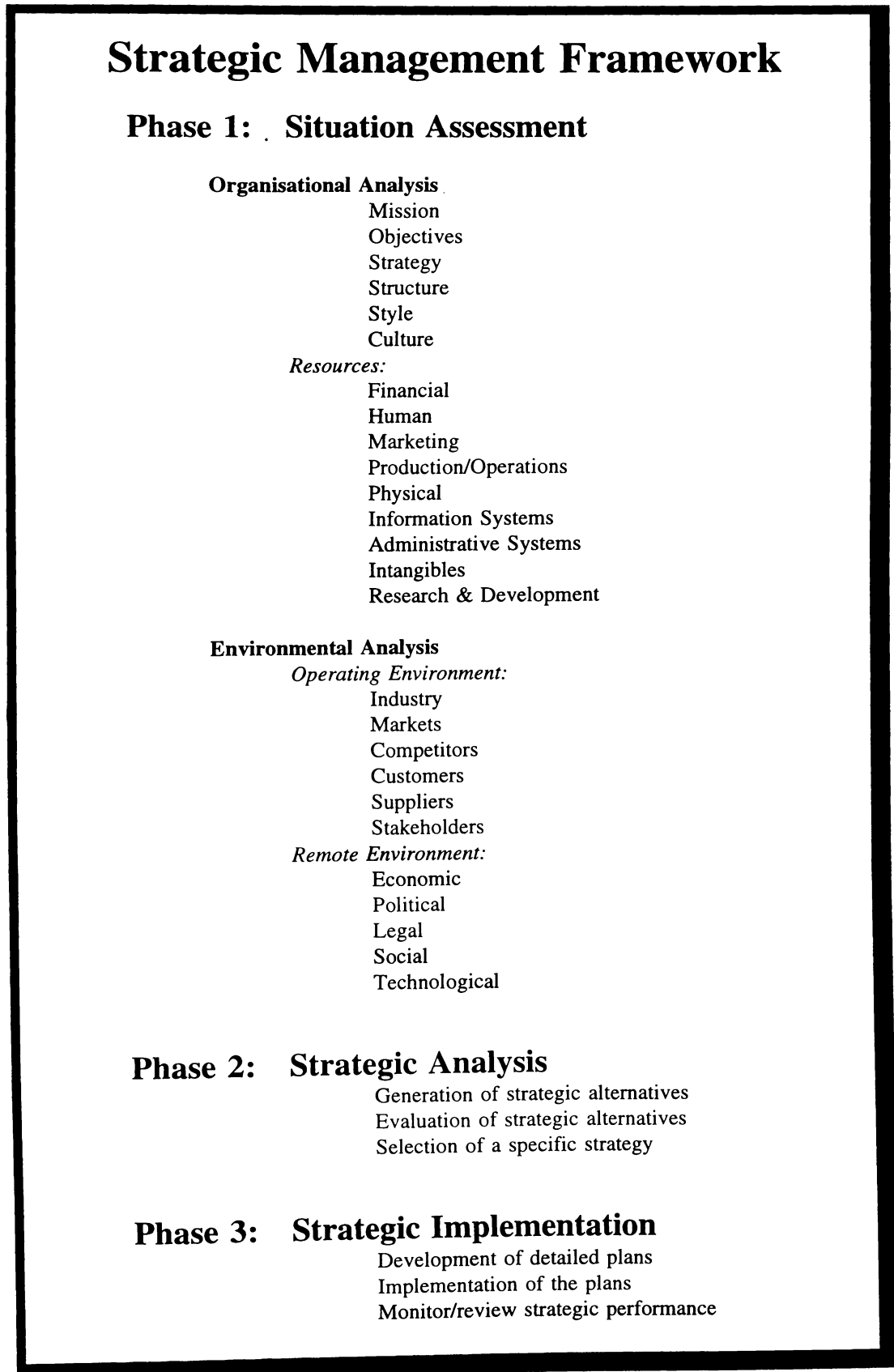


Figure 5.2 SM Framework



5.4 Evaluation of the SM Framework

Before using this SM Framework in the empirical studies both theoretical and operational

evaluations were performed. In this section, theoretical evaluations of samples of tools from both disciplines will be described, followed by a discussion of the operational testing.

A sample of sixty six Strategic Management tools was identified and evaluated in terms of their potential ability to assist with each of the strategic tasks (Clark, 1993). The results for this sample showed that the Strategic Analysis phase had the most tool support and the Strategic Implementation phase was comparatively weak. The specificity of the tools was confirmed by this analysis; this indicates the necessity to use multiple tools to cover all of the basic elements in a complete strategic review. Furthermore, it was found that many of the tools focus on the more easily quantifiable elements (e.g. Financial and Marketing Resources), yet the people and behavioural elements (e.g. Style and Culture) will have a major impact on successful Implementation of the strategy. The evaluation concluded that the SM framework does provide a workable structure for tool evaluation. The inclusion of the Organisational and Environmental elements within the Phase 1 Situation Assessment enables a much more detailed evaluation of the content incorporated by each tool than the previous SM process based tool comparisons (Prescott and Grant, 1988; Webster et al., 1989; Day, 1986; Dyson, 1990).

The SM framework was also used to evaluate a sample of forty tools from the MS/OR discipline (Clark and Scott, 1992). The cumulative results indicate that the major strategic contributions from these MS/OR tools appear in the evaluation of resources in Phase 1, in the evaluation of alternatives in Phase 2, and to support the development of action plans in Phase 3. The results for the individual tools can be presented as a Manager's Guide to assist with tool selection. Again, the SM framework provided a workable structure for evaluating and comparing these tools. This is an essential requirement for the MS/OR tool evaluation dimension of the research design.

To provide a structure for the empirical studies, the SM framework also needs to meet a series of operational criteria. The tasks need to be distinct categories which can be considered separately; they need to be expressed in familiar terminology which is recognisable to managers in both disciplines; and they need to provide sufficient information to represent the typical activities of SM in a relatively compact, yet complete, summary format. This framework of thirty two strategic tasks in three phases is composed of readily recognisable, distinct tasks which are expressed succinctly, in basic terminology, which will be familiar to any manager; the size of the framework appears to be

manageable; as the tasks cover the basic activities of the entire SM process it is complete; finally, the nature of the framework will enable sufficient details to be collected for tool usage comparisons to be made. The operational capabilities of the framework were examined in the pilot testing phase: specific information was sought from targeted SM practitioners and academics; this feedback provided independent confirmation of the SM framework by SM experts.

5.5 Conclusion

A SM process based approach was used to develop a framework of strategic tasks for this comparative tool evaluation project. The SM process approach ensures that the tasks are representative of the core SM activities. Furthermore, the approach has already been used by others within the SM discipline (Day, 1986; Webster et al., 1989; Dyson, 1990) which adds to the validity of the process and its acceptability. The SM framework was tested by performing theoretical evaluations of samples of tools from both the SM and MS/OR disciplines; it was able to provide a workable structure for both of these analyses. In addition, the completeness of the framework and its operational capabilities were examined and confirmed by SM experts in the pilot testing phase.

This SM framework of strategic tasks provides a structure for identifying the tools which are used for each task. It will also allow the tasks which are currently supported by tools to be determined, and thus to find out which areas are relatively under-represented. In this way, the SM framework provides a means of exploring tool usage theoretically and in practice. The linkage of tool usage with specific strategic tasks has not previously been reported. Therefore, examining tool capabilities from this new perspective will provide insights and increased understanding of what is currently available, and what is needed for the future.

Next, in chapter 6, the results from the empirical investigation of SM tool usage in which this SM framework has been used, will be presented.

Chapter 6 Strategic Management Tool Usage

6.1 Introduction

To identify the current status of tool usage in Strategic Management an empirical study was conducted. A normative SM framework based on the SM process model was used to provide a structure for the SM tool evaluation. A postal questionnaire was designed to collect quantitative evidence from SM practitioners in NZ and the UK; concurrently semi-structured interviews were conducted to provide qualitative explanatory data.

The results from these Strategic Management surveys will be described in this chapter. First, the results from the organisational and personal contextual variables will be discussed to set the scene. SM tool usage results for each of the SM process phases and tasks will be described in sections 6.2 and 6.3; and the levels of familiarity with a sample of thirty SM tools will be presented in section 6.5. The use of "new" SM tools will be considered next, followed by the nature of personal involvement in SM. In the penultimate section, deficiencies in the current SM toolkit will be proposed, and the chapter will conclude with a brief overview.

6.2 SM Tool User Information

In the SM surveys, 91.3% of the UKSM and 93.5% of the NZSM respondents indicated that they are involved with SM tool use. The results from these respondents are the focus of this chapter (see Appendix XIII for non tool user information). In this section, information on the organisational and personal backgrounds of the SM tool users will be presented and discussed. These background areas provide a rich source of contextual factors which will potentially influence SM tool usage.

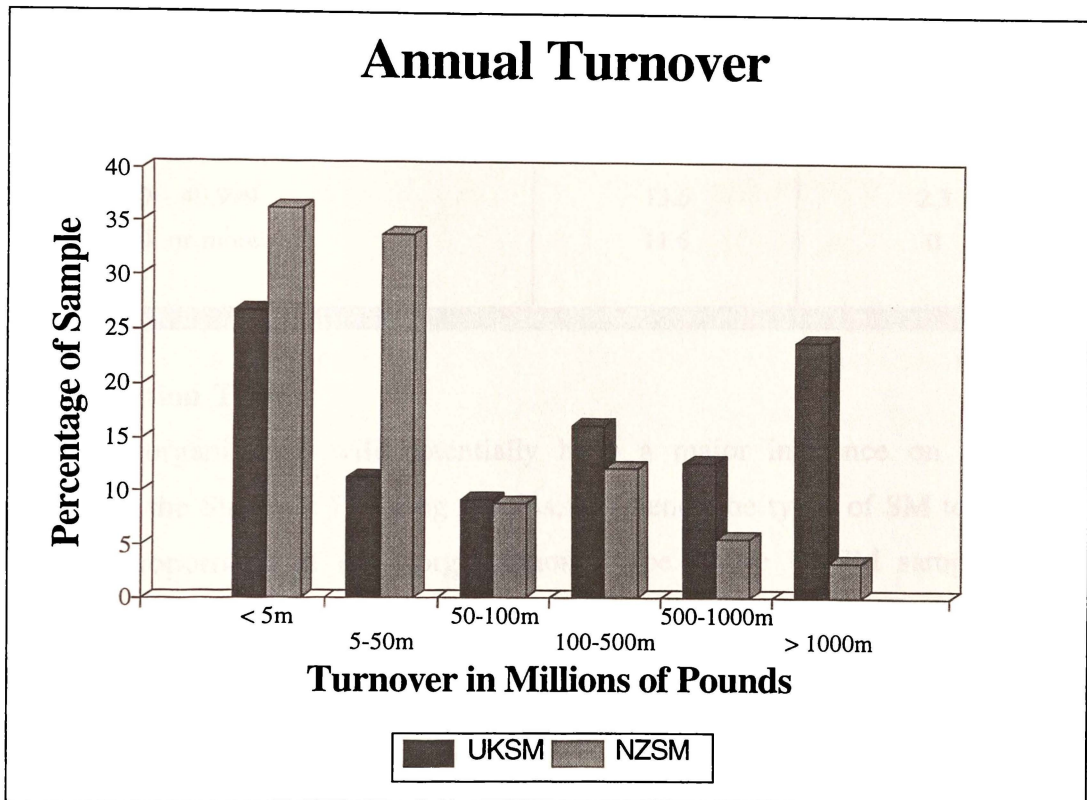
6.2.1 Organisational Backgrounds

The organisation provides not only the **context** for the application of SM tools, but also the subject matter or **content** for many of the SM tools. Therefore, it is important to consider some of the major organisational variables affecting the individual SM tool users who are the focus for the study and generated the results which will be described in this chapter. The size and types of organisations represented will be discussed; the main product or area of operation, and the presence of separate departments/groups will follow. Finally, the overall strategic position of the organisations will be considered.

A. Organisation Size

The size of the organisations represented by the SM tool users will be considered in terms of two of the conventional size measures: annual turnover and the number of employees. The approximate annual turnover is used as an indicator of financial magnitude. The turnover results for the UKSM and the NZSM samples, expressed in UK pounds, are summarised in Figure 6.1.

Figure 6.1 Annual Turnover



The distribution of organisations represented in the NZSM sample is positively skewed with 70% of the sample reporting turnover less than £UK 50 million. Although the mode for both countries is the smallest turnover category (< £UK 5 million), this is counterbalanced in the UKSM sample by 23% of the sample falling in the largest turnover category. The graph clearly demonstrates that more of the UKSM tool users are working in larger organisations (higher turnover) than their NZ counterparts. Conversely, more of the NZSM tool users are employed in smaller organisations indicated by lower turnover.

The number of employees provides another standard measure of organisation size. The number of employees in the UKSM and NZSM samples is summarised in Table 6.1. Here, the same pattern is evident in these results. Two thirds of the organisations represented in the survey employ less than 500 people in NZ, compared with 5000 in the

UK. While the modal category was the smallest for both samples (< 100 employees), one quarter of the UK organisations employ over 10,000 people. Clearly, the NZ sample contains more smaller organisations.

Table 6.1 Number of Employees

Number of Employees	UKSM %	NZSM %
Less than 100	29.3	35.2
100 - 499	10.2	32.0
500 - 999	10.2	8.6
1,000 - 4,999	19.7	17.2
5,000 - 9,999	5.4	4.7
10,000 - 49,999	13.6	2.3
50,000, or more	11.6	0

B. Organisation Type

The type of organisation will potentially have a major influence on the style and complexity of the Strategic Planning process, and hence the types of SM tools which are used. The proportions of each organisational type in the UKSM sample, ranked in descending order, are shown in Table 6.2; along with the corresponding NZSM sample proportions.

Table 6.2 Type of Organisation

Organisation Type	UKSM %	NZSM %
Listed company	39.5	18.1
Non-listed company	29.9	33.1
Other	7.5	7.9
Central government	6.8	14.2
Partnerships	5.4	11.8
State owned enterprise	4.1	9.4
Self employed/sole trader	4.1	3.1
Local government	2.7	2.4

The majority (69%) of the UKSM tool users are employed in Companies, with the majority of these, being Listed Companies. In the NZSM sample, 51% of the

organisations are Companies, with the majority being Unlisted Companies. As a consequence of the lower proportion of Listed Companies in the NZSM sample, the proportions of NZ tool users from Central Government, Partnerships and State Owned Enterprises are higher than in the UK sample.

C. Main Product/Area of Operation

To provide an indication of the range of industries represented in the samples, the main product or area of operation of the organisations was identified. The results show that the SM tool users are widely spread throughout public and private sectors including both manufacturing and service industries. The top five categories in the UKSM sample were: Consultancy (28.0%), Finance/Banking/Insurance (14.0%), Manufacturing/Engineering (13.3%), Energy (7.7%), and Welfare Services (7.7%). In the NZSM sample, the top five categories were: Consultancy (34.1%), Other (13.5%), Finance/Banking/Insurance (10.3%), Manufacturing/Engineering (9.5%), and Energy and Business Services (both 6.3%). The top categories in both samples are similar, although more NZ respondents selected the "other" option. Both samples of SM tool users are dominated by the Consultancy profession.

D. Size of MS/OR and SP Groups

The existence of specialist groups or departments working in the areas of MS/OR and SP, and, if present, the size of these groups, was also investigated to identify the status of current practices. The roles of individuals working in these specialist groups, especially in relation to SM tool use, was explored in the SM interviews (see Section 6.7). The proportions of the UKSM and NZSM organisations which have separate groups or departments for MS/OR, Corporate SP, or another SP group, and the mean sizes of these groups, are shown in Table 6.3.

Table 6.3 Size of MS/OR and SP Groups

Groups	UKSM		NZSM	
	Yes %	Mean	Yes %	Mean
MS/OR Group	21.8	18.9	14.7	10.8
Corporate SP Group	51.4	8.0	37.3	5.9
Another SP Group	30.1	18.4	16.0	6.5

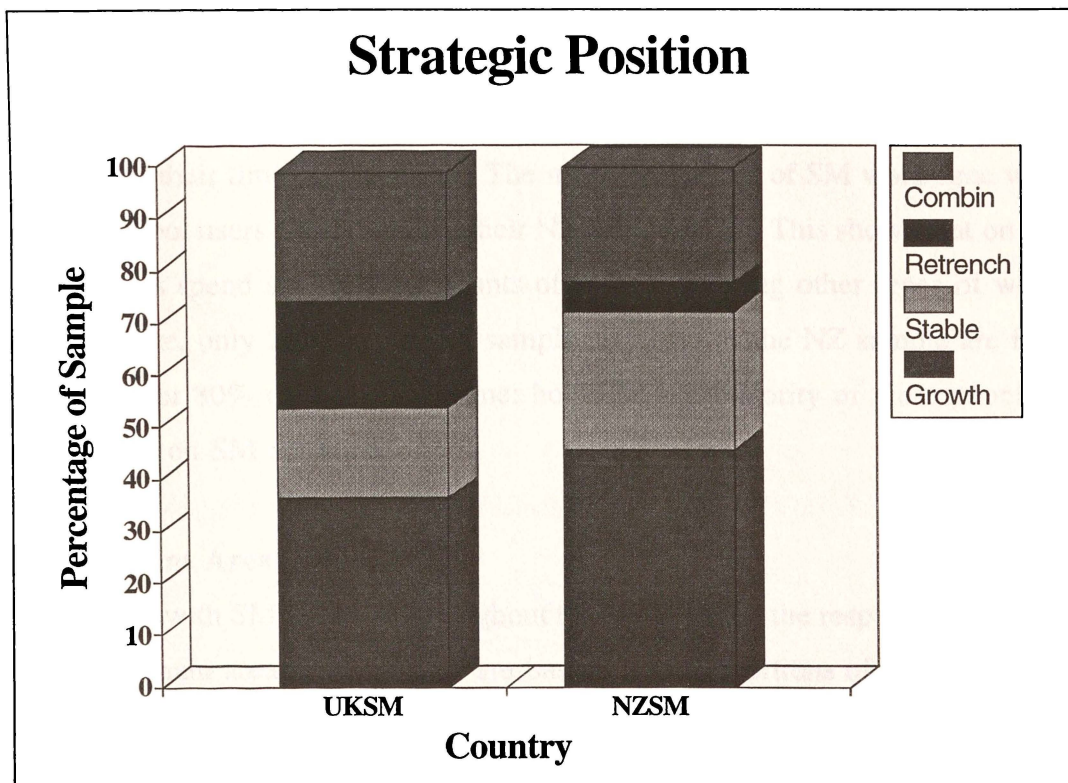
The UKSM sample has more organisations with each of the three types of groups and the

groups are larger on average than their NZ counterparts. Just over half of the UKSM tool users work in organisations with a separate Corporate Strategic Planning group, and 30% have another SP group (in addition to the Corporate group); for the NZSM sample, these SP groups are present in 14% fewer organisations. The Corporate SP groups are on average smaller than the other specialist groups in both countries. The average numbers of people who are primarily employed to do Strategic Planning/Management was 9.5 in the UKSM sample and 4.2 in the NZSM sample. These averages are low when compared with the SP group mean sizes, but they include all of the organisations in the survey, rather than just the subset of organisations with groups.

E. Strategic Position

The overall strategic position of the organisation will potentially influence its approach to SM and hence the types of tools which will be used. To investigate the perceived strategic position of the organisations, Glueck's (1980) four overall strategies were used: Growth, Stability, Retrenchment and Combination. Figure 6.2 shows the proportions of the organisations from both the UKSM and the NZSM samples which are perceived to reflect each of these overall strategic positions.

Figure 6.2 Strategic Position



The modal category for both samples is Growth; with Stability in second position for the

NZSM sample and the Combination strategy second in the UK. While the NZ results seem very positive, the UK sample has a significant proportion of organisations following a Retrenchment strategy. Given the higher proportion of larger organisations in the UK, this strategy may lead to survival of a 'leaner' organisation rather than extinction.

6.2.2 Personal Information

While the organisation provides the context and content for the application of SM tools, the capabilities and preferences of the individual practitioners will also potentially have a major influence on SM tool usage. The SM process is designed and facilitated by people working individually and in teams/groups. In this section some of the major personal factors will be explored including SM work time allocation, management area and time in the current position. Analytical roles, training sources, years of SM work experience, information sources, and educational and professional qualifications will also be discussed. Finally, personal strategic performance ratings and basic demographic statistics will be considered.

A. SM Work Time Allocation

The level of personal involvement with SM will have a major impact on the nature and extent of SM tool usage. The percentage of work time spent on SM activities for the UKSM and NZSM tool users is shown in Figure 6.3.

The graph shows that 31% of the UKSM sample and 43% of the NZSM sample spend 20%, or less, of their time on SM work. The mean proportion of SM work time was 48% for the UKSM tool users and 36.5% for their NZ counterparts. This shows that on average SM practitioners spend significant amounts of their time doing other types of work. At the other extreme, only 20% of the UK sample and 10% of the NZ sample are involved with SM for over 80% of their work time; however, the majority of these people spend all of their time on SM activities.

B. Management Area

As involvement with SM is spread throughout the organisation the respondents were asked to indicate the main area in which they are based. The proportions of the UKSM sample in each of the management areas, ranked in descending order, are shown in Table 6.4. The corresponding proportion for each area from the NZSM sample is also listed. (This question was adapted from the Carter survey of the UK OR Society).

Figure 6.3 SM Work Time Allocation

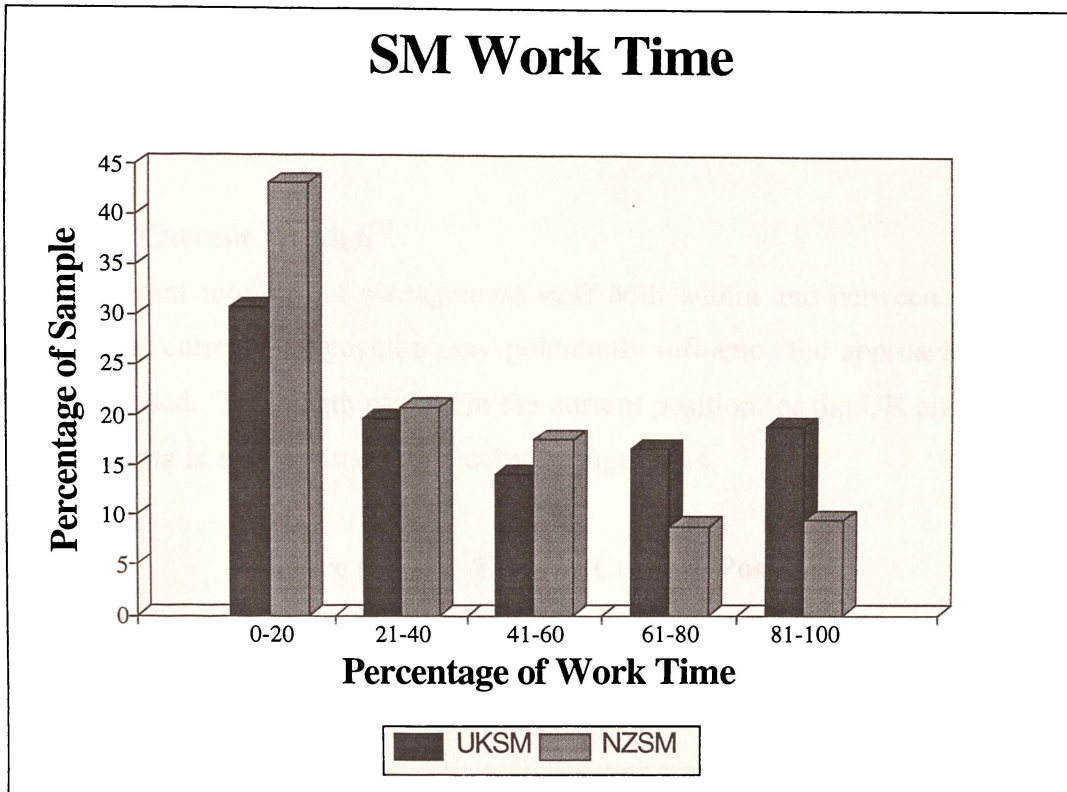


Table 6.4 Management Area

Area	UKSM %	NZSM %
Senior Management	42.5	57.1
Strategic Planning Group	30.1	11.1
Management Services, Consulting	12.3	13.5
Functional Department	8.2	7.9
Research and Development Group	3.4	1.6
Information Systems, Computing	1.4	2.4
MS/OR Management	1.4	0.8
Other	0.7	4.8
MS/OR Department or Service	0	0.8

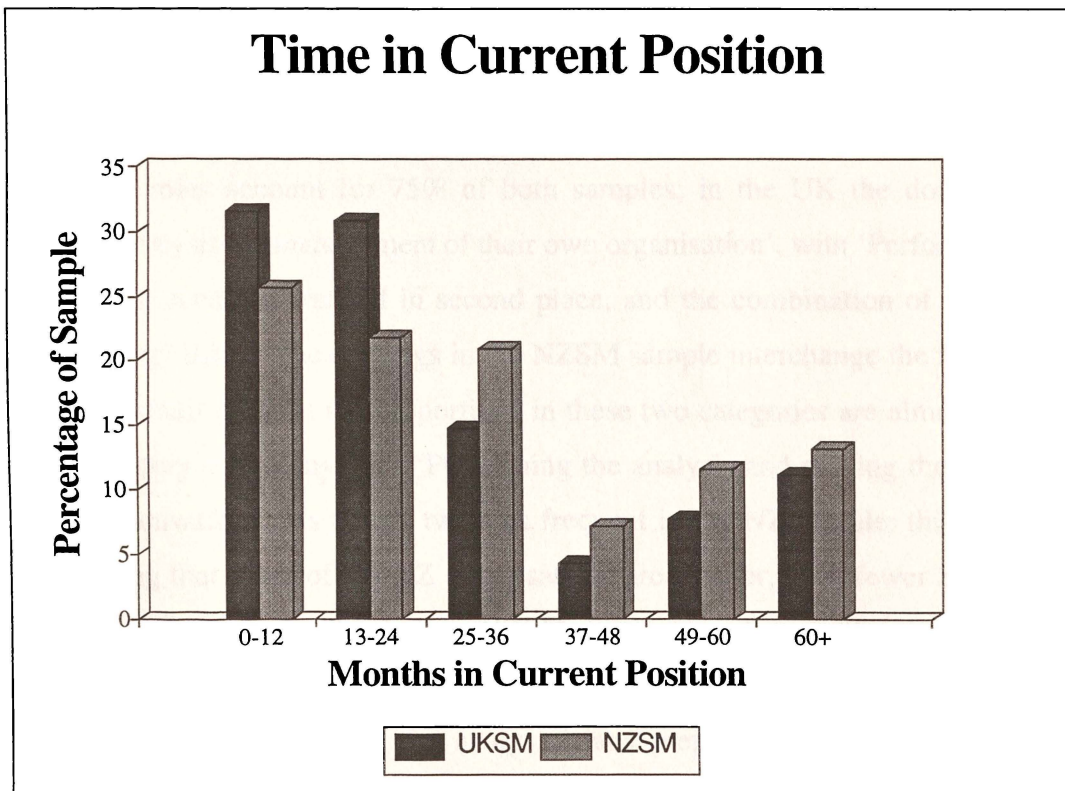
For both of these samples, over 80% of the SM tool users are based in the same three management areas: Senior Management, Strategic Planning Group, or Management Services/Consulting. Senior Management is the top area represented in both of the surveys. The UKSM sample has a much higher proportion of respondents working in Strategic Planning groups; this is consistent with the earlier finding that these groups are more abundant in the UK organisations sampled. Likewise the comparatively high

Management Services/Consulting area rating reflects the incidence of Consultancy organisations in the samples. While there is no universal job title or designation for SM tool users, these results show that most of these people are clustered in a few management areas.

C. Time in Current Position

Given the current mobility of management staff both within and between organisations, the time in the current SM position may potentially influence the approach adopted and the SM tools used. The length of time in the current position for the UK and NZ SM tool user respondents is summarised graphically in Figure 6.4.

Figure 6.4 Time in Current Position



The results show that the majority of the SM tool users in both countries have held their current positions for 24 months, or less; 62% in the UK and 47% of the NZ sample. At the other extreme, only 20% of the UK sample and 25% of the NZ sample, have been in the same position for over four years. In general, more of the UK sample have spent shorter periods in their current position than their NZ counterparts.

D. Analytical Roles

To investigate the type of SM involvement, respondents to the questionnaires were asked

to indicate the main role that they perform in their current position, from a set of primarily analytical options. Table 6.5 summarises the proportions of the UKSM and NZSM samples that are involved with each of these SM roles.

Table 6.5 Main Analytical Role

Role	UKSM	NZSM
Analysis for own organisation	41.1	26.4
Analysis for other outside organisations	22.6	27.2
Analysis and decision making for your own organisation	11.6	21.6
Making decisions using analysis/plans prepared by others	8.2	13.6
Overall management responsibility	6.2	1.6
Other roles	4.1	2.4
Co-ordinating plan developments	4.1	1.6
Analysing the plans and implementing them	2.1	0

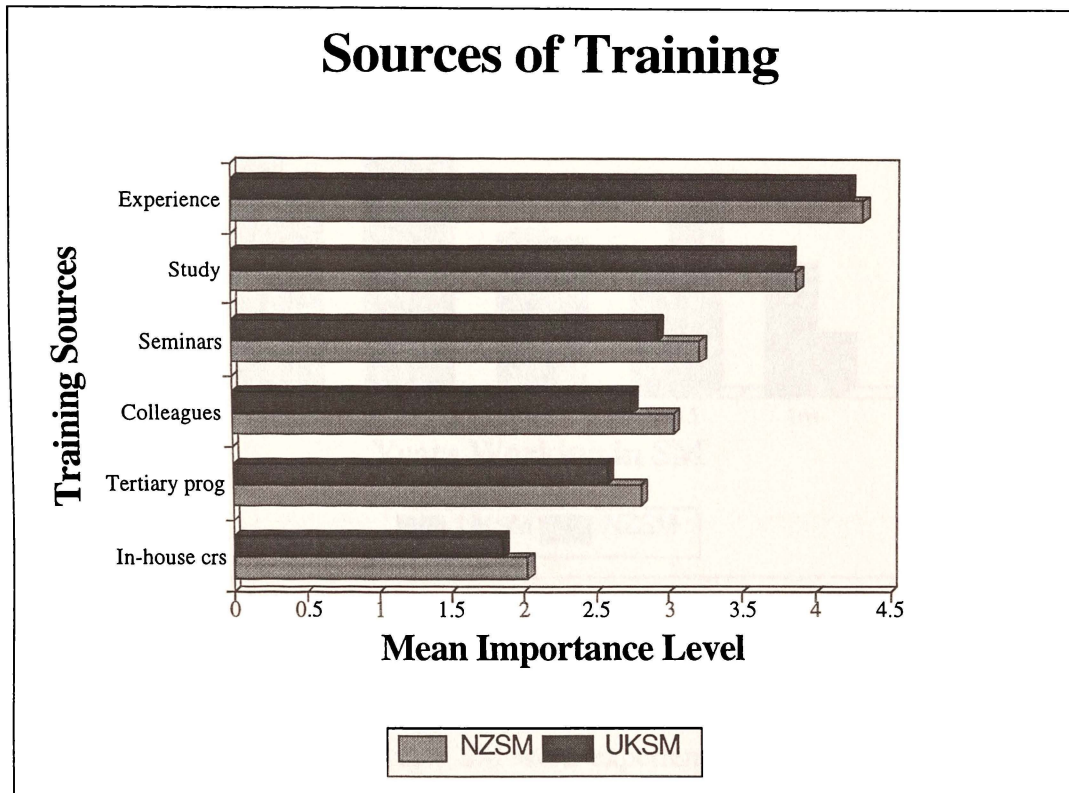
The top three roles account for 75% of both samples; in the UK the dominant role is 'Performing analysis for management of their own organisation', with 'Performing analysis for outside organisations' ranked in second place, and the combination of 'Analysis and decision making' third. The rankings in the NZSM sample interchange the first two roles, but by a very small margin; the proportions in these two categories are almost equivalent. The third category which involves 'Performing the analysis and making the decisions for your own organisation' was nearly twice as frequent in the NZ sample; this is consistent with the finding that more of the NZ organisations are smaller, have fewer SP groups and less staff involved in SM. The higher NZSM proportion of senior level management is also reflected in the higher incidence in the NZ sample, of respondents who are involved in 'Making the decisions using the analysis/plans prepared by others'. The 'Overall management responsibility for the business' and 'Co-ordinating plan developments' were identified from the responses in the 'Other' category, which occurred frequently enough to warrant individual mention. The 'Analysis and implementation' option was recommended in the pilot testing by a SM consultant, yet this does not appear to be an important role for either sample.

E. Training Sources

As SM positions are generally senior level appointments the perceived importance of a set of training sources was investigated. Respondents indicated the level of importance of

each source for their current position on a horizontal numerical scale from 1 (not important) to 5 (extremely important). The mean values for each training source for both the UKSM and NZSM samples are presented in a profile chart format in Figure 6.5.

Figure 6.5 Sources of Training

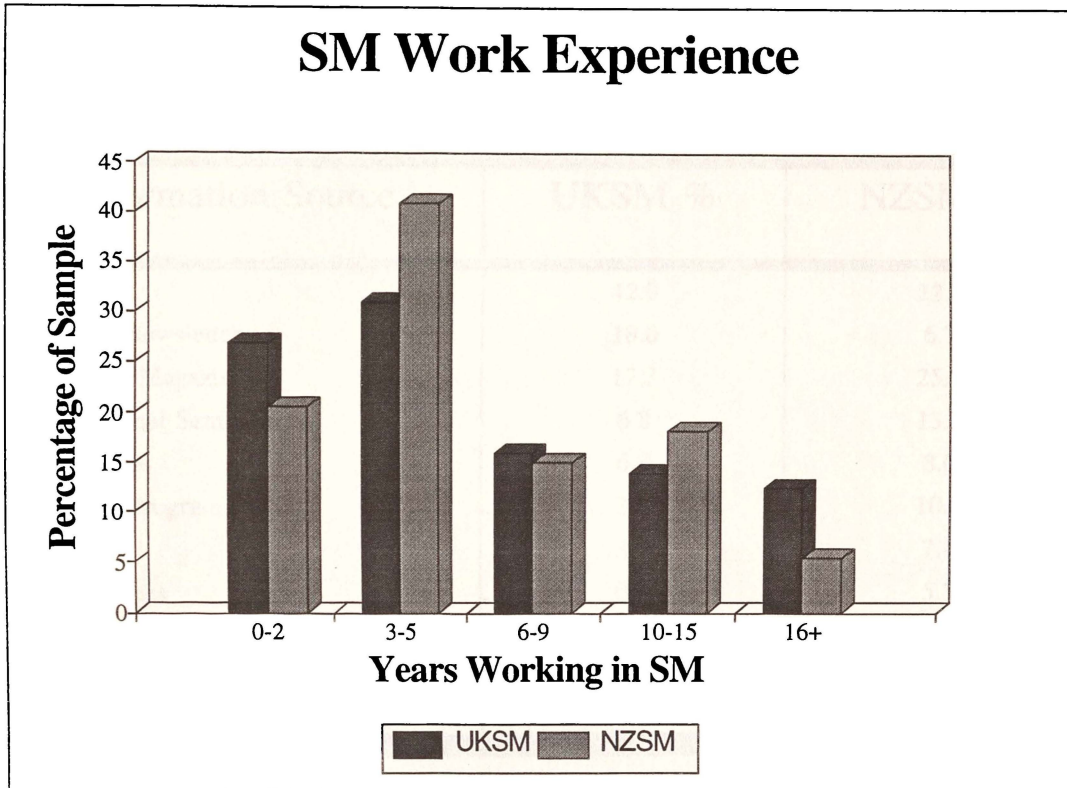


The training sources have been ranked in descending order of their mean values. This layout shows that all six sources have been ranked in the same order by both samples, and all of the sources have higher mean values in the NZSM sample. Accumulated Experience and Self Initiated Study are the two most important sources for both samples. Professional Seminars and Coaching by Colleagues have mean values over three in the NZSM sample, so they are rated as "Moderately Important". On average Tertiary Programmes are perceived to make some contribution, but In-house courses are not an important source of training for the majority of the SM respondents from both countries.

F. SM Work Experience

Experience provides a foundation of knowledge, understanding and skills on which to build and develop. Thus, expertise in SM develops over time, and this will potentially influence the SM tools which are adopted and applied. The number of years SM work experience for the UKSM and NZSM samples is shown in Figure 6.6.

Figure 6.6 SM Work Experience



The majority of the SM tool users in both countries have worked in SM for 5 years, or less; 61% in the NZ sample and 58% of the UK sample. Half of these in NZ and one third in the UK, have only two years SM work experience. At the other end of the time scale, 13% of the NZSM tool users and 17% of the UKSM sample have been involved in SM for ten, or more, years. In general, the differences between the SM work experience in the two samples vary, rather than forming a specific or dominant pattern.

G. Sources of Information

The concepts and tools of SM are continually evolving and developing, partially in response to the dynamic global environment. This creates pressures to keep up to date with new developments in the discipline. The sources of information on new SM developments were investigated by requesting respondents to indicate their main information source. Table 6.6 shows the results from both SM samples ranked in descending order by the UKSM sample proportions.

The rankings and the proportions are quite different for this factor. In the UKSM sample, the top three information sources account for 78% of the sample, with Journals serving as the dominant source. The *Long Range Planning* journal, published by the Strategic Planning Society and the European Strategic Planning Federation, is assumed to be a major

contributor to this result as all of the UK Society members receive copies as part of their membership.

Table 6.6 Main Information Source

Information Source	UKSM %	NZSM %
Journals	42.9	22.1
Society Newsletters	18.0	6.7
Business Magazines	17.3	25.7
Professional Seminars	6.8	13.3
Colleagues	6.8	8.0
Tertiary Programmes	3.8	10.6
Other	3.0	7.1
Conferences	0.8	5.3
Newspapers	0.8	0
In-house courses	0	0.9

The top three information sources in the NZSM sample, which include Business Magazines, Journals and Professional Seminars, account for 61% of the sample. Apart from Society Newsletters, all of the other information sources were important for higher proportions of the NZSM sample. The NZ Strategic Management Society does not produce a Journal (although a Journal proposal is currently under review), and their newsletters are brief; however, their Seminar Programme serves a key dissemination role. Tertiary Programmes also have a more important role in the NZ than in the UK.

H. Educational and Professional Qualifications

Information was also collected on the educational and professional qualifications of the SM tool users. The respondents had tertiary educational qualifications in a wide range of disciplines including Architecture, Education, Economics and Engineering. The top 4 educational areas in the UKSM sample were: Management/Business Studies (42%), Humanities/Arts/Languages (16%), Science (16%) and Mathematics/Statistics (15%). In the NZSM sample the top areas were: Management/Business Studies (46%), Accounting/Finance (27%), Humanities/Arts/Languages (17%), and Engineering, Mathematics/Statistics, Social Science (all 14%). The highest level of educational qualification attained by the SM tool users is summarised in Table 6.7 for both samples.

There are two major differences between the highest educational qualifications of the SM

tool users in the two samples: the UKSM sample has a significantly higher proportion of MBA graduates and the NZSM sample has a very high proportion at First degree level.

Table 6.7 Highest Educational Qualifications

Qualification	UKSM %	NZSM %
Diploma	4.8	5.5
First Degree	26.0	47.2
Masters	19.2	19.7
MBA	34.9	16.5
Doctorate	9.6	6.3
Other	5.5	4.7

In addition, the respondents hold a wide range of professional qualifications. The two dominant professional categories in the UK sample included Management/Business Studies (29%) and Accounting/Finance (25%). In the NZSM sample, there were four areas of professional training which featured; these included Management/Business Studies (25%), Accounting/Finance (22.5%), Engineering (11.6%) and Education (8.5%).

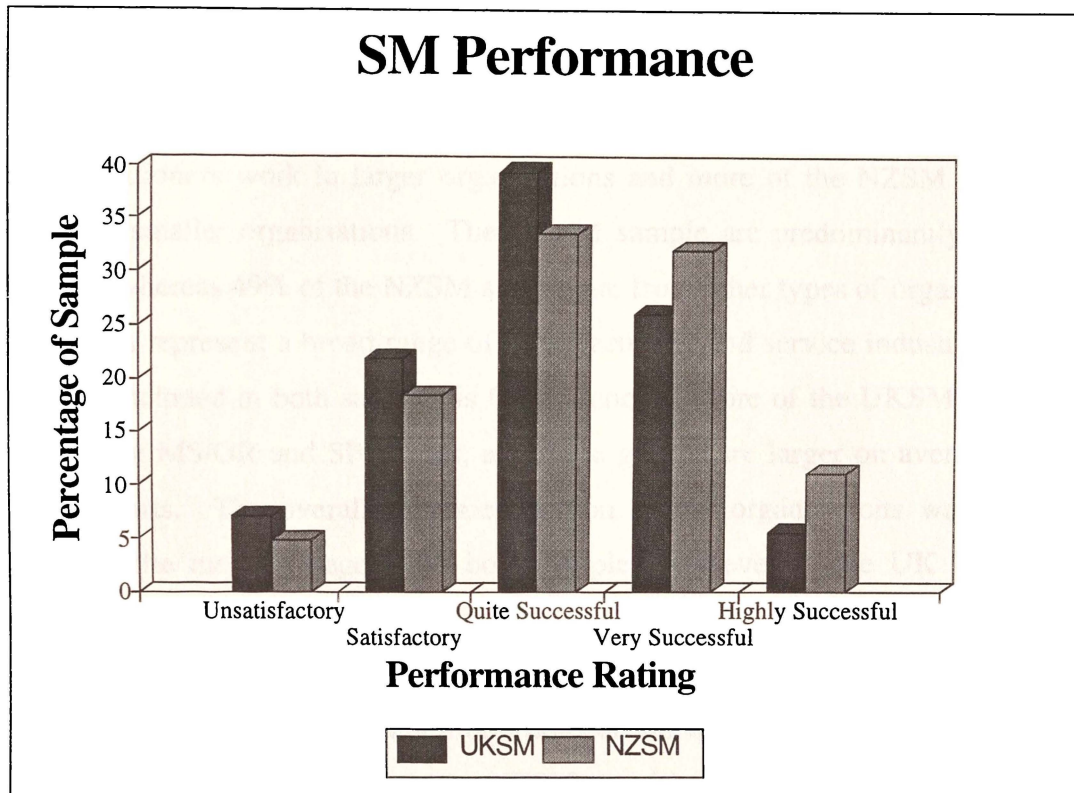
I. Strategic Performance Rating

There is no standard measure of the effectiveness of SM performance. The simplest approach is to examine output measures of financial performance. However, there are also process based approaches for evaluating the effectiveness of the planning systems and staff, or the achievement of strategic objectives. Comparative approaches, within and across, sectors and industries, are also applicable as SM performance measures. As all of these approaches require specific detailed information it was not possible to include this topic in this research. Nevertheless, to provide some indication of the participants SM performance, respondents were asked to indicate the successfulness of their SM efforts. The perceived SM performance ratings for both SM samples are shown in Figure 6.7.

The modal category for both samples is the "Quite Successful" rating. The UKSM results resemble a normal distribution with low proportions of the sample rating their performance in the extreme categories (Unsatisfactory, Highly Successful). The NZSM results show a negative skew, which means that higher proportions of the sample rate their SM performance in the higher performance categories. Data is not available to compare these personally perceived performance ratings with organisational expectations or external

measures. Are the SM tool users in NZ actually more effective or do they just have a more positive outlook?

Figure 6.7 Strategic Performance Rating



J. Demographic Statistics

Primarily for comparative purposes, basic demographic statistics on age and sex were collected; these are summarised in Table 6.8.

Table 6.8 Sample Demographics

	UKSM %	NZSM %
Age:		
Under 30	13.0	6.2
30 - 39	36.3	38.8
40 - 49	30.1	41.9
50 - 59	14.4	11.6
60, plus	6.2	1.6
Sex:		
Female	12.9	14.7
Male	87.1	85.3

The UKSM sample has more younger (under 30) and more older (over 60) respondents than the NZSM sample. However, the NZSM sample has a higher proportion in the 40-49 age bracket. The male/female proportions are approximately the same in both samples.

6.2.3 Overview

The SM tool users represent a wide range of organisation sizes and types; more of the UKSM practitioners work in larger organisations and more of the NZSM tool users are employed in smaller organisations. The UKSM sample are predominantly employed in Companies, whereas 49% of the NZSM sample are from other types of organisations. The SM tool users represent a broad range of manufacturing and service industries; the single largest area included in both samples is Consultancy. More of the UKSM organisations have specialist MS/OR and SP groups, and these groups are larger on average than their NZ counterparts. The overall strategic position of the organisations was considered; Growth was the modal category for both samples, however in the UK Retrenchment featured quite strongly.

The SM tool users spend significant proportions of the work time on other types of work; only 20% of the UKSM and 10% of the NZSM practitioners have more than 80% of their time for SM tasks. Most of the SM tool users are based in three management areas: Senior Management, Strategic Planning or Management Services/Consulting; with Senior Management as the dominant area. Most of the practitioners are primarily performing analysis for their own or outside organisations. The mobility of management staff/positions was demonstrated in both countries as the majority of the SM tool users have held their current positions for 24 months, or less. Similarly, many of the SM respondents have limited SM work experience having been employed in SM for 5 years or less. However, the SM tool users rated their personal strategic performance efforts as "Quite Successful".

The most important sources of training for the SM tool users in both samples were Accumulated Experience and Self Initiated Study. However, the top three sources of information on new developments differ in the two countries: Journals, Society Newsletters, and Business Magazines account for 78% in the UKSM sample; while in the NZSM sample, Business Magazines, Journals and Professional Seminars were the main sources of information for 61% of the sample.

The SM tool users hold a wide range of educational and professional qualifications. A higher proportion of MBAs in the UK sample and more Accounting/Finance tertiary qualifications in NZ. As far as the demographic statistics are concerned, 80% of the NZSM sample are in the 30-49 age bracket, compared with 66% in the UK; the UKSM sample has higher proportions of younger (< 30) and older (60+) SM tool users. The majority of the SM respondents were males: 87% in the UKSM and 85% in the NZSM sample.

A descriptive summary of the key factors from the organisational context and personal backgrounds of the SM tool user respondents from the UKSM and NZSM surveys has been presented and discussed. Comparisons have been made between the two samples to identify similarities and specific differences between them. The key results from these SM tool users will be outlined in the remaining sections of this chapter; starting with the tool usage results for the SM process tasks.

6.3 Strategic Management Process Results

The SM process model provides a set of core strategic tasks. This SM framework was used to collect information on tool usage in the postal questionnaire. Within each of the three phases, respondents were asked to indicate a "yes" response for all of the task areas in which they use tools; these respondents are referred to as the tool users. Space was also provided to list the names of the specific tools being used in each area.

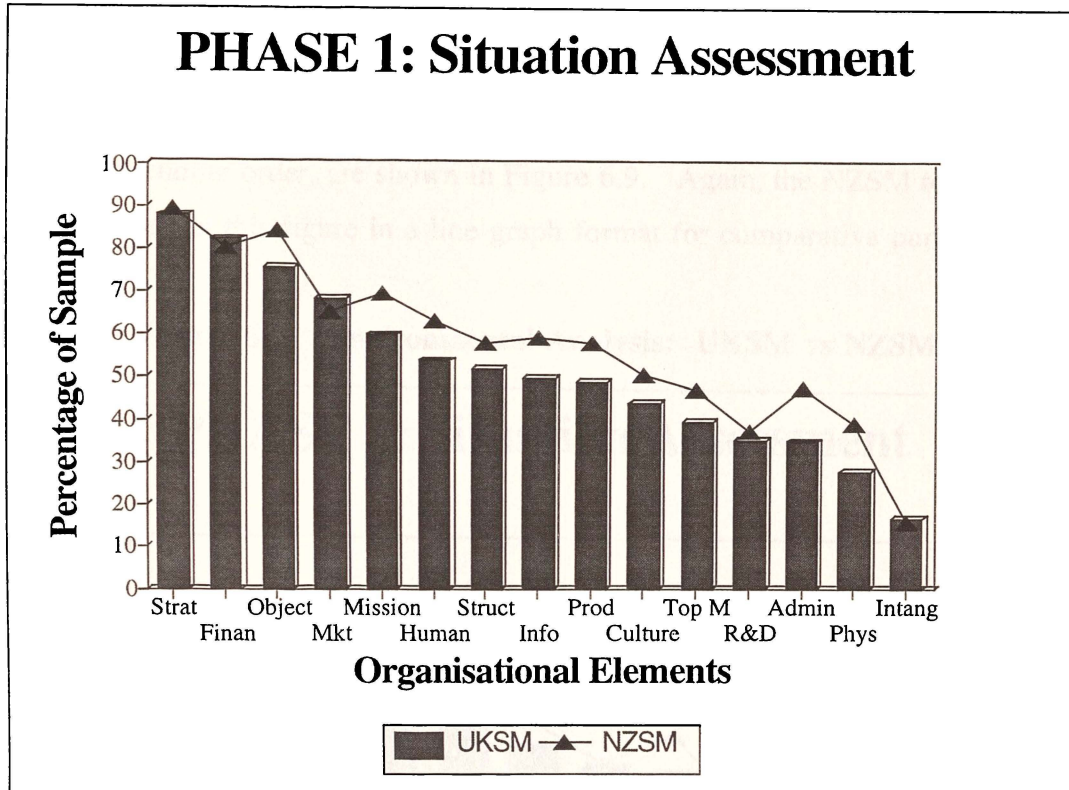
6.3.1 Phase 1: Situation Assessment

Phase 1 involves an evaluation of the current strategic position of the organisation and the identification of strategic issues. This is operationalised by reviewing fifteen internal Organisational areas and eleven external Environmental influences. The use of tools to support the review of these areas was investigated. First, the results from the Organisational Analysis will be presented, followed by the Environmental Analysis findings.

A. Organisational Analysis

The percentage of the UKSM sample who indicated that they use tools for each of the fifteen Organisational areas are shown in Figure 6.8. The Organisational elements have been sorted in descending order by the proportion of the UKSM tool users. The NZSM results are also included in this figure in a line graph format to facilitate comparisons.

Figure 6.8 Organisational Analysis: UKSM vs NZSM



First, the results show that all of these tasks are being supported by tools. Second, the level of tool support for each of the tasks is very similar in both countries. The top five areas include three of the core strategic tasks of evaluating Strategy, Objectives and the Mission of the organisation, and two other major areas, namely Financial Resources and the Marketing/Distribution area. At least 60% of both of these samples are involved with these top five areas. At the other extreme only about 16% of both samples indicate the use of tools to evaluate Intangible Resources.

Although the proportion of NZ tool users for twelve of these areas is higher than the UK proportion, the differences are comparatively small. This was confirmed by a chi square statistical test which found no significant differences at the .05 level (Appendix XIV). The mean number of organisational areas for the NZSM sample was 7.9 with a mode of 7. The UKSM mean was slightly lower at 6.9 task areas, and the mode of 4 is much lower than the NZSM sample. Five individuals in the NZSM sample and one from the UKSM reported using tools for all fifteen of these areas.

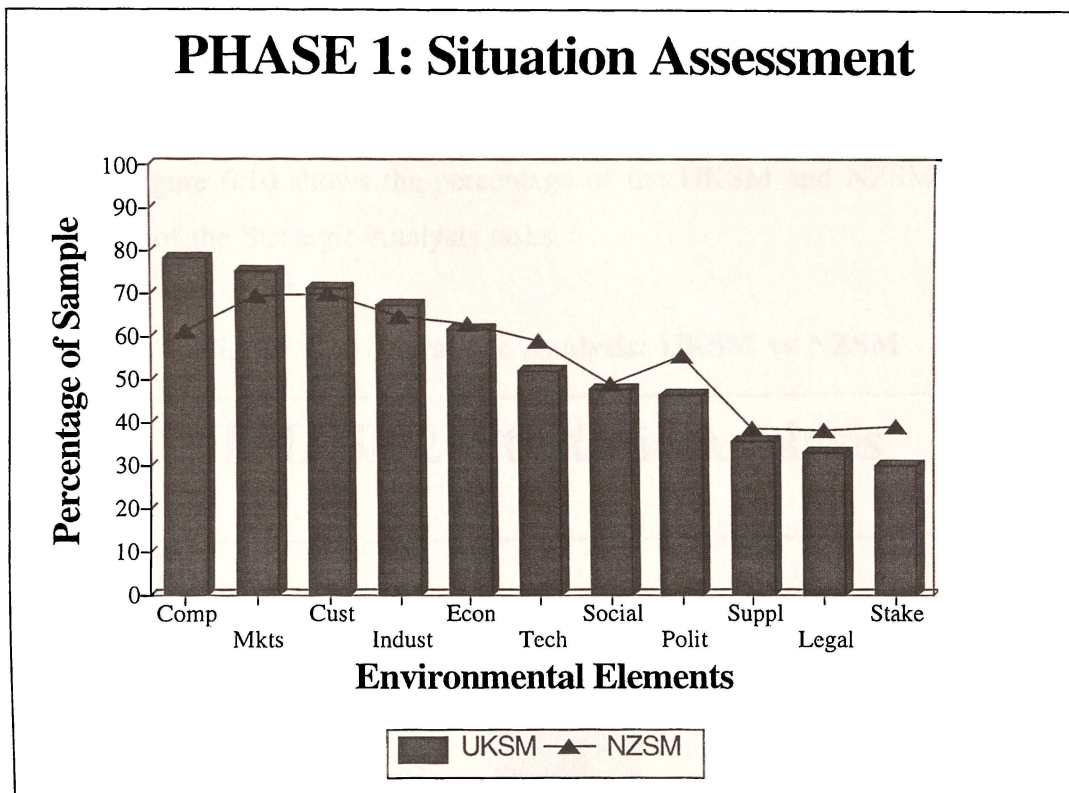
The close similarity of tool use for all of these organisational areas in both countries is an interesting finding. The actual tools which are being used for each of these activities will

be reported in section 6.4.

B. Environmental Analysis

The percentage of the UKSM sample using tools for each of the Environmental areas, ranked in descending order, are shown in Figure 6.9. Again, the NZSM tool user results are also included in this figure in a line graph format for comparative purposes.

Figure 6.9 Environmental Analysis: UKSM vs NZSM



Tools are being used to evaluate each of these Environmental influences. As with the Organisational areas above, the level of involvement in both countries is very similar. Evaluating Competitors was the only area where the results were significantly different (at 0.01%); a higher proportion of the UKSM sample were using tools for this task.

The top three environmental areas for the UKSM sample are: evaluating Competitors, Markets, and Customers; and for the NZSM the top three are Customers, Markets and the Industry. The top five areas in both samples are all above the 60% level. The same three areas were at the lower levels of tool usage for both countries: evaluating Stakeholders, Suppliers and Legal developments were between 33-39% level.

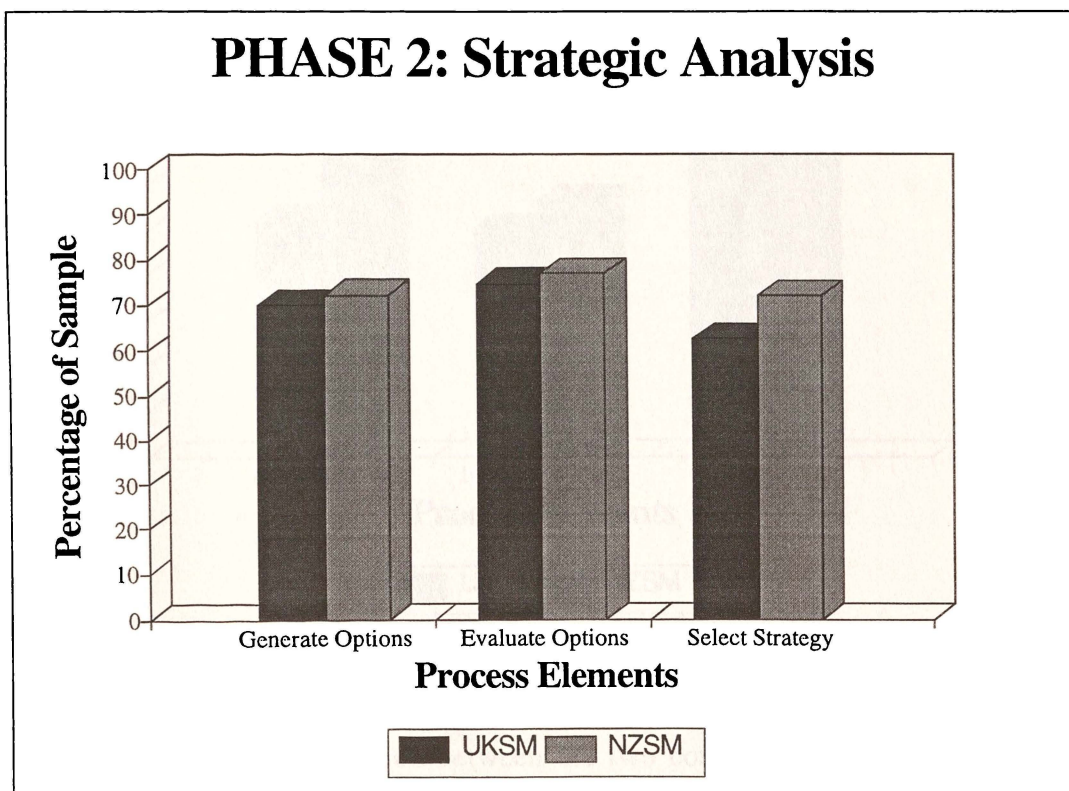
The mean number of these Operating Environment areas is very close for both samples:

3.3 for the UKSM, and 3.2 in the NZSM sample. Similarly, the mean Remote Environmental tool use values are similar: 2.1 for the UKSM and 2.4 in the NZSM sample. Significant proportions were found at both ends of the Environmental tool involvement range. In the Operating Environmental area, the modal value of these tasks was 4 for the UKSM sample and 6 for the NZSM sample. As for the Remote Environmental tasks, the UKSM mode was 0, however 19% of the sample were involved with all five activities. The same pattern was exhibited in the NZSM sample with a mode of 0 and 22.5% of the sample involved with all five tasks.

6.3.2 Phase 2: Strategic Analysis

Phase 2 involves three key Strategic Analysis tasks to identify/select the best strategy for the future. Figure 6.10 shows the percentage of the UKSM and NZSM samples using tools for each of the Strategic Analysis tasks.

Figure 6.10 Strategic Analysis: UKSM vs NZSM



The same pattern of similar results between the two countries has been found; no statistically significant differences were observed. For these tasks the proportions are all high; the lowest value was 62.5% for the UKSM select strategy task and the remaining five results were all over 70%. Evaluating Strategies is the top task by a small margin of 4%. These high proportions signal that these tasks are supported by tools by the majority

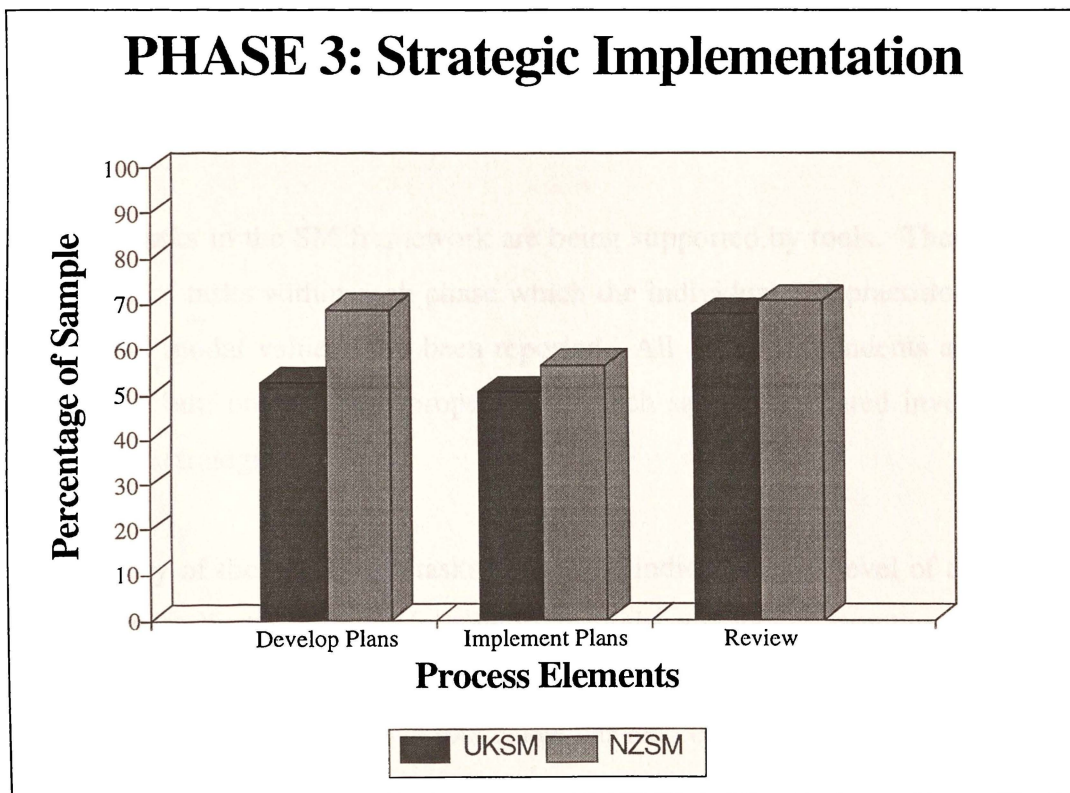
of the SM respondents.

The mean numbers of these three Strategic Analysis tasks which the respondents are using tools for - 1.97 and 1.98 for the UK and NZ samples respectively. Further, 48% of the UKSM sample are using tools for all 3 of these tasks and 54% in the NZSM sample.

6.3.3 Phase 3: Strategic Implementation

Phase 3 involves three key tasks which enable/facilitate implementation of the strategy. The percentage of the UKSM and NZSM samples using tools for each of the Strategic Implementation tasks is shown in Figure 6.11.

Figure 6.11 Strategic Implementation: UKSM vs NZSM



These results show some variation between the two countries, but the only statistically significant difference occurs with the task of Developing Plans (.01 level); here the NZSM is higher than the UKSM sample. The Monitor/Review task has the highest proportion of tool users involved (68-71%), and the Assisting Implementation task is the lowest for both samples (50-57%). The level of involvement as indicated by these proportions is comparatively high for these Strategic Implementation tasks; although slightly lower than the Strategic Analysis tasks.

The mean number of these Implementation tasks that individual respondents use tools for is 1.6 for the UKSM sample and 1.7 for the NZSM sample. Further, 40% of the UKSM sample are using tools for all 3 of these tasks and 43% in the NZSM sample.

While much of the normative literature has emphasised the strategy formulation area, these results suggest that tools are being used to support these Strategic Implementation tasks.

6.3.4 Conclusion

The SM framework was used to collect information on SM tool usage for a set of core strategic tasks. The proportions of tool users for each task in each of the three SM Process Phases were reported for the UKSM and NZSM samples. The striking similarity between the results from the two countries was confirmed by statistical significance testing. Only two of the 32 strategic tasks were found to be significantly different: Competitor evaluation in the phase 1 Environmental Analysis, and Developing Plans in the Implementation phase.

All of the 32 tasks in the SM framework are being supported by tools. There is variation in the number of tasks within each phase which the individual SM practitioners use tools for; mean and modal values have been reported. All of the respondents are working in multiple areas; but, only a small proportion of each sample indicated involvement with tools for all 32 strategic tasks.

For the majority of these strategic tasks the results indicate a high level of SM tool usage in both countries. Further the SM framework provides a workable structure for identifying SM tool usage within specific task areas. This is useful for diagnostic and comparative purposes. Previous research on SM tool usage has not considered the linkage of tools with tasks. Therefore these results provide more detailed, descriptive information than has been available before.

In the next section, the tools which are being used in practice for these tasks will be presented.

6.4 Top Tools Used In Practice

The SM process model was also used to collect information on the SM tools which are currently used in practice. In the questionnaire, space was provided for respondents to record the names of the SM tools which they use for each task.

A checklist was not provided for this section as it was felt that this would restrict the responses to the named subset of tools available. With the diversity of tools expected from the two disciplines, it was also determined that a very long checklist would act as a deterrent for many potential respondents; having to find each of their tools on a master list would increase their time required to complete the questionnaire.

Many respondents included multiple tools for each of the tasks that they are involved with. A master list of 440 approaches was prepared from all four surveys prior to collation of the results. For comparative purposes the **top five tools** will be reported for each of the strategic areas; this provides an indication of the most frequently used tools for each task. This is an average result from the whole sample based on current practice and therefore reflects the status quo. Unfortunately, it cannot at the same time incorporate the diversity of approaches which are used for each task; that will be addressed separately.

For some tasks many tools were highly rated, but for others there were only a couple of clear "leaders" as the respondents were all using different tools. In these cases less than five top tools will be reported.

6.4.1 Top Tools Used in Phase 1: Situation Assessment

The top tools used for the Phase 1 Organisational and Environmental Analysis tasks by the UKSM and NZSM samples will be presented in this section.

A. Top Tools Used for Organisational Analysis

The most frequently mentioned top tools for each of the Organisational tasks are summarised in Table 6.9 for the two SM samples. Looking at the whole set of results, the similarity between the top tools in both countries stands out immediately. This is confirmed by determining the average number of top tools which are common to both samples, over all fifteen tasks: three out of five of the top tools are the same in both samples.

Table 6.9 Organisational Analysis Top Tools

Task	UKSM	NZSM
Mission	SWOT, Focus Groups, Mission, Critical Success Factors	SWOT, Focus Groups, Critical Success Factors, Core Competences
Objectives	SWOT, Critical Success Factors, Focus Groups, Spreadsheets	Critical Success Factors, SWOT, Focus Groups, Core Competences
Strategy	SWOT, Critical Success Factors, Porter's 5F, Scenarios, Portfolios, Core Competences	SWOT, Critical Success Factors, Focus Groups, Core Competences,
Structure	SWOT, Benchmarking, Critical Success Factors, Focus Groups	Critical Success Factors, SWOT, Focus Groups, Core Competences
TopM style	SWOT, Mngt Profiles	Mgmt Profiles, Critical Success Factors, SWOT, Core Competences
Culture	SWOT, Surveys, Focus Groups, McKinsey 7S	Focus Groups, Critical Success Factors, SWOT, Surveys
Resources:		
Financial	Budgeting, Financial ratios, Spreadsheets, Forecasting, Cost Benefit	Budgeting, Financial ratios, Spreadsheets, Forecasting, Cost Benefit
Human	Forecasting, SWOT, Benchmarking Budgeting, Core Competences	Core Competences, SWOT, Mngt Profiles, Benchmarking,
Mktg/Distbn	Mkt Segmentation, Market Opport Analysis, SWOT, Forecasting, Benchmarking	Mkt Segmentation, SWOT, Market Opport Analysis, Benchmarking, Porter's 5 Forces
Prodn/Opns	Benchmarking, Forecasting, SWOT Spreadsheets, Process Mapping	Benchmarking, Process Mapping, Spreadsheets, Value Chain, Cost Benefit, Budgeting
Physical	Forecasting, Cost Benefit, Budgeting, SWOT	Cost Benefit, Budgeting, SWOT
Info Systems	Cost Benefit, Critical Success Factors, SWOT, Benchmarking, Budgeting	Cost Benefit, In-house models, Benchmarking, Critical Success Factors, SWOT, Budgeting
Admin Systems	Benchmarking, SWOT, Budgeting, Process Mapping, Spreadsheets	Benchmarking, Process Mapping, Cost Benefit, Budgeting, Spreadsheets
Intangibles	SWOT, Core Competences	Critical Success Factors, SWOT
R and D	Cost Benefit, SWOT, Focus Group, Forecasting, Market Opport Analysis	Focus Groups, Cost Benefit, Market Opport Analysis

For the first six organisational features (at the top of the table) SWOT, Focus Groups and Critical Success Factors predominate. The NZ samples also include Core Competences in the top tool set for five of these six evaluative tasks. The resource areas tend to be more specific so the only general tool which is widely used across the nine areas is SWOT Analysis. Budgeting and Cost Benefit Analysis occur in the top set for four resource areas in the UK and five areas in the NZSM sample. Benchmarking also contributes to five areas in both samples. Forecasting plays a greater role in the UK sample, appearing in the

top set for five tasks compared with only one task in the NZ sample.

B. Top Tools Used for Environmental Analysis

Table 6.10 summarises the top tools for each of the Environmental Analysis areas for the UK and NZ samples.

Table 6.10 Environmental Analysis Top Tools

Task	UKSM	NZSM
Operating Environment		
Industry	Porter's 5F, SWOT, Benchmarking, Scenarios, Forecasting	Benchmarking, SWOT, Forecasting, Porter's 5F, Focus Group, Industry Analysis
Markets	Mkt Segmentation, SWOT, Mkt Opport Analysis, Porter's 5F	Mkt Segmentation, Forecasting, Mkt Opport Analysis, SWOT, Focus Groups
Competitors	Benchmarking, SWOT, Porter's 5F, Finan ratios, Mkt Segmentation	SWOT, Benchmarking, Competitor Analysis, Mkt Signaling
Customers	Porter's 5F, Focus Groups, Mkt Segmentation, SWOT, Surveys	Focus Groups, SWOT, Surveys
Suppliers	Porter's 5F, Benchmarking, SWOT	SWOT, Porter's 5F, Focus Groups, Value Chain
Stakeholders	SWOT, Focus Groups, Financial Ratios, Surveys	SWOT, Focus Groups, Delphi, Stakeholder Analysis
Remote Environment		
Economic	Forecasting, Scenarios, Spreadsheets, PEST, SWOT	Forecasting, SWOT, Spreadsheets, Focus Groups
Govt/political	Scenarios, PEST, SWOT, Forecasting	SWOT, Forecasting, Focus Groups, Scenarios
Legal	SWOT, PEST, Focus Groups, Scenarios	SWOT, Forecasting, Focus Groups
Social trends	SWOT, Scenario, PEST, Forecasting, Focus Groups	SWOT, Forecasting, Focus Groups
Technological	SWOT, Focus Groups, PEST, Scenarios	SWOT, Forecasting, Focus Groups

The top tools for the Environmental tasks exhibit the same overall patterns as the Organisational tasks. The results show a very similar set of top approaches from both countries (average in common is 2.5), and SWOT Analysis is included in the top set for all eleven of the Environmental areas in both samples.

For the Operating Environmental tasks quite a number of different tools feature in the top set for each task. In the UK, Porter's Five Forces model is ranked in the top set for five of the six tasks; it occurs only twice in the NZ top tool sets. Benchmarking and Market Segmentation appear three times in the UK, and less often in the NZ sample. Conversely, in the NZ sample, Focus Groups feature in five of the Operating Environmental areas, but in only two tasks in the UK. Some specific approaches which achieve top ranking in the NZ sample include Value Chain Analysis and Stakeholder Analysis.

In the Remote Environmental areas, there are more tools in common across the set of five tasks. SWOT, Forecasting and Focus Groups form a core of approaches for all five tasks in the NZ sample. In the UK, Forecasting and Focus Groups appear in the top set of tools for three of the tasks; however, Scenarios and PEST are used for all five tasks.

6.4.2 Top Tools Used in Phase 2: Strategic Analysis

The top tools for each of the Strategic Analysis tasks are listed in Table 6.11.

Table 6.11 Phase 2: Strategic Analysis Top Tools

Task	UKSM	NZSM
To generate alternative strategies	SWOT, Scenarios, Focus Groups, Spreadsheets, Brainstorming	Focus Groups, SWOT, Spreadsheets Mkt Segmentation, Benchmarking
To evaluate alternative strategies	Spreadsheets, SWOT, Cost Benefit, Scenarios, Focus Groups, Corporate Models	Cost Benefit, SWOT, Spreadsheets Focus Groups, Critical Success Factors
To select a specific strategy	SWOT, Cost Benefit, Spreadsheets, Focus Groups, Critical Success Factors	Cost Benefit, Focus Groups, Spreadsheets, Critical Success Factors, SWOT

Once again, the pattern of similarity between the two samples is observed; the average number of tools in both samples, over all tasks, is four. For these three tasks, in addition to SWOT being applied universally, Focus Groups and Spreadsheet Modelling appear in all the top sets. Cost Benefit Analysis occurs in two tasks for both samples. Scenarios appear twice in the UK top tool sets, but not in the NZ top sets; Critical Success Factors occur twice in the NZ sample and only once in the UK results.

6.4.3 Top Tools Used in Phase 3: Strategic Implementation

Table 6.12 summarises the top tools for each of the Strategic Implementation tasks for

both the SM samples.

Table 6.12 Phase 3: Strategic Implementation Top Tools

Task	UKSM	NZSM
To develop plans to implement the strategy	Budgeting, Focus Groups, Spreadsheets	Critical Success Factors, Budgeting, Focus Groups, Cost Benefit, In-house models
To assist with implementation of the strategy	Budgeting, Focus Groups, Regular Monitoring, Spreadsheets	Budgeting, Cost Benefit, Focus Groups, Spreadsheets
To monitor/review the strategic performance	Budgeting, Financial Ratios, Critical Success Factors, Spreadsheets, Forecasting, Reviews	Budgeting, Benchmarking, Financial Ratios, Critical Success Factors, Reviews

For these tasks the pattern of similar results between the two countries is once again present; the average number of tools in common is three, over all of these tasks. The major difference between these tasks and the preceding phases, is the absence of SWOT Analysis. The only tool which occurs in the top set for both samples, for all three Implementation tasks, is Budgeting. Focus Groups appear in two tasks for both samples. In the UK Spreadsheet Modelling is ranked in the top sets for all three tasks; but only appears once in the NZ sample. Cost Benefit Analysis occurs twice in the NZ sample, but is not in the UK top set. Finally, Critical Success Factors occur twice in the NZ sample and only once in the UK results.

6.4.4 Conclusion

These results provide evidence of the top tools which are used for each of the strategic tasks in practice in both countries. The major patterns which are consistently evident in each of the three phases are the close similarity of the results between the two countries, and the dominant role of SWOT Analysis in phases one and two. Another tool which features strongly in all three phases is Focus Groups; while Budgeting is dominant in phase three. In general, the same types of top tool sets are found for clusters of similar tasks (e.g. organisational features). There are some sets of top tools which are almost identical for each country (e.g. the Remote Environment tools).

The country-specific differences include the use in NZ of Core Competences for the phase one organisational features. In the UK, Forecasting featured in the phase one resource

evaluation, Porter's Five Forces in the Operating Environmental analysis, and PEST and Scenarios were dominant in the Remote Environment area.

The results show that a range of different types of tools are applied to each task. For example, each Strategic Analysis task has a general strategic approach (eg SWOT), a process approach (e.g. Focus Groups) and a technical tool (e.g. Spreadsheet Modelling). This demonstrates the use of multiple tools for each task.

Looking at the top tools which are used for each SM process phase confirms the relevance of both general and specific approaches. General approaches, such as SWOT analysis or Focus Groups, can be applied to a wide range of areas; whereas specific tools are only applicable to a specific area or type of analysis, e.g. Market Segmentation or Financial Ratio Analysis. Further, it illustrates the range of tools which are required for a complete strategic audit.

6.5 Familiarity with SM Tools

A sample of thirty SM tools was used to investigate the levels of awareness, familiarity and usage of tools in both countries. Respondents were asked to indicate how familiar they were with each of these tools by selecting one of the options: (1) Don't Know, (2) Know About, (3) Know Well Enough To Apply, or (4) Have Used. For clarification purposes a definition of each tool was included in an appendix provided with each questionnaire. The comparative results for the both countries will be presented, starting with the tools which are highly ranked for usage (option 4), and working through to those which are not known (option 1).

6.5.1 Tools which Respondents "Have Used"

The tools which have been used by over 20% of the UKSM sample are listed in descending order in Table 6.13. In addition, the corresponding proportions and rankings from the NZSM respondents are included for each tool.

The top tool for usage in both countries is SWOT Analysis; this is expected and consistent with the results from the previous section. Budgeting occurs in second place, again for both samples. From here the comparative rankings diverge, although for eight of the listed tools, the usage proportions are essentially the same (within 5%); a further seven of the tools are used by only 5-10% more, in one of the samples. The remaining six tools show

Table 6.13 Tool Familiarity: Tools Used

Tool	UKSM		NZSM	
	Rank	Have Used %	Rank	Have Used %
SWOT	1	88.9	1	88.9
Budgeting	2	82.1	2	88.2
Forecasting	3	81.1	6	66.9
Spreadsheets	4	76.4	5	69.0
Critical Success Factors	5	72.6	3	76.2
Financial Ratios	6	63.6	8	62.1
Market Segmentation	7	56.6	10	48.8
Cost Benefit Analysis	8	55.3	4	70.2
Focus Groups	9	49.3	7	62.3
Portfolio Models	10	43.7	20	26.7
Porter's 5 Forces	11	43.4	15	34.4
Market Opportunity Analysis	12	41.7	12	39.2
Corporate Models	13	40.1	19	28.8
Benchmarking	14	40.1	11	43.4
Product Life Cycles	15	38.2	18	29.5
Value Chain Analysis	16	36.4	13	37.7
Simulation	17	33.8	16=	30.8
Multiple Scenarios	18	33.6	14	35.3
Core Competences	19	29.2	9	50.8
Driving Forces	20	24.5	21	23.9
Process Mapping	21	22.6	16=	30.8

over 10% variation in usage proportions: Corporate Models (11.3%), Forecasting (14.2%), and Portfolio Models (17%) are used more in the UK; while Focus Groups (13%), Cost Benefit Analysis (14.9%), and Core Competences (21.6) have higher usage frequencies in NZ.

The set of tools which form the top ten are almost identical for both countries; except for Portfolio Models and Core Competences, which are included in the UK and NZ top tools respectively, (but not in the other set). The top ten are mostly general tools; they include three financial approaches (Budgeting, Financial Ratios, and Cost Benefit Analysis), a marketing approach (Market Segmentation), a technological tool (Spreadsheet Modelling) and a process approach (Focus Groups).

6.5.2 Tools which Respondents "Can Apply"

The tools, which over 20% of the UKSM respondents "Know well enough to apply", are

listed in descending order in Table 6.14, along with their corresponding proportion and rankings from the NZSM survey.

Table 6.14 Tool Familiarity: Can Apply

Tool	UKSM		NZSM	
	Rank	Can Apply %	Rank	Can Apply %
Cost Benefit Analysis	1	27.7	3	22.6
Product Life Cycle	2	27.1	1	27.9
Benchmarking	3	26.1	4	22.1
Value Chain Analysis	4	23.1	10	18.9
Core Competences	5	22.2	11	18.5
Multiple Scenarios	6	21.4	22	12.6
Portfolio Models	7	20.4	2	24.2
Delphi	8	20.3	9	19.0

This category was included to distinguish between the tools which are *actually* used and those which are *well known*, but *not applied*, for whatever reasons. Only eight tools were rated in this category by more than 20% of the UKSM sample, and four of these tools were also over 20% in the NZSM sample. The UK proportions are slightly higher for six of these tools; Multiple Scenarios has an 8.8% margin, which is the largest variation between the two samples.

These tools, which can potentially be applied without any additional training, include typical financial, marketing and forecasting approaches, as well as three of the newer SM approaches: Benchmarking, Value Chain Analysis, and Core Competences.

6.5.3 Tools which Respondents "Know About"

The tools which respondents have heard about, but do not know well enough to apply or use, were also identified. Table 6.15 summarises those tools which over 20% of the UKSM sample "Know About", and includes the corresponding proportions and ranking from the NZSM survey.

There were seven tools in the UKSM sample and six in the NZSM sample, which over 30% of the samples rated in this category. Five of the tools were essentially the same in both countries (within 5%), and a further ten tools were familiar to 5-10% more of the

Table 6.15 Tool Familiarity: Know About

Tool	UKSM		NZSM	
	Rank	Know About %	Rank	Know About %
Reverse Engineering	1	42.6	2	35.9
Simulation	2	40.3	4	33.3
Strategic Software	3	37.4	13	24.4
McKinsey 7S	4	34.0	11	26.1
Delphi	5	33.3	10	27.3
Driving Forces	6	31.7	12	25.6
Core Competences	7	31.3	18	20.2
Focus Groups	8	28.2	21	16.4
Value Chain Analysis	9	28.0	15	23.0
Market Signaling	10	27.5	1	37.6
Multiple Scenarios	11	27.1	6	31.1
Product Life Cycles	12	26.4	8=	27.9
Process Mapping	13	26.3	16	21.7
Management Profiles	14	26.2	3	34.2
Corporate Models	15	25.4	5	31.4
Benchmarking	16	25.4	8=	27.9
Market Opportunity	17	24.5	7	28.3
SODA	18	21.3	22	16.1
Strategic Choice/AIDA	19	21.2	24	12.8

respondents in one survey; eight of the later were in the UK sample. The tools with over 10% difference in proportions included: Strategic Software (13%), Focus Groups (11.8%) and Core Competences (11.1%), which were higher in the UK; and Market Signaling (10.1%), which was higher in the NZ sample.

Most of the tools which are highly ranked in this subset are specific approaches: Reverse Engineering is only applied to physical products; Simulation and Strategic Software are specific technical tools; McKinsey 7S is a model for implementation success; Delphi is a qualitative forecasting approach.

6.5.4 Tools which respondents "Don't Know"

The tools which over 20% of the UKSM respondents "Don't Know" are listed in descending order in Table 6.16. In addition, the corresponding proportions and rankings from the NZSM respondents are included for each tool.

Table 6.16 Tool Familiarity: Unknown Tools

Tool	UKSM		NZSM	
	Rank	Don't Know %	Rank	Don't Know %
Strategic Funds Programming	1	70.6	1	76.5
Strategic Choice/AIDA	2	62.8	2	76.1
Strategic Options Develop and Analysis (SODA)	3	57.4	3	63.6
Management Profiles	4	40.4	12	28.3
Market Signaling	5	39.1	8	35.0
Strategic Software	6	36.7	4	56.5
McKinsey 7-S	7	36.2	5	43.1
Driving Forces	8	36.0	7	37.6
Process Mapping	9	35.8	11	31.7
Reverse Engineering	10	35.3	6	40.2
Delphi	11	29.7	10	32.2

The three tools which were "unknown" by the highest proportions were the same in both countries: Strategic Funds Programming, Strategic Choice/AIDA, and SODA. From here the rankings diverge, although five of the tools have very close proportions in both samples (within 5%), and three of the tools are within 5-10%. The remaining three tools show over 10% variation in sample proportions: more of UK sample do not know the Management Profiles (12.1%) approach; while more of the NZ sample do not know about Strategic Choice/AIDA (13.3%), and Strategic Software (19.8%). Corporate Models (12.3%) and Portfolio Models (14.9%) are also less well known in the NZ sample.

These results show that significant proportions (30-77%) of both samples do not know about these eleven tools. As in the previous "Know About" category, these are all quite specific tools: Strategic Funds Programming is a financial allocation procedure to align investment with strategies; the Strategic Choice methodology was developed in the UK by Friend and Hickling and has been promoted there in seminars and conferences; and the SODA methodology was also developed in the UK by Colin Eden.

6.5.5 Conclusion

The levels of familiarity, awareness and usage of a sample of thirty SM tools in NZ and the UK has been examined. The results reflect the overall pattern of similarity between the two countries which has been found in the previous tool use sections. At each level in this continuum of familiarity, the proportions of the UK and NZ samples are within

10% for at least 70% of the tools.

While there is divergence in the rankings within the subsets for the two middle categories (Can Apply, Know About), the subset of tools in the top ten rankings for the categories at the extreme ends of the continuum (Have Used, Don't Know) are almost identical in both countries. The highest sample proportions are also evident in these two extreme categories. While the high usage result is encouraging, the high "unknown" result is of concern, and signals the need for further investigation.

Looking at the types of tools which feature prominently in each category subset: the highly rated "Have Used" tools are all general approaches; and the "Can Apply" subset are basic tools, but they include three of the newer SM approaches. The tools which feature highly in the two remaining categories, "Know About" and "Don't Know", are all quite specific approaches.

One third of the sample of tools are "unknown" for 30-77% of both samples; this raises many questions. Why are there so many tools which are not used or not known? Obviously there is a direct linkage between knowledge and usage of tools, as you cannot use a tool without knowing about it; but there are many other factors involved here as well. Some of the questions which arise from these results include: are these tools included in tertiary education courses or professional development programmes? are practitioners able to attend these programmes? how do practitioners keep up to date with new developments? how do people who move into SM positions from other functional areas learn the basic tools of the trade? are there terminology problems with some of these approaches which influence the results? are specific approaches sector and industry related? is organisational size a factor? what if there is a SP group working with a team approach? what about personal factors such as preferences? previous experience? attitude to change?

Many of these questions are beyond the scope of this project but some of them will be explored in chapter 8 which focuses on the factors affecting tool selection. In the next section, the first time use of tools and the functions of tools will be discussed.

6.6 The Use of "New" Tools

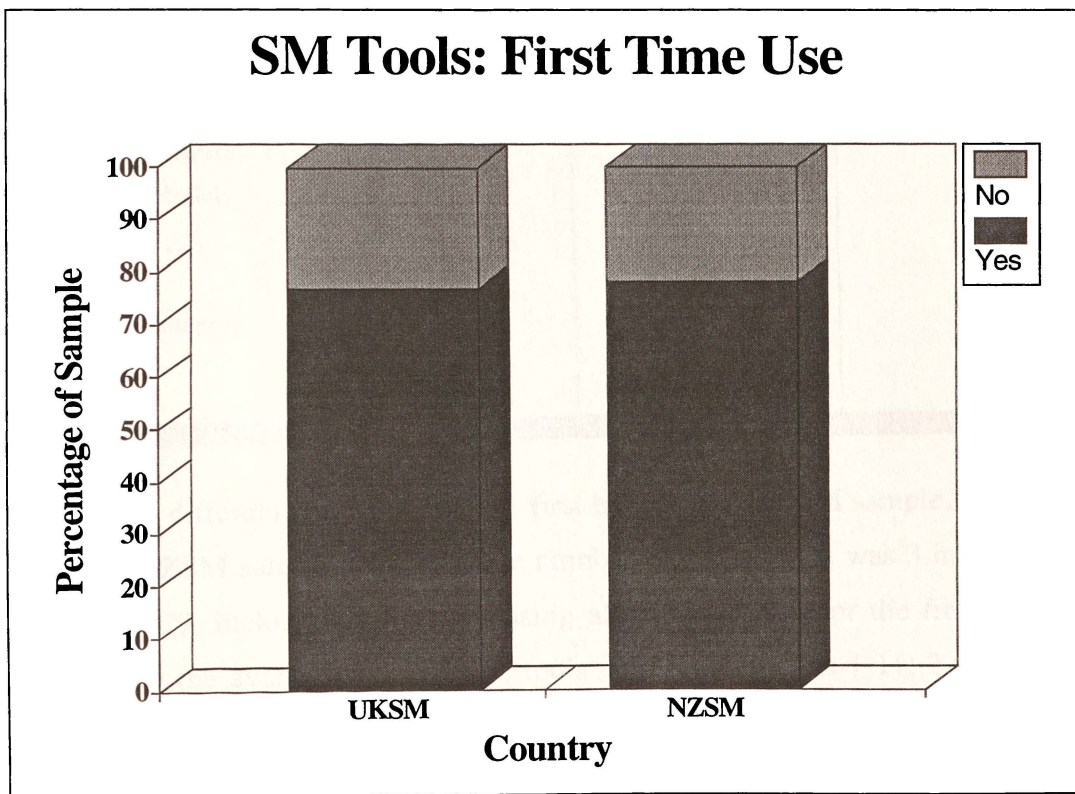
Perpetual mobility of staff and positions, combined with continuous development of new

approaches, create a scenario which necessitates on-going professional development. Given this context, the incidence of "new" tool usage and the types of tools which are being used for the first time were examined to provide evidence of the status quo. These results from the SM questionnaires will be presented in this section, along with the results on the main functions which tools perform.

6.6.1 First Time Use of SM Tools

The proportion of the SM samples trying a SM tool for the first time within the previous two year period was investigated in the questionnaire. This was included to gauge the responsiveness to new approaches and the types of approaches which were "new" to individual SM practitioners. Figure 6.12 shows the proportions of the UKSM and NZSM respondents samples who indicated "Yes" and "No" responses to this question.

Figure 6.12 First Time Use of SM Tools



As the graph clearly demonstrates, the proportions of SM practitioners who have used a SM tool for the first time are almost identical in both samples. Furthermore, the majority of respondents have tried at least one new SM approach within the previous two year period. This is consistent with the finding that significant proportions of both samples have changed to their current position within that period, so may need to apply some approaches which are "new" for them. The types of tools which are "new" for the

respondents were also collected. A summary of the most frequently mentioned "new" tools for the UKSM sample, ranked in descending order of frequency, is shown in Table 6.17; the corresponding NZSM frequencies are also listed.

Table 6.17 SM Tools Used for the First Time

"New" Tools	UKSM	NZSM
Benchmarking	24	14
Value Chain Analysis	18	3
Porter's Five Forces	16	8
Critical Success Factors	16	10
SWOT Analysis	13	7
Multiple Scenarios	11	1
Portfolio Models	10	2
Focus Groups	7	8
Simulation	7	2
Market Segmentation	6	7
Process Mapping	6	5
Financial Ratios	6	1
Strategic Software	5	3
Corporate Models	5	1
Budgeting	4	0
Forecasting	4	2
Core Competences	4	22
Delphi	4	5

There were 92 different tools used for the first time by the UKSM sample, compared with 53 from the NZSM sample. The average number of "new" tools was 3 in the UK with a range from 1-29, including 6 who are using all of their tools for the first time. In the NZSM sample the average was 2 "new" tools with a range from 1-11; 2 people reported using all "new" tools, and there were two unspecified "many" responses and one unspecified "most" response.

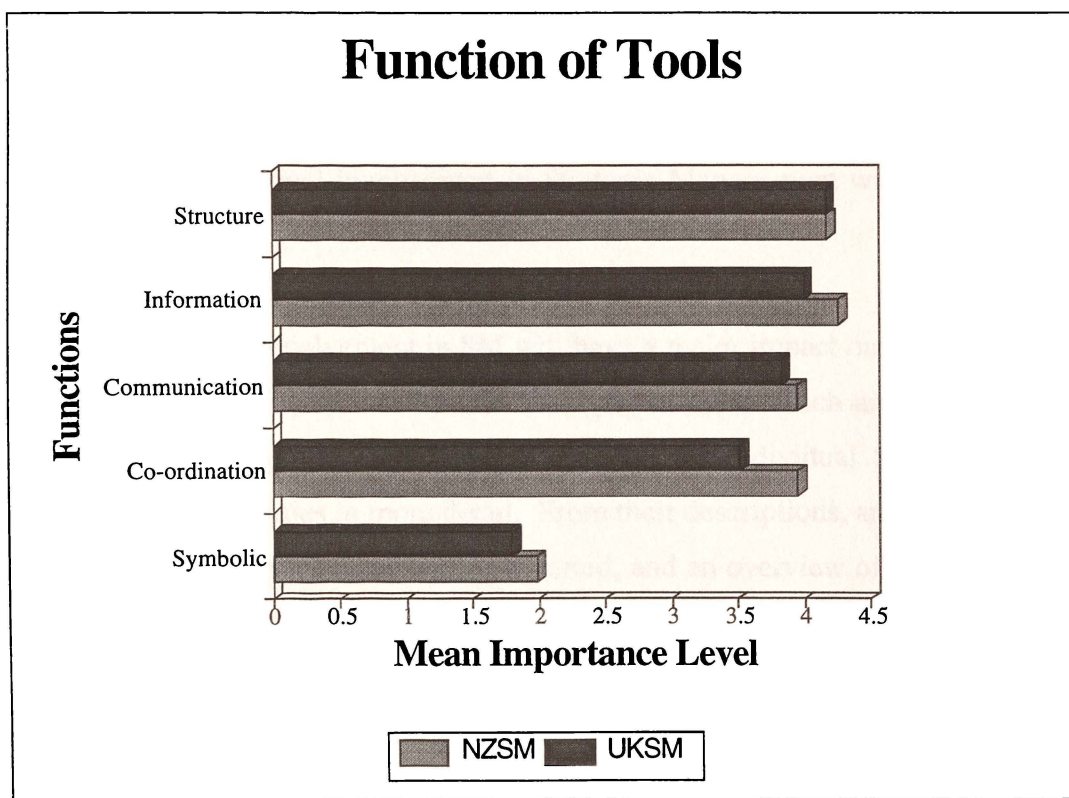
With higher frequencies and a wider range of tools from the UKSM sample, the rankings were also quite different to the NZSM results; however, seven of the set of top 12 tools are the same for both countries. In the UK more respondents have tried Value Chain Analysis, Scenarios, Portfolio Models, Simulation and Financial Ratios for the first time. In NZ the top "new" tool was Core Competences, which reflects the inclusion of

Prahalad's 2 visits to NZ in 1991 and 1992 in the Society's conference/seminar programme. The frequencies of the remaining tools in the NZSM top set were approximately the same as in the UK; these include Driving Forces, Management Profiles, Delphi and Spreadsheet Modelling.

6.6.2 Function of SM Tools

The main purpose or function of SM tools was also investigated in the questionnaire using the set of functions proposed by Langley (1988, 1991) and Day (1986). Respondents indicated the level of importance of each function on a horizontal numerical scale from 1 (not important) to 5 (extremely important). The mean values for each function for both the UKSM and NZSM samples are presented in a profile chart format in Figure 6.13.

Figure 6.13 Function of SM Tools



The functions have been ranked in descending order of the UKSM mean values. This layout shows that the NZSM mean value is the same for the first 'Providing a structure for analysis' function, but higher than the UKSM values for all of the other main functions. On average the NZSM respondents rate the first four functions as very important, whereas in the UKSM average results the Co-ordination function is not as important. In both samples, the use of tools for Symbolic Purposes ranks last and is only "slightly" important.

6.6.3 Conclusion

The same overall pattern of similarity between the two countries was reported for the proportions of tools being used for the first time and the functions of tools. However, higher frequencies and a wider range of "new" tools were found in the UKSM sample. The types of tools which were being tried for the first time include some of the basic SM approaches such as SWOT Analysis, and some of the newer tools such as Benchmarking, Core Competences and Value Chain Analysis. The "new" tools include a mixture of different types of tools: financial (e.g. Budgeting, Financial Ratios), marketing (Market Segmentation) and technological tools (e.g. Strategic Software).

The importance of a series of functions of SM tools was investigated. The results showed that four of the functions were rated as very important by both samples; these include: 'Providing a structure for analysis', 'Generating information for decision making', 'Encouraging the communication of ideas' and 'Assisting with co-ordination by establishing direction'.

Next, the nature of personal involvement in Strategic Management will be discussed.

6.7 The Nature of SM Involvement

The nature of personal involvement in SM will have a major impact on the actual strategic tasks and activities performed, and hence the types of tools which are used. This topic was investigated in depth in the interviews, where the individual Strategic Managers described their SM activities in more detail. From their descriptions, an itemised summary of the key tasks for each manager will be reported, and an overview of the main SM roles for each hierarchical strategy level will be presented.

6.7.1 Principal Strategic Tasks

Interviews were conducted with sixteen members of the UK Strategic Planning Society and twenty members of the New Zealand Strategic Management Society, as described in chapter 4. The nature of their involvement in SM was described by each interviewee; an overview level summary will be presented here. The principal task(s) performed by each Strategic Manager will be outlined; starting with the UK interviewees and followed by the NZ interview sample.

A. United Kingdom Strategic Managers

A summary of the principal tasks for each of the UKSM interview sample follows; the position title and area of the organisation are included in italics for each interviewee.

1. Developing strategies for the division (*Senior Planning Manager, Banking company*).
2. Creation of the annual Strategic Plan and identification of the issues that are going to feature within the plan (*Director of Strategic Planning, Banking/Finance company*).
3. Responsible for strategic development of some specific businesses in the group, external environmental scanning to identify strategic issues (*Strategic Planning Manager, Finance/Banking/Insurance company*).
4. Corporate strategy role: involved in projects which have significance for the group trends in European retail banking, potential acquisitions or divestments (*Manager Group Strategy, Finance/Banking company*).
5. Planning and implementing a new IT strategy for the organisation (*Director of Systems Development, Consultancy Partnership*).
6. Portfolio review of a company, analysis of investment decisions, market positioning, new product launches, business start ups, acquisitions and disposals, human resource review, target setting (*Managing Director, non-listed Consultancy company*).
7. Preparing corporate plan and analysis of strategic issues (*Group Strategic Planner, Distribution business (SOE)*).
8. Developing Strategic Planning process, portfolio management, competitor analysis, and educating management (*Strategic Planning Manager, Information/Publishing company*).
9. Scenario building and analysis (*Business Environment Manager, Energy company*).
10. Analysing spreadsheet financial models, providing assumptions to the BUs before they start building up their business plans, and inter-firm competition (*Senior Group Planning Analyst, Energy company*).
11. Adopting a corporate strategy role and trying to raise the quality of strategic thinking (*Senior Business Analyst, Energy company*).
12. Identifying, analysing, and some review of, acquisitions (*Group Strategic Planner, Manufacturing company*).
13. Data gathering, 'what if?' and scenario analysis, competitor analysis, pre-acquisition studies, industry analysis (*Marketing Analyst, Manufacturing company*).

14. Understanding environmental developments 5 -10 years out (*Market Strategist, Telecommunications company*).
15. Analysing competitors (*Competitor Strategy Manager, Transportation company*).
16. Preparing business plan up to year 2042 - mostly financial forecasts (*Strategy Manager, Transportation Corporation (SOE)*).

B. New Zealand Strategic Managers

A summary of the principal tasks for each of the NZSM interview sample follows; the position title and area of the organisation are included in italics for each interviewee.

1. Corporate strategy role and project evaluation (*Manager Strategic Planning, Banking company*).
2. Evaluating projects such as mergers and acquisitions (mostly financial analysis) (*Manager Strategic Projects, Banking company*).
3. Providing planning framework for operating companies, analysis of meta issues, portfolio analysis (*Planning Director, Building/Construction group of listed company*).
4. We co-ordinate the consolidation of the group company business plan, identify and evaluate growth opportunities (*Acting Director of Planning, Information / Communications SOE*).
5. Working with clients to develop SP process using own toolkit of approaches (*Director, Consultancy firm*).
6. Wide range of strategic projects for clients (*Vice President, Consultancy partnership*).
7. Developing strategies for/with client organisations (*Managing Partner, Business Consultancy partnership*).
8. Developing 5 year Strategic Plans for health sector clients and assisting with change management (*Manager Health Sector Consulting, Consultancy Charity Trust*).
9. Corporate planning role, some financial evaluations for market segments, and consultancy projects (*Planning Manager/Senior SP analyst, Energy Company*).
10. Use models to do 'what if' analysis for scenarios, identify major value areas in the business, and investment/disinvestment decisions (*Corporate Development Manager, Energy SOE*).
11. Developing corporate strategy for group and working with businesses to help them prepare their Strategic Plans (*Planning and Research Manager, Energy company*).

12. Guidance/facilitation of strategy development sessions with industry groups
(*General Manager Strategic Development Unit, Export Development quango*).
13. Starting process of developing 5-10 year Strategic Plan (*Manager Strategic Planning, Local Government organisation*).
14. Corporate planning role and organisational development (*Corporate Development Manager, Local Government organisation*).
15. Co-ordinator and driving executive of the whole SM programme (*Director Planning and Development, Local Government organisation*).
16. Annual Strategic Plan preparation, identification of the key value drivers, and evaluation of new projects involving capital expenditure (*General Manager, Manufacturing company*).
17. Introducing a SP process for the organisation (first time) (*Planning Manager for M/F Retail/wholesale organisation*).
18. Developing annual plan process and evaluating initiatives/issues (*Senior Manager Corporate Planning, Telecommunications company*).
19. Analysing the outside environment, educating Senior Management, running the SP cycle, giving help to individual businesses and also special projects (*Senior Economic Analyst, Telecommunications company*).
20. Managing the SP process and development of strategies, analysis of strategic alliances and corporate level issues (*Manager Strategic Planning, Transportation/tourism company*).

This itemised summary of the main tasks for each Strategic Manager interviewed shows the diversity of tasks and responsibilities of SM positions. From the thirty six Strategic Managers interviewed, thirty one different job titles were recorded (listed alphabetically in Appendix XV). The strategic tasks range from developing a functional strategy, establishing SP processes at the business level, through to corporate roles, and beyond this to SP at the industrial level. While some Strategic Managers may focus on a single area such as competitors, or acquisitions, or developing a Strategic Plan; most of those interviewed have multiple areas of responsibility. The level of detail involved also varies from quite specific, detailed ‘what if?’ analysis, through to a very broad spectrum of corporate SM projects (e.g. by the consultants).

6.7.2 Hierarchical Strategy Roles

From the detailed descriptions provided by the interviewees, the main tasks were combined

to provide a summary of the basic SM roles for each hierarchical level of strategy: Industry, Corporate Strategy, Business Strategy, and Functional Strategy level. The summary for each of these four levels will now be outlined.

A. Industry Strategy Level

One of the interviewees was the Director of an industry level strategic development unit. He was involved in in-house strategy development for his own unit and working with external industry level groups to assist with their development of strategies for the industry as a whole.

B. Corporate Strategy Level

Twenty four of the interviewees were primarily involved in SM at the corporate level. This provided a rich database from which to extract a detailed summary of the nature of their strategic tasks and the roles which they perform. A set of five major roles have been identified from the responses; this includes setting corporate direction and strategies, supporting business units, as well as an education role, strategic review, and a strategic issues/projects role. The tasks for each of these roles will be summarised below.

1. Corporate Direction and Strategy

- to co-ordinate the preparation of the Corporate Strategic Plan;
- to determine the strategic direction of the organisation (where are we going?);
- to provide a corporate direction statement at the start of each planning cycle;
- to establish the SP framework for the BUs/subsidiaries/operating companies;
- to catalyse the Strategic Planning process within the organisation;
- to assume responsibility for the strategic development of specific businesses;
- to identify new opportunities;
- to be responsible for the on-going strategic development of the company;
- and also for the development of internal capability.

2. Support

- to provide support and assist with the preparation of plans by individual businesses (to challenge the different businesses as they draw up their plans and ensure that they are asking the right sorts of questions, dealing with the right sorts of issues and making some credible plans for the future);
- to provide information about what's happening globally, internationally in terms of technology etc;

- to provide guidance for BU staff on the types of tools which might be appropriate to their situation;
- we have a consulting role..to the other businesses;
- to act as an advisory unit to the Chief Executive;
- to act as facilitators.

3. Education

- to encourage strategic thinking;
- to educate management;
- to foster innovation and creativity.
- to work with existing management teams- to update strategic thinking and planning skills.

4. Strategic Review

- to monitor and review strategic performance;
- to monitor the whole external environment(competitors/markets/regulations).

5. Strategic Issues and Projects

- to evaluate corporate level issues -
 - portfolio issues,
 - potential mergers and acquisitions,
 - scenario building/analysis,
 - competitor performance,
 - remote environment developments,
 - diversification;
- to evaluate new projects (involving capital expenditure).

C. Business Strategy Level

Five of the interview sample were involved in strategy development at the business unit level. The basic SM tasks at the business unit level from their descriptions are as follows:

- to introduce a Strategic Planning process
- to co-ordinate the preparation of the annual Strategic Plan
- to encourage strategic thinking
- to identify the key value drivers across the business
- to evaluate new projects (involving capital expenditure)
- to educate management
- to foster innovation and creativity
- to identify new opportunities

This list basically mirrors the tasks/roles at the corporate level. The only key task which was not explicitly mentioned by any of the five interviewees, but which they must do implicitly, is to monitor the strategic performance of their business units.

D. Functional Strategy

One of the interviewees was primarily involved in the development and implementation of an Information Technology strategy for the organisation. Although this project was at the corporate level, the focus was on the development of the functional strategy. A special process was designed for this one-off project by the staff involved.

6.7.3 Conclusion

The complexity of SM is clearly demonstrated by this descriptive evidence on the nature of personal involvement in SM. There is not a standard job title for SM practitioners. This is indicative of the variety of SM positions in organisations, each with different emphases and areas of responsibility. As a consequence, there is diversity in the main tasks which are performed by Strategic Managers. Most of the interviewees had multiple areas of responsibility; however, some were employed to focus on a specific area such as competitors, or acquisitions, or developing a Strategic Plan.

The scope of SM positions is very broad, regardless of the hierarchical level at which the job is focussed. The main tasks at the Business Strategy level, appear to mirror those at the Corporate Strategy level. However, the tools which are used will depend not only on the tasks, but also on a number of Personal and Organisational factors. These other factors which affect SM tool selection will be investigated more fully in chapter 8.

6.8 Gaps in the SM Toolkit

To identify deficiencies in the current SM toolkit, data was collected from the SM interview samples in both countries on their need for new tools? of specific types? or for specific tasks? In this section an overview level summary of the responses will be presented by looking first at the main responses to the basic question, and then outlining the new technological tools which were identified. Finally, the research agenda for future development of SM tools, concepts and frameworks will be presented.

6.8.1 Need for New SM tools?

The perceived need for new SM tools was examined in the SM interviews. There were

four main responses to this question: (1) Yes, (2) No, (3) Use More Existing Tools, and (4) Improve Existing Tools. Each of these responses will be discussed now.

Yes

There is always a need for, and scope to develop, new tools which will be useful. The need for new tools arises when new practices emerge, and the scope for new tools is enhanced by information technology and conceptual developments. Two types of creative responses were also noted: the inventive approach of customising something to meet the need, sometimes by combining aspects from other tools; and the "if we identify a gap- we fill it" approach, from a global SM tool developer. For others, there was a definite perception that if they could think of a new tool, then they "would be made" (i.e. find fame and fortune!).

No

The NO response came from people who feel that the tools available are adequate for the types of analysis that they have always done. The "I don't feel that we need any new tools" response was observed at both ends of the spectrum; from the casual *laissez faire* approach, and from those at the "leading edge" with access to a global electronic network and all the latest developments. This shows that being satisfied with the SM toolkit is possible for those in a stable situation where repetition is viable, as well as those at the forefront of current practice; it does not necessarily equate with laziness and/or ignorance.

Use More of the Existing Tools

For many organisations Strategic Planning is a comparatively new activity. It takes time to learn the basic SM approaches and develop expertise. For those individuals who are new to SM positions, and those who are expanding their skills, the interest is in making **more** use of existing tools. Some of the areas identified for personal development include:

- mapping service chains;
- identifying core competences in a non-technical non-manufacturing operation;
- to develop corporate parenting strategies;

- how to define a mature industry (for a commodity product which changes over time e.g consumer magazines);
- to learn about benchmarking- how to do it?
- to develop a more integrated approach to information gathering;
- econometric growth models..forecasting models;
- price response modelling;
- modelling for de-regulated market;
- ideas modelling software;
- need some more financial tools for SM purposes;
- stakeholder analysis;
- process for priority setting;
- tool to predict the world price of sugar;
- de-rigidise the planning process.

Overall, there is recognition of a need for greater understanding and wider appreciation of existing tools.

Make Improvements to Existing Tools:

In addition to making more use of the SM tools which are available, this response proposes making improvements to existing tools. For example, using existing tools in imaginative ways to help strategic decision makers; using combinations of tools to provide better information; providing technological enhancements to improve the capability and ease of use of some approaches. It was also noted that some tools are "re-invented in a different guise"; for example, business process re-engineering which is undergoing a resurgence in the 1990's.

These responses were not mutually exclusive options, but rather they were proffered in combination; both 'Yes' and 'No' responses being followed by indications of the 'Need to Use More Existing Tools' or to 'Make Improvements to Existing Tools'. This captures the range of perceptions on the need for new SM tools; while the tools currently available are adequate in some contexts, there is a recognised need for improvement in utilisation of existing tools. The types of new tools which were proposed by the 'Yes' respondents will be discussed in the next two sections, starting with the new technological tools and then examining the new theoretical developments which were proposed.

6.8.2 New Technological Tools

From the SM interviews, gaps in the existing SM toolkit were identified. Technological tools to support existing SM approaches, as well as new database and software developments, were suggested as follows:

a. **New tools to support existing SM approaches**

- SWOT analysis;
- Porter's Five Forces;
- Business Process Analysis;
- Benchmarking.

b. **Databases**

- need PIMS-like databases for other functional areas of the business;
- cost effective access to more industry level databases.

c. **Software**

- to assist with facilitation: to augment and speed up the process;
- enhanced software for Project Management;
- better graphical software to show businesses shrinking and growing;
- ability to incorporate simulation in models to test alternatives.

6.8.3 SM Research Agenda

In addition to the specific tools which were identified to support or enhance existing approaches and SM processes, a number of more major research issues were proposed. These gaps are more difficult as they require theoretical development of new concepts and frameworks. First, the specific research gaps will be listed, and these will be followed by the broader, more general types of research issues.

A. Specific Research Gaps

The specific research gaps have been grouped into five different groups based on topic areas:

a. **Marketing**

- need a tool which analyses the sequencing and timing of product substitutions (for high tech, rapidly changing, industries);
- cost effective tracking of developments in a market across a wide range of participants and parameters;
- need a framework to understand industry evolution which is based on

assumptions which are universally acceptable.

b. **Forecasting**

- to be able to assess risk and sensitivities more accurately;
- need a tool for sector volatility;
- assistance to predict political influences;
- need something which will help to reduce environmental uncertainty.

c. **Technological**

- need assistance to evaluate the impact/significance of technological change;
- tool to predict technological innovation.

d. **Educational**

- need to identify and define the training needs for senior management.

e. **Behavioural**

- the area of remuneration and motivation and its connection to strategies;
- how to motivate professionals to do teamwork as opposed to doing individualistic stuff;
- need a mechanism to learn from mistakes in organisations;
- tools for focussing organisational development;
- to model organisation's behaviour under different structures;
- need a framework to understand the politics of regulation.

B. General Research Gaps

The general research gaps have been grouped into three different categories:

a. **Service Sector**

- need for new tools for service industries as a whole;
- need to adapt tools developed in a manufacturing context for service organisations.

b. **Dynamic Approaches**

- most of the tools are static and need to be re-structured to cope with dynamic environments.

c. **Integrative Frameworks**

- need something to link the frameworks (e.g. BCG, Porter's 5 Forces) with models to show the impact on profitability and corporate resources;
- need a framework for managing integrated businesses, while allowing them

- to maintain their autonomy;
- to integrate math models of human decision making with intercompany market simulations;
- to improve the interface between action/implementation and human resource planning;
- need a better integration of process strategy and structure strategy;
- need to be able to link appropriate types of change process to specific kinds of organisations;
- tools for effectively managing the trade-off between economic and non-economic objectives.

6.8.4 Conclusion

In this section deficiencies in the current SM toolkit have been identified and discussed. These include both new technological tools to support or enhance present SM systems and approaches, and a comprehensive research agenda to fill theoretical and conceptual gaps. For many SM practitioners, there is also an acknowledged need to make better use of **more** of the existing SM tools and frameworks.

6.9 Conclusion

Results from empirical studies of SM tool usage in the United Kingdom and New Zealand have been described in this chapter. These results provide new evidence of the current state-of-the-art in SM in these countries. The SM framework enabled a detailed investigation of SM tool use for a specific series of core strategic tasks to be conducted. This is the first research to link SM tool use with particular strategic tasks. In addition to the specific results of the levels of tool use for each task, and the types of top tools which are used for each task, the study also produced some more general level outputs about the nature of SM tool usage. These insights include the range of tools which are used in SM, and the need for multiple tools for each task.

Replicating the study in two countries has added a comparative dimension to the research. This has generated some interesting findings, notwithstanding the almost identical patterns of tool usage in both countries; these occur in spite of quite marked differences in organisational factors.

Familiarity, awareness and usage of a sample of thirty SM tools revealed the same pattern

of similarity between the two samples. The highly rated tools at the usage end of the continuum were all general approaches, while the "unknown" tools were quite specific approaches. Significant proportions from both countries were not familiar with one third of the tools in the sample; this finding raises many questions and signals the need for further investigation of this issue.

The nature of SM involvement was investigated in depth in the interviews. The complexity and diversity of SM tasks and roles were identified and discussed. To conclude, deficiencies in the current SM toolkit were proposed; these include new technological tools to support or enhance present SM approaches, and a comprehensive research agenda to fill theoretical and conceptual gaps. The need to make better use of more of the existing SM tools was also advocated.

In the next chapter the MS/OR tool usage results will be presented and discussed. Inter-disciplinary comparisons and external comparisons with previous research will be outlined in chapter 9.

Chapter 7 MS/OR Tool Usage in SM

7.1 Introduction

To identify the current status of MS/OR tool usage in Strategic Management an empirical study was conducted. A normative SM framework based on the SM process model was used to provide a structure for the strategic tool evaluation. A postal questionnaire was designed to collect quantitative evidence from MS/OR practitioners in NZ and the UK; concurrently semi-structured interviews were conducted to provide qualitative explanatory data.

The results from these MS/OR tool surveys will be described in this chapter. First, the results from the organisational and personal contextual variables will be discussed to set the scene. MS/OR tool usage results for each of the SM process phases and tasks will be described in sections 7.3 and 7.4; and the levels of familiarity with a sample of twenty five MS/OR tools will be presented in section 7.5. The use of "new" tools will be considered next, followed by the nature of MS/OR involvement in strategy. In the penultimate section, deficiencies in the current strategic MS/OR toolkit will be proposed, and the chapter will conclude with a brief overview.

7.2 MS/OR Strategic Tool User Information

In the MS/OR surveys, 78.5% of the UKOR and 66.7% of the NZOR respondents indicated that they are involved with strategic level MS/OR tool use. The results from these respondents are the focus of this chapter (see Appendix XVI for non strategic tool user information). In this section, information on the organisational and personal backgrounds of the strategic tool users will be presented and discussed. These background areas provide a rich source of contextual factors which will potentially influence strategic level tool usage.

7.2.1 Organisational Backgrounds

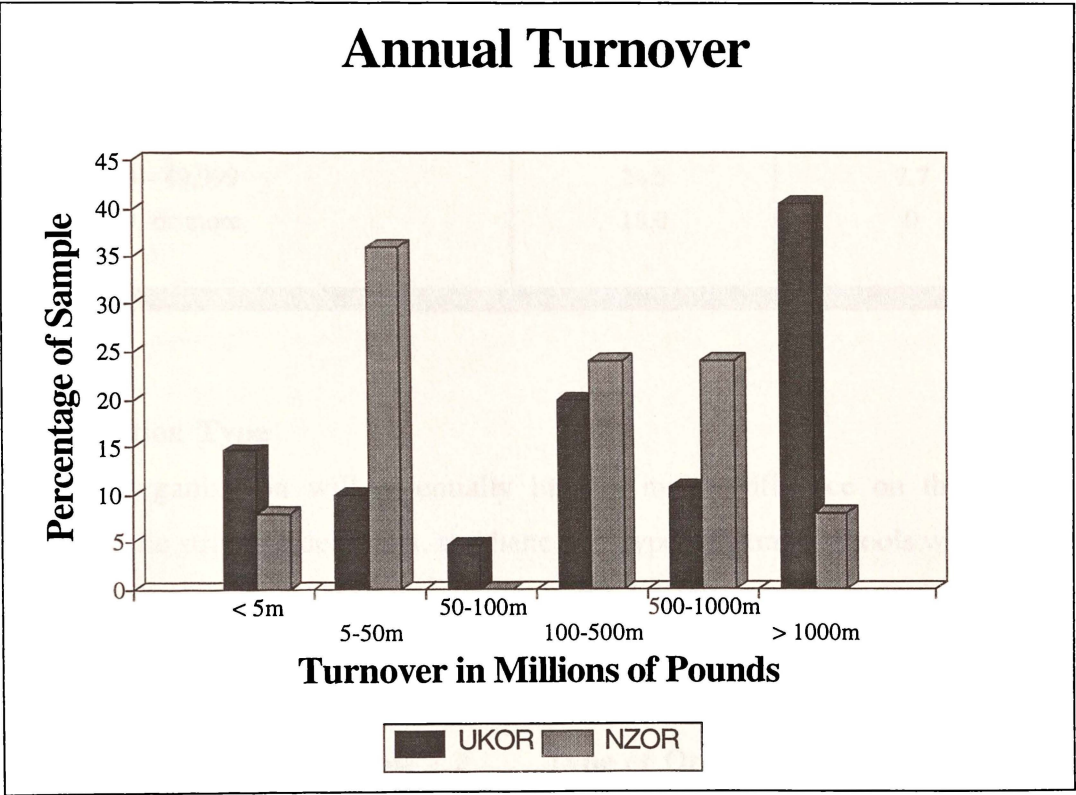
The organisation provides not only the **context** for the application of strategic tools, but also the subject matter or **content** for many of the tools. Therefore, it is important to consider some of the major organisational variables affecting the individual tool users who are the focus for the study and generated the results which will be described in this chapter. The size and types of organisations represented will be discussed; the main product or area of operation, and the presence of separate departments/groups will follow.

Finally, the overall strategic position of the organisations will be considered.

A. Organisation Size

The size of the organisations represented by the strategic MS/OR tool users will be considered in terms of two of the conventional size measures: annual turnover and the number of employees. The approximate annual turnover is used as an indicator of financial magnitude. The turnover results for the UKOR and the NZOR samples, expressed in UK pounds, are summarised in Figure 7.1.

Figure 7.1 Annual Turnover



Both samples contain the full spectrum of organisation sizes as measured by their annual turnover. The mode for the NZOR sample is the £UK 5-50 million category, however 56% of the organisations are larger than this. In the UKOR sample, 40% of the organisations fall in the largest turnover category (> £UK 1000 million). Clearly more of the UKOR tool users are working in larger organisations (higher turnover) than their NZ counterparts. Interestingly, the proportion of UK tool users in the smallest turnover category (< £UK 5 million) is also higher than in the NZ sample.

The number of employees provides another standard measure of organisation size. The number of employees in the UKOR and NZOR samples is summarised in Table 7.1. Here,

the same pattern is evident in these results. The majority (77%) of the organisations represented in the NZOR survey employ less than 5000 people; compared with only 47.5% of the organisations in the UKOR sample. Furthermore, 42.5% of the UK organisations employ over 10,000 people. Clearly, the UK sample contains more larger organisations as measured by employment levels.

Table 7.1 Number of Employees

Number of Employees	UKOR %	NZOR %
Less than 100	14.4	7.7
100 - 499	10.1	30.8
500 - 999	2.9	3.8
1,000 - 4,999	20.1	34.6
5,000 - 9,999	10.1	15.4
10,000 - 49,999	24.5	7.7
50,000, or more	18.0	0

B. Organisation Type

The type of organisation will potentially have a major influence on the nature and complexity of the strategic decisions, and hence the types of strategic tools which are used. The proportions of each organisational type in the UKOR sample, ranked in descending order, are shown in Table 7.2; along with the corresponding NZOR sample proportions.

Table 7.2 Type of Organisation

Organisation Type	UKOR %	NZOR %
Listed company	53.6	26.9
Non-listed company	13.8	19.2
State owned enterprise	9.6	19.2
Central government	8.7	19.2
Other	6.5	3.8
Partnerships	4.3	0
Local government	2.9	7.7
Self employed/sole trader	0.7	3.8

The majority (67%) of the UKOR tool users are employed in Companies, with the majority of these, being Listed Companies. Similarly, 46% of the NZOR organisations are Companies, predominantly Listed Companies. The proportions of NZ tool users from State Owned Enterprises, Central and Local Government are higher than in the UK sample.

C. Main Product/Area of Operation

To provide an indication of the range of industries represented in the samples, the main product or area of operation of the organisations was identified. The results show that the strategic tool users are widely spread throughout public and private sectors including both manufacturing and service industries. The top five categories in the UKOR sample were: Consultancy (16.9%), Manufacturing/Engineering (15.4%), Finance/Banking/Insurance (11.8%), Energy (11.8%), and Information/Computers and Retailing/Wholesaling (both 9.6%). In the NZOR sample, the top five categories were: Transportation (15.4%), Energy (11.5%), Manufacturing/Engineering (11.5%), Telecommunications (11.5%) and Information/Computers (11.5%). Three of these top categories are common to both samples. Looking at the differences, the UK sample has higher proportions from general management areas of Consultancy, Finance and Retailing; whereas more of the NZ respondents are from the specific areas of Transportation and Telecommunications.

D. Size of MS/OR and SP Groups

The existence of specialist groups or departments working in the areas of MS/OR and SP, and, if present, the size of these groups, was also investigated to identify the status of current practices. The roles of individuals working in these specialist groups, especially in relation to strategic tool use, was explored in the interviews (see Section 7.7). The proportions of the UKOR and NZOR organisations which have separate groups or departments for MS/OR, Corporate SP, or another SP group, and the mean sizes of these groups, are shown in Table 7.3.

Table 7.3 Size of MS/OR and SP Groups

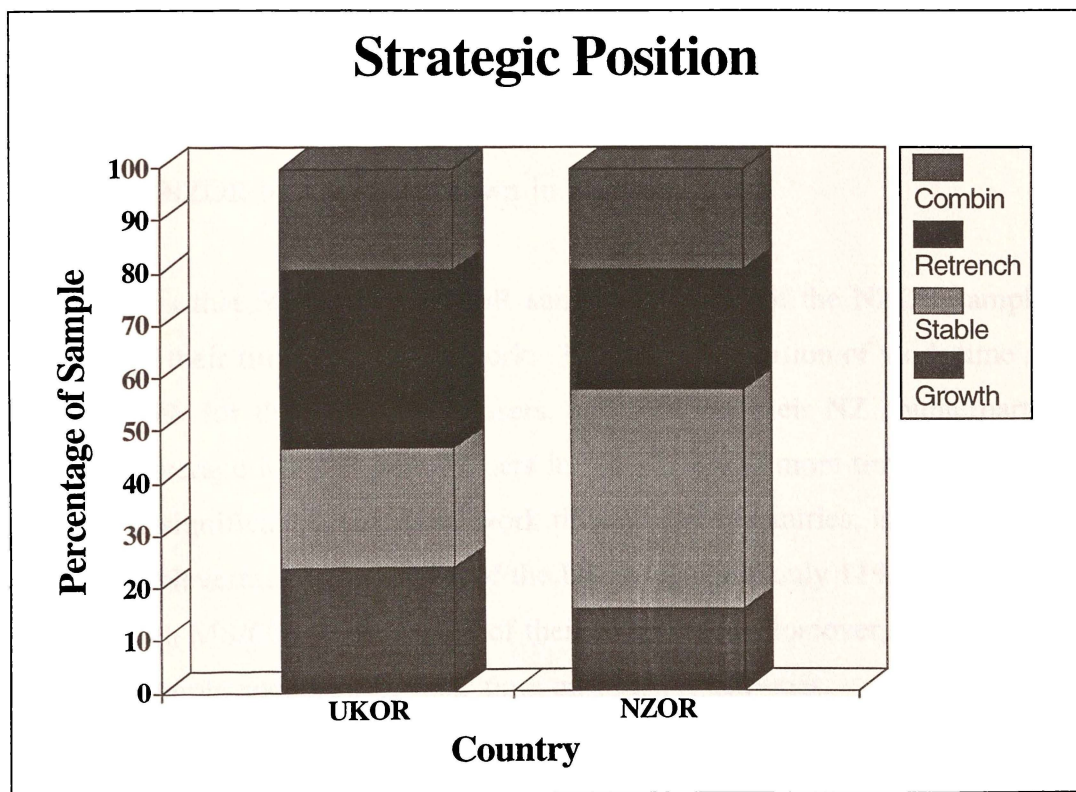
Groups	UKOR		NZOR	
	Yes %	Mean	Yes %	Mean
MS/OR Group	55.5	38.4	7.7	7.5
Corporate SP Group	39.1	12.6	69.2	9.4
Another SP Group	27.9	20.7	34.6	7.2

Over half of the UKOR organisations have a MS/OR group compared with only 8% of the NZ organisations. Furthermore, the UK MS/OR groups are on average much larger groups than their NZ counterparts. Just over two thirds of the NZOR tool users work in organisations with a separate Corporate Strategic Planning group, and 35% have another SP group (in addition to the Corporate group); these specialist groups are smaller than in the UK. Although the UKOR sample has fewer Strategy groups they are larger on average than the SP groups in NZ. The large difference (30%) in the proportions of the organisations with Corporate Strategy groups is an unexpected/surprising result.

E. Strategic Position

The overall strategic position of the organisation will potentially influence its approach to SM and hence the types of tools which will be used. To investigate the perceived strategic position of the organisations, Glueck's (1980) four overall strategies were used: Growth, Stability, Retrenchment and Combination. Figure 7.2 shows the proportions of the organisations from both the UKOR and the NZOR samples which are perceived to reflect each of these overall strategic positions.

Figure 7.2 Strategic Position



The modal category for the NZ sample is Stability for 42.3% of the organisations. In contrast, one third of the UK organisations are currently following a Retrenchment

strategy. However, Retrenchment is the second highest strategy for the NZOR sample, with 23% of the organisations reporting this as their current strategic position. While the UK sample has fewer Stable organisation, it has more organisations reporting a Growth strategy than the NZOR sample. Given the higher proportion of larger organisations in the UK, the Retrenchment strategy may lead to survival of a 'leaner' organisation rather than extinction.

7.2.2 Personal Information

While the organisation provides the context and content for the application of strategic tools, the capabilities and preferences of the individual practitioners will also potentially have a major influence on strategic tool usage. The SM process is designed and facilitated by people working individually and in teams/groups. In this section some of the prominent personal factors will be explored including MS/OR work time allocation and the strategic component, management area, time spent and analytical role of the current position. Training sources and years of work experience, information sources, and educational and professional qualifications will also be discussed. Finally, personal strategic performance rating and basic demographic statistics will be considered.

A. MS/OR Work Time Allocation

The level of personal involvement with MS/OR will have a major impact on the nature and extent of MS/OR tool usage. The percentage of work time spent on MS/OR activities for the UKOR and NZOR tool users is shown in Figure 7.3.

The graph shows that 30% of the UKOR sample and 35% of the NZOR sample spend 20%, or less, of their time on MS/OR work. The mean proportion of work time spent on MS/OR was 56% for the UKOR tool users, and 39% for their NZ counterparts. This shows that on average MS/OR practitioners in the UK spend more time on their MS/OR work; however significant amounts of work time, in both countries, is spent doing other types of work. Nevertheless, one third of the UK sample and only 11% of the NZ sample are involved with MS/OR for over 80% of their work time. Moreover, in the UK sample, 30.7% of the sample spend **all** of their time on MS/OR activities.

The proportion of work time spent on strategic MS/OR is of more interest for this project. Strategic work time needs to be considered in the context of the MS/OR work pattern described above. The proportion of strategic MS/OR work time is shown in Figure 7.4

for both MS/OR samples.

Figure 7.3 MS/OR Work Time Allocation

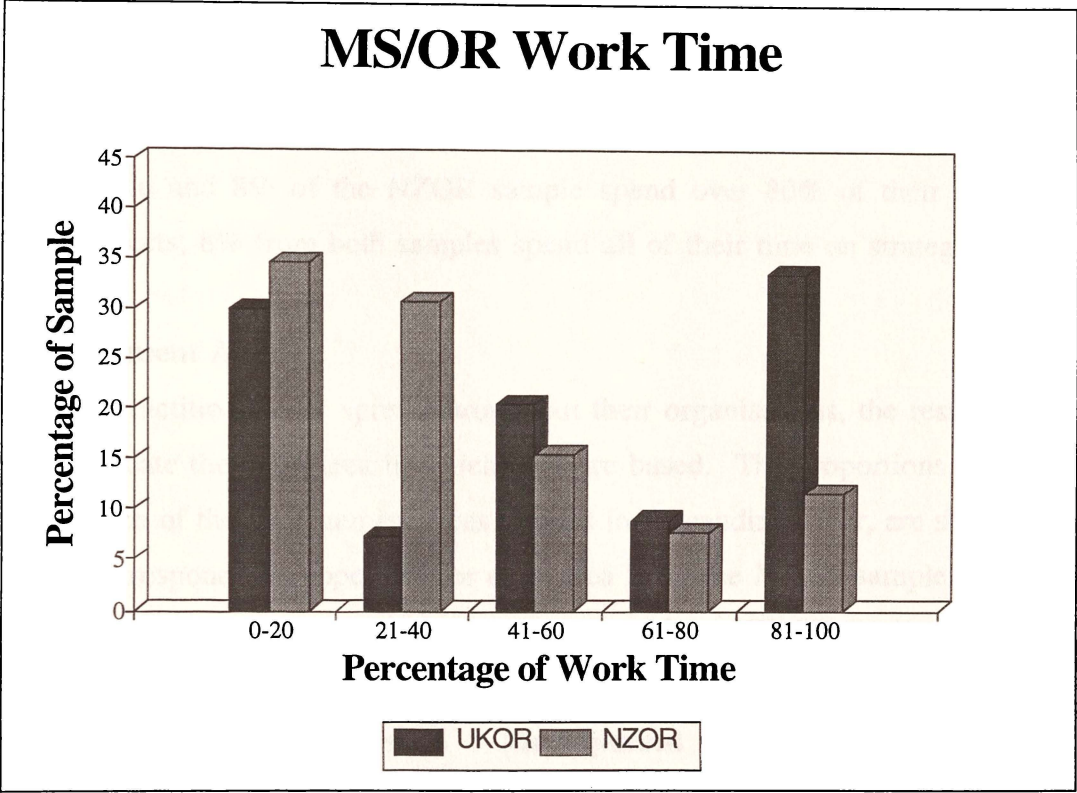
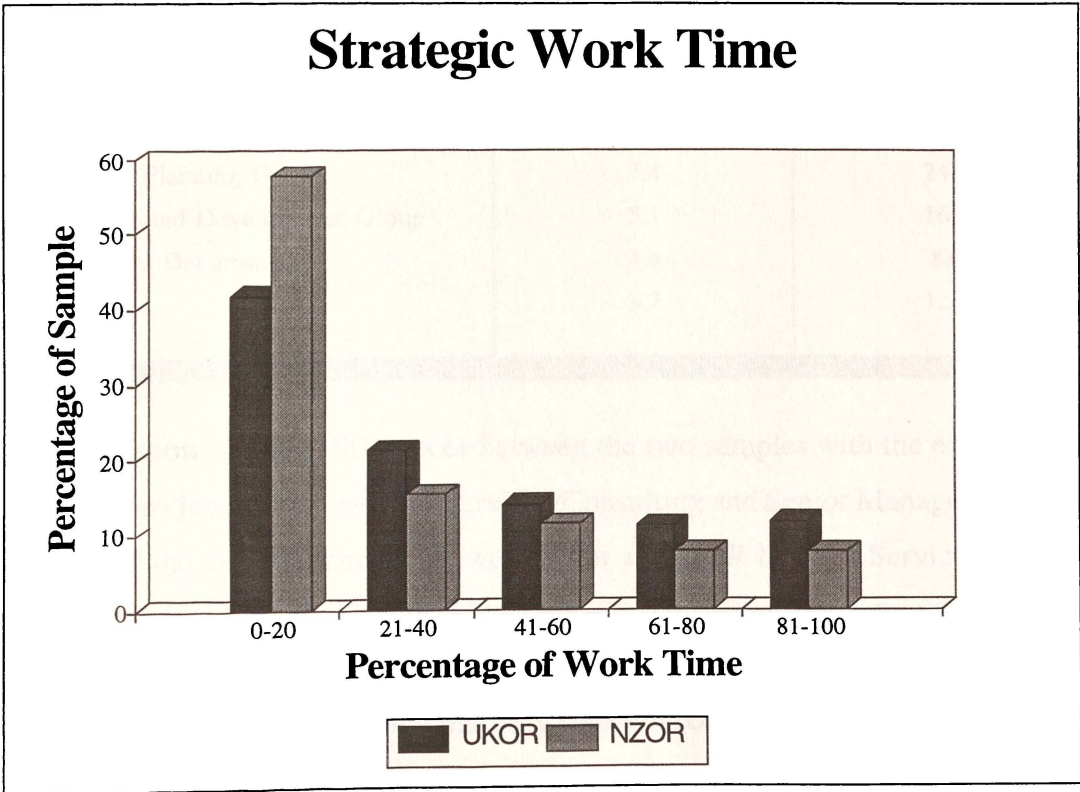


Figure 7.4 Strategic MS/OR Work Time



The graph clearly demonstrates that the majority of MS/OR practitioners in both countries spend relatively small proportions of their total work time on strategic projects. The mean proportion of strategic MS/OR work time was 38% for the UKOR tool users and 31% for their NZ counterparts; these represent 68% and 81% respectively of their MS/OR work time. Given the low profile and recognition of the strategic contribution of MS/OR these results are not only significant, but also higher than expected. Furthermore, 12% of the UKOR sample and 8% of the NZOR sample spend over 80% of their work time on strategic projects; 8% from both samples spend **all** of their time on strategic level work.

B. Management Area

As MS/OR practitioners are spread throughout their organisations, the respondents were asked to indicate the main area in which they are based. The proportions of the UKOR sample in each of the management areas, ranked in descending order, are shown in Table 7.4. The corresponding proportion for each area from the NZOR sample is also listed. (This question was adapted from the Carter survey of the UK OR Society).

Table 7.4 Management Area

Area	UKOR %	NZOR %
MS/OR Department or Service	24.3	0
Management Services, Consulting	22.1	20.0
Information Systems, Computing	13.2	8.0
Senior Management	12.5	12.0
MS/OR Management	7.4	0
Strategic Planning Group	7.4	24.0
Research and Development Group	5.1	16.0
Functional Department	4.4	8.0
Other	3.7	12.0

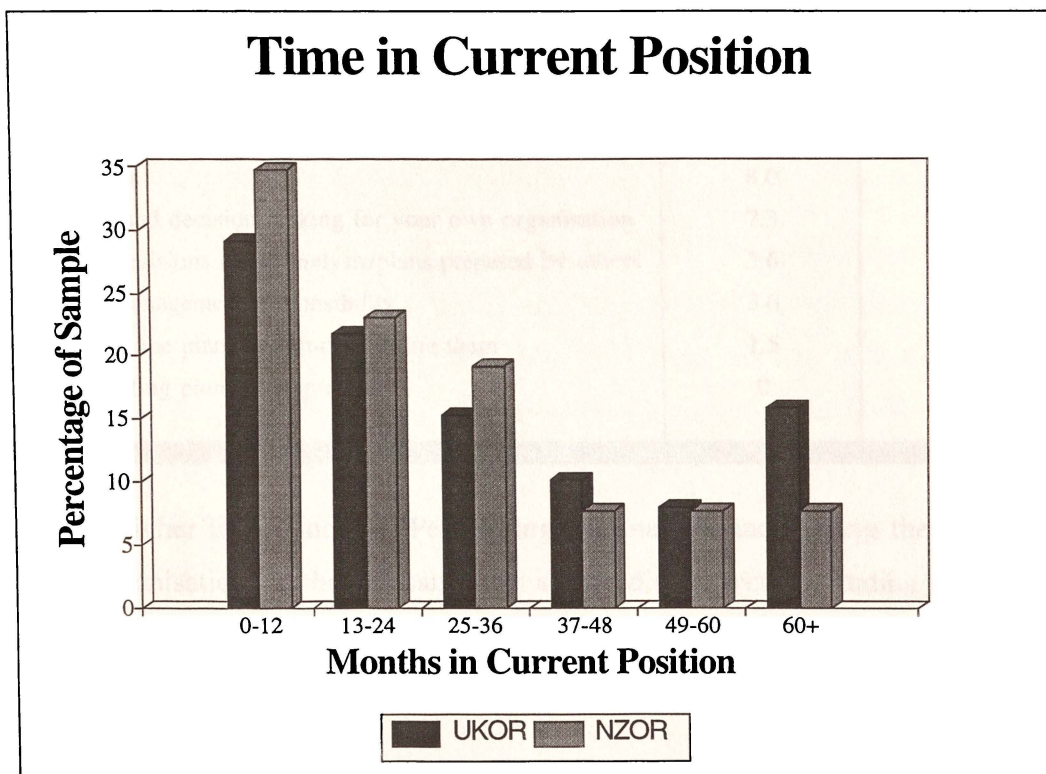
These results show marked differences between the two samples with the exception of the proportions working in Management Services/Consulting and Senior Management. Almost one quarter of the UKOR sample are working in a MS/OR Dept or Service group, and a further 7% are involved in MS/OR Management; neither of these two categories were represented in the NZOR sample. Information Systems/Computing was the third highest area represented in the UK sample, but only ranked sixth in the NZ sample. The NZOR sample has a much higher proportion of respondents working in Strategic Planning groups

and in Research and Development. As there is no universal job title or designation for MS/OR practitioners, these results illustrate the diversity of management areas in which these people are employed. Comparisons with Carter's 1985 UKOR survey are provided in Appendix XVII.

C. Time in Current Position

Given the current mobility of management staff both within and between organisations, the time in the current position may potentially influence the approach adopted and the MS/OR tools used. The length of time in the current position for the UK and NZ MS/OR tool user respondents is summarised graphically in Figure 7.5.

Figure 7.5 Time in Current Position



The results show that just over half of the MS/OR tool users in both countries have held their current positions for 24 months, or less: 51% in the UK and 58% of the NZ sample. At the other extreme, one quarter of the UK sample and 15% of the NZ sample, have been in the same position for over four years. In general, more of the NZ sample have spent shorter periods in their current position than their UK counterparts.

D. Analytical Roles

To investigate the type of strategic involvement, respondents to the questionnaires were

asked to indicate the main role that they perform in their current position, from a set of primarily analytical options. Table 7.5 summarises the proportions of the UKOR and NZOR samples that are involved with each of these analytical roles.

The top three roles account for 84% of the UKOR sample and 92% of the NZOR sample; the dominant role in both samples is 'Performing analysis for management of their own organisation'. In the UK sample 'Performing analysis for outside organisations' ranked in second place, and 'Other roles' is in third place. The combination of 'Analysis and decision making' was ranked second in the NZOR sample, and 'Other roles' is in third

Table 7.5 Main Analytical Role

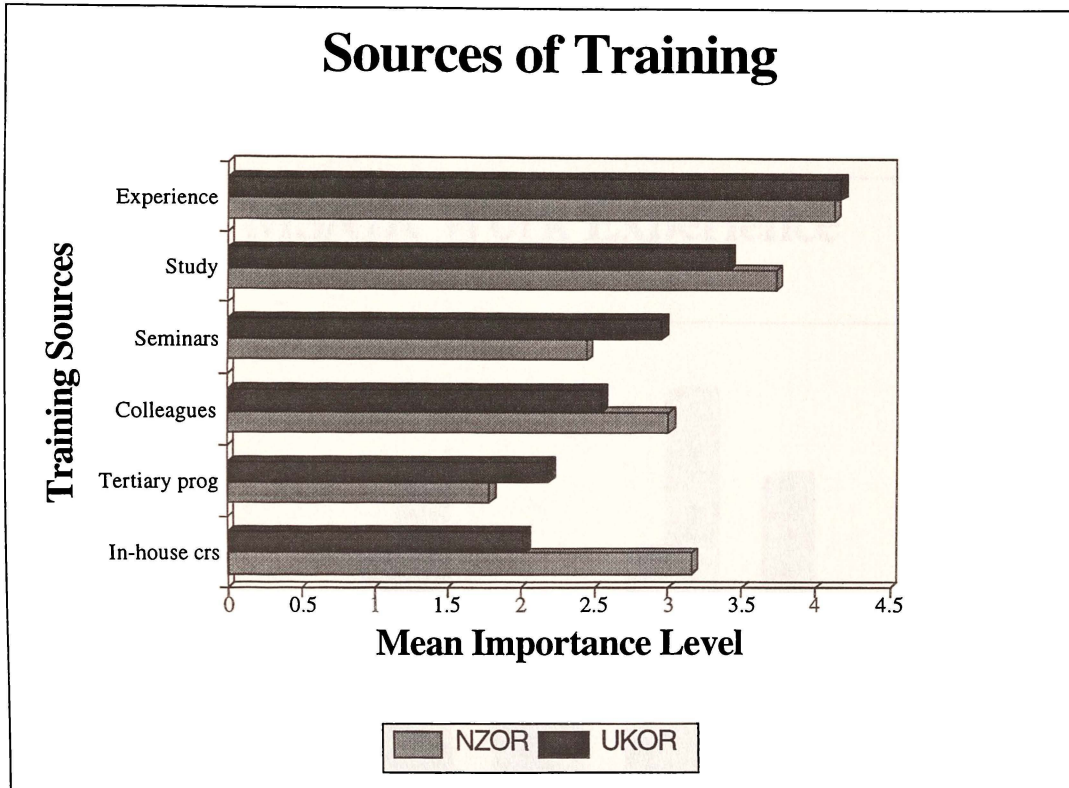
Role	UKOR	NZOR
Analysis for own organisation	51.8	64.0
Analysis for other outside organisations	24.1	8.0
Other roles	8.0	12.0
Analysis and decision making for your own organisation	7.3	16.0
Making decisions using analysis/plans prepared by others	3.6	0
Overall management responsibility	3.6	0
Analysing the plans and implementing them	1.5	0
Co-ordinating plan developments	0	0

place. The higher importance of 'Performing the analysis and making the decisions for your own organisation' in the NZ sample is assumed to reflect the finding of the smaller size of the NZ organisations.

E. Training Sources

As tool usage may potentially be affected by the availability of training, the perceived importance of a set of training sources was investigated. Respondents indicated the level of importance of each source for their current position on a horizontal numerical scale from 1 (not important) to 5 (extremely important). The mean values for each training source for both the UKOR and NZOR samples are presented in a profile chart format in Figure 7.6.

Figure 7.6 Sources of Training



The training sources have been ranked in descending order of the mean values for the UKOR sample. Accumulated Experience, Self Initiated Study and Professional Seminars are the three most important training sources for the UKOR sample. Although the top two training sources in the NZOR sample are the same as in the UKOR survey, the NZ sample also rates In-house Courses and Colleagues as "Moderately Important" on average. Professional Seminars and Tertiary Programmes have lower mean values in the NZ sample than in the UK; In-house Courses are the least important training source in the UK.

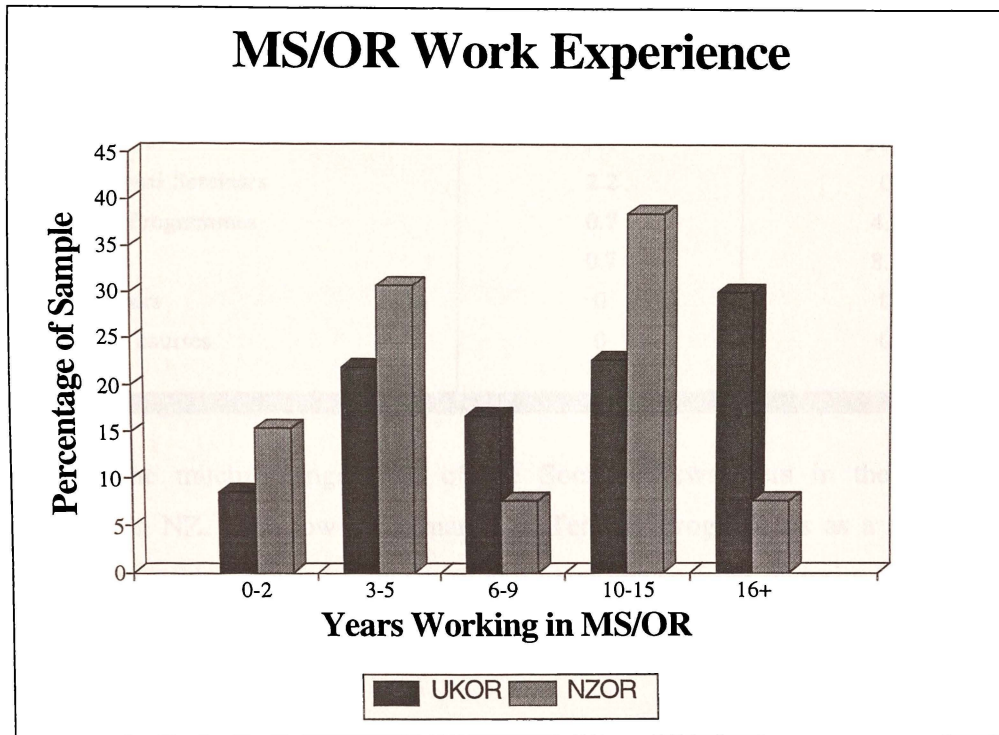
F. MS/OR Work Experience

Experience provides a foundation of knowledge, understanding and skills on which to build and develop. Thus, expertise in the discipline develops over time, and this will potentially influence the strategic tools which are adopted and applied. The number of years MS/OR work experience for the UKOR and NZOR samples is shown in Figure 7.7.

Almost half of the strategic MS/OR tool users in NZ and approximately one third of the UK sample have worked in MS/OR for 5 years, or less; of these 15% of the NZOR tool users and 9% of the UKOR sample have been involved in MS/OR for two years or less. At the other extreme 8% in NZ and 30% in the UK have been working in MS/OR for more than 15 years. Although the mode for both samples is the same, the mean values

are different: 7.7 years experience in NZ and 12 years experience in the UK. This shows that more of the UK respondents have more MS/OR work experience than their NZ counterparts.

Figure 7.7 MS/OR Work Experience



G. Sources of Information

The concepts and tools of both MS/OR and SM are continually evolving and developing, partially in response to the dynamic global environment. This creates pressures to keep up to date with new developments in these disciplines. The sources of information on new MS/OR developments were investigated by requesting respondents to indicate their main information source. Table 7.6 shows the results from both MS/OR samples ranked in descending order by the UKOR sample proportions.

Although Journals are the most important source of new information for both samples, the rest of the rankings and proportions are all quite different. In the UKOR sample, the top three information sources account for 85% of the sample, with Journals providing almost half of this total; Society Newsletters follow in second place, and Colleagues are the third most important source of new information. In the NZOR sample, the top three information sources which account for almost the same proportion of the sample total (87%), include Journals, Conferences, and Other sources. It is interesting to see these differences,

Table 7.6 Main Information Source

Information Source	UKOR %	NZOR %
Journals	41.2	56.5
Society Newsletters	33.8	4.3
Colleagues	10.3	4.3
Business Magazines	5.9	0
Conferences	5.1	21.7
Professional Seminars	2.2	0
Tertiary Programmes	0.7	4.3
Other	0.7	8.7
Newspapers	0	0
In-house courses	0	0

particularly the much stronger role of the Society Newsletters in the UK, and of Conferences in NZ. The low performance of Tertiary Programmes as a source of new information possibly reflects the maturity and experience of the majority of the samples. In addition, it suggests that once qualified, practitioners do not maintain links with tertiary institutions.

H. Educational and Professional Qualifications

Information was also collected on the educational and professional qualifications of the MS/OR tool users. The respondents had tertiary educational qualifications in a wide range of disciplines including accounting, education, economics and engineering. The top four educational areas in the UKOR sample were: Mathematics/Statistics (61%), Management/Business Studies (41%), Social Science (25%) and MS/OR (15%). In the NZOR sample the top areas were: Mathematics/Statistics (54%), Management/Business Studies (39%), Engineering (31%), and Science (23%). The highest level of educational qualification attained by the MS/OR tool users is summarised in Table 7.7 for both samples.

The top three highest qualifications were the same for both samples: Masters degree, First Degree and Doctorate. There are two major differences between the proportions of these qualifications held by the strategic tool users: the UKOR sample has a higher proportion of Masters graduates, and the NZOR sample has a higher proportion at First degree level.

In addition, the respondents hold a wide range of professional qualifications. The three dominant professional categories in the UK sample included Management/Business Studies

Table 7.7 Highest Educational Qualifications

Qualification	UKOR %	NZOR %
Diploma	1.4	3.8
First Degree	29.5	38.5
Masters	54.0	42.3
MBA	2.9	0
Doctorate	11.5	15.4
Other	0.7	0

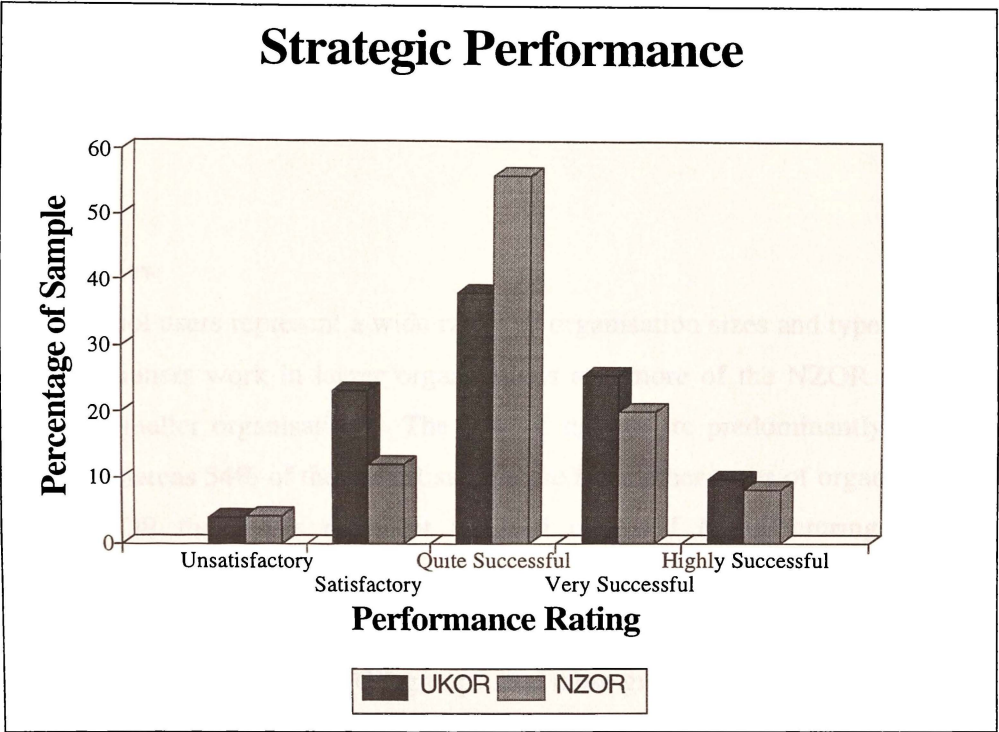
(41%), Mathematics/Statistics (25%) and Accounting/Finance (21%). In the NZOR sample, the three top areas of professional training were: Engineering (50%), Management/Business Studies (20%), and Accounting/Finance (20%).

I. Strategic Performance Rating

There is no standard measure of the effectiveness of strategic performance. The simplest approach is to examine output measures of financial performance. However, there are also process based approaches for evaluating the effectiveness of the planning systems and staff, or the achievement of strategic objectives. Comparative approaches, within and across, sectors and industries, are also applicable as strategic performance measures. As all of these approaches require specific detailed information it was not possible to include this topic in this research. Nevertheless, to provide some indication of the participants strategic performance, respondents were asked to indicate the successfulness of their strategic modelling efforts. The perceived strategic performance ratings for both MS/OR samples are shown in Figure 7.8.

The modal category for both samples is the "Quite Successful" rating; however, the NZOR sample has 18% more respondents indicating this performance level than in the UK. The levels indicating unsatisfactory performance are low (4%) in both samples. However, in the remaining performance categories, the UKOR sample has higher proportions than the NZOR samples. Overall, both sets of results resemble a normal distribution curve for this factor. Data is not available to compare the personally perceived performance ratings with organisational expectations or other external measures of strategic performance.

Figure 7.8 Strategic Performance Rating



J. Demographic Statistics

Primarily for comparative purposes, basic demographic statistics on age and sex were collected; these are summarised in Table 7.8.

Table 7.8 Sample Demographics

	UKOR %	NZOR %
Age:		
Under 30	33.8	34.6
30 - 39	22.3	30.8
40 - 49	26.6	30.8
50 - 59	13.7	3.8
60, plus	3.6	0
Sex:		
Female	20.4	15.4
Male	79.6	84.6

Approximately one third of both samples are in the youngest age bracket (under 30). However, the UKOR sample has more older respondents (over 50) than the NZOR sample.

The NZOR sample has higher proportions in the 30-39 and 40-49 age groups. The male/female proportions are approximately 4:1 in the UKOR sample and 5.5:1 in the NZOR sample. This UKOR sample has twice as many female respondents as Carter's 1985 survey, which suggests that more women are now working in this discipline in the UK.

7.2.3 Overview

The MS/OR tool users represent a wide range of organisation sizes and types; more of the UKOR practitioners work in larger organisations and more of the NZOR tool users are employed in smaller organisations. The UKOR sample are predominantly employed in Companies, whereas 54% of the NZOR sample are from other types of organisations. The strategic MS/OR tool users represent a broad range of Manufacturing and Service industries; three of the top categories common to both samples include Manufacturing/Engineering, Energy, and Information/Computers. More of the UKOR organisations have specialist MS/OR groups, and these groups are much larger on average than their NZ counterparts. Although a higher proportion of the NZOR organisations have Strategic Planning groups, these groups are larger on average in the UK. The overall strategic position of the organisations was considered; Stability was the modal category for the NZOR sample. In the UK one third of the organisations are currently following a Retrenchment strategy; both Growth and Stability positions were recorded for a further 23% of the UK organisations.

The strategic MS/OR tool users spend significant proportions of the work time on other types of work; only 33% of the UKOR and 11% of the NZOR practitioners have more than 80% of their time for MS/OR tasks. The proportion of MS/OR time spent on strategic projects is 68% for the UKOR tool users and 81% for the NZOR tool users. These results are significant given the low profile and recognition of the strategic contribution of MS/OR.

Most of the strategic UKOR practitioners are based in three management areas: MS/OR department, Management Services/Consulting, and Information Systems/Computing; in the NZOR sample the three top areas were Strategic Planning, Management Services/Consulting, and Research and Development. At least half of the MS/OR practitioners are in both countries are primarily performing analysis for their own organisations. The mobility of management staff/positions was demonstrated as the majority of the MS/OR

tool users have held their current positions for 24 months, or less. Similarly, many of the MS/OR respondents have limited MS/OR work experience having been employed in MS/OR for 5 years or less; mean values show that on average the UKOR respondents have more MS/OR work experience than their NZ counterparts. Moreover, the MS/OR tool users from both countries rate their personal strategic performance efforts as "quite successful".

The most important sources of training for the MS/OR tool users in both samples were Accumulated Experience and Self Initiated Study. However, the top three sources of information on new developments differ in the two countries: Journals, Society Newsletters, and Colleagues account for 85% in the UKOR sample; while in the NZOR sample, Journals and Conferences were the main sources of information for 78% of the sample.

The MS/OR tool users hold a wide range of educational and professional qualifications. A higher proportion of masters degree holders in the UK sample, and more engineering and science tertiary qualifications in NZ. As far as the demographic statistics are concerned, approximately one third of both samples are in the youngest age bracket (under 30) and the UK has more in the older age groups. The majority of the MS/OR respondents were males; 80% in the UKOR and 85% in the NZOR sample.

A descriptive summary of the key factors from the organisational context and personal backgrounds of the MS/OR tool user respondents from the UKOR and NZOR surveys has been presented and discussed. Comparisons have been made between the two samples to identify similarities and specific differences between them. The key results from these strategic MS/OR tool users will be outlined in the remaining sections of this chapter; starting with tool usage results for the SM process tasks.

7.3 Strategic Management Process Tool Usage Results

The SM process model provides a set of core strategic tasks which can be used to collect information on strategic tool usage. In the questionnaire respondents were asked to indicate a "yes" response for all of the task areas in which they use tools. Space was also provided to list the names of the specific tools being used in each area. In this section the tool user proportion results will be presented for each of the three SM phases.

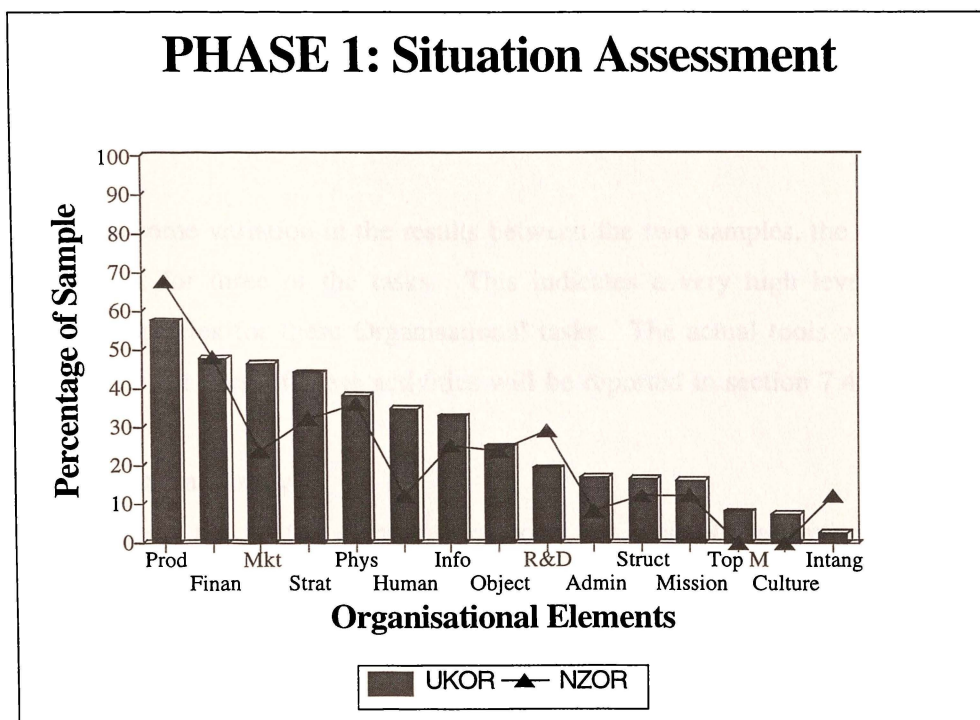
7.3.1 Phase 1: Situation Assessment

Phase 1 involves an evaluation of the current strategic position of the organisation and the identification of strategic issues. This is operationalised by reviewing fifteen internal Organisational areas and eleven external Environmental influences. The use of tools to support the review of these areas was investigated. First, the results from the Organisational Analysis will be presented, followed by the Environmental Analysis findings.

A. Organisational Analysis

The percentage of the UKOR sample who indicated that they use tools for each of these Organisational areas are shown in Figure 7.9. The Organisational elements have been sorted in descending order by the proportion of the UKOR tool users. The NZOR results are also included in this figure in a line graph format to facilitate comparisons.

Figure 7.9 Organisational Analysis: UKOR vs NZOR



In the UK some MS/OR people are using tools in all of these Organisational areas; however two of the tasks are not supported by tools in the NZOR sample. The top two areas for both samples reflect the traditional MS/OR domain: analysis of the Production/Operations and Financial Resources. In the UKOR sample the next two areas are Marketing/Distribution and evaluating Strategy, which are not generally recognised

areas for MS/OR contribution; in the NZOR sample, Physical Resources and evaluating Strategy are ranked in the third and fourth positions respectively. At least 44% of the UKOR sample are involved with each of the top four tasks, whereas only the top two tasks in the NZOR sample have involvement from more than 40% of the tool users.

Although the proportion of UKOR tool users for eleven of these areas is higher than the NZ proportion, the differences are comparatively small. This was confirmed with a chi square statistical test which found only three significant differences at the .05 level (Appendix XVIII) for Human Resources, Marketing/Distribution and Intangible Resources. The mean number of Organisational areas for the UKOR tool users was 3.8 with a mode of 3. The NZOR sample had a mean of 3.3 Organisational areas and a mode of 2. The number of the Organisational areas ranged from 0 to 15 in the UKOR sample, with small numbers of individuals using tools for ten or more of these tasks. However, in the NZOR sample the tool users were only involved with up to eight of the fifteen tasks. Only 12-14 % of both samples were not involved with tool use for any of these tasks. These results demonstrate the diversity of application areas for MS/OR practitioners and MS/OR tools. Although the percentages are quite low in some of the areas, they indicate potential areas of MS/OR involvement and contribution.

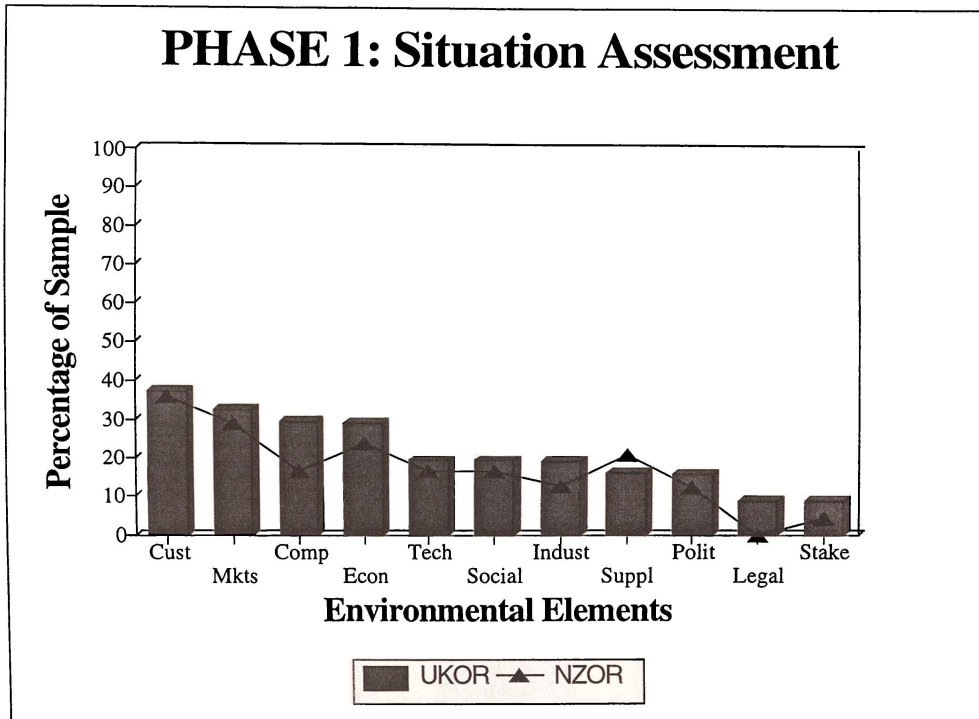
While there is some variation in the results between the two samples, the differences are only significant for three of the tasks. This indicates a very high level of similarity between the countries for these Organisational tasks. The actual tools which are being used in practice for each of these activities will be reported in section 7.4.

B. Environmental Analysis

The percentage of the UKOR sample using tools for each of the Environmental areas, ranked in descending order, are shown in Figure 7.10. Again, the NZOR tool user results are also included in this figure in a line graph format for comparative purposes.

The results show that some of the MS/OR practitioners from both samples are using tools in all of these Environmental areas. With the exception of Suppliers, the NZOR tool user proportions are all lower than the UKOR percentages for the Environmental Analysis tasks. However, the variation is not statistically significant (at .05 level) for any of these Environmental tasks (Appendix XVIII).

Figure 7.10 Environmental Analysis: UKOR vs NZOR



The top two Environmental areas for the both samples are evaluating Customers, and Markets. Competitors and Economic Trends are the next two in the UKOR; the same two feature next in the NZOR sample, however the ranking of these two tasks is reversed. At the other extreme, less than 10% of both samples are involved with tool use for evaluating Legal Developments and Stakeholders.

Half of the respondents in both samples were not involved with tool use for any of the Operating Environmental areas. In the UKOR sample, 25% were involved with 3 or more of these operating areas, compared with only 12% of the NZOR sample. The mean number of these Operating Environment areas is very close for both samples: 1.4 for the UKOR and 1.1 for the NZOR sample.

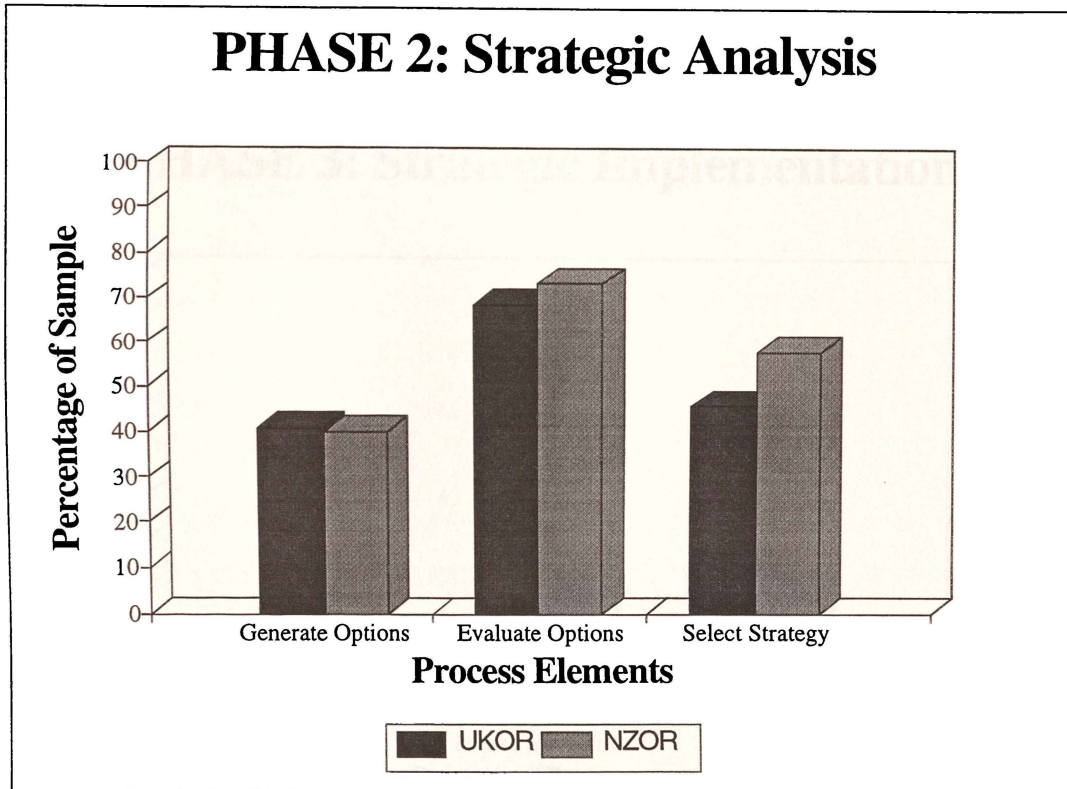
For the Remote Environmental tasks, 60% of both samples were not involved with any of these tasks. However, 15% of the UKOR sample and 8% of the NZ sample were involved with three or more of these tasks. The mean Remote Environmental tool use values are also very similar: 0.86 in the UKOR sample and 0.65 in the NZOR sample.

7.3.2 Phase 2: Strategic Analysis

Phase 2 involves three key Strategic Analysis tasks to identify/select the best strategy for

the future. Figure 7.11 shows the percentage of the UKOR and NZOR samples using tools for each of the Strategic Analysis tasks.

Figure 7.11 Strategic Analysis: UKOR vs NZOR



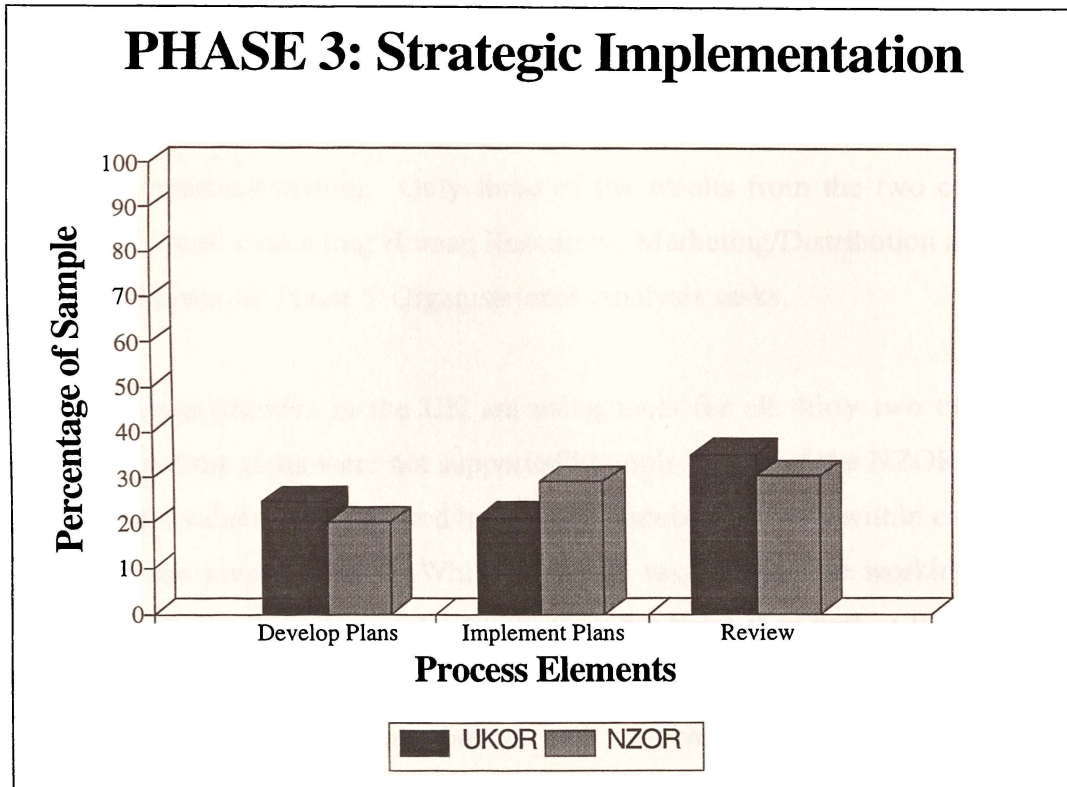
The same pattern of similar results between the two countries has been found; no statistically significant differences were observed. The level of tool use for these tasks is comparatively high, with over 40% of both samples being involved in each of these tasks. Evaluating Alternative Strategies is the top strategic task for both MS/OR samples: 68% of the UKOR sample and 73% of the NZOR sample are using tools for this task. This reflects the traditional role of MS/OR to develop models as a means of investigating alternative systems or options. In the UK, 46% of the sample are using tools for the Strategy Selection process; compared with 58% in the NZ sample. The generation of Strategic Alternatives is also supported by tools, by 40% of both samples.

The mean number of these three tasks, for which the MS/OR practitioners are using tools, is 1.47 in the UK and 1.69 in NZ. Further, 24% of the UKOR sample are using tools for all three of these tasks and 35% of the NZOR sample. Looking at the non-participants, 23% of the UKOR sample and 30% of the NZOR sample are not involved with any of these Strategic Analysis tasks.

7.3.3 Phase 3: Strategic Implementation

Phase 3 involves three key tasks which enable/facilitate implementation of the strategy. The percentage of the UKOR and NZOR samples using tools for each of the Strategic Implementation tasks is shown in Figure 7.12.

Figure 7.12 Strategic Implementation: UKOR vs NZOR



Again, the results show the involvement of some MS/OR practitioners with each of the Strategic Implementation activities, and the similarity in tool use between the two countries. There is some variation between the two samples, but the differences are not statistically significant. Sixty percent of both samples are not involved with tool use for any of these Strategic Implementation tasks. As a discipline which has traditionally focussed on operational performance improvements, MS/OR could be expected to have a major emphasis in this SM Phase, which deals with "operationalising the strategy". However, these comparatively low results can be explained in part by the modelling/analyst role which the majority of the sample are performing for management in their own or other outside organisations; often they are providing inputs for strategic decision making, rather than being part of the Strategic Implementation process. Other situations which do not reach the implementation stage include exploratory feasibility studies, or cases in which the decision is made not to proceed with a particular strategic project.

The mean numbers of these three tasks which the practitioners are using tools for is .76 in the UK and .73 in NZ. Further, 12-14% of both MS/OR samples are using tools for all three of these Strategic Implementation tasks.

7.3.4 Conclusion

The SM framework was used to collect information on strategic MS/OR tool usage for a set of core strategic tasks. The proportions of tool users for each task in each of the three SM Process Phases were reported for the UKOR and NZOR samples. As with the SM results in chapter 6, the striking similarity between the results from the two countries was confirmed by statistical testing. Only three of the results from the two countries were found to be different: evaluating Human Resources, Marketing/Distribution and Intangible Resources; these are all Phase 1 Organisational Analysis tasks.

Some MS/OR practitioners in the UK are using tools for all thirty two of these tasks; however, three of the tasks were not supported by tools by any of the NZOR respondents. Mean and modal values were reported to show the numbers of tasks within each phase that the tool users are involved with. While all of the respondents are working in multiple areas, only small numbers are involved with tools for more than half of the tasks in each phase. Although the percentage of tool users is quite low for some tasks, they signal potential areas for MS/OR contribution and involvement. Moreover, the results demonstrate the diversity of strategic application areas for MS/OR practitioners and MS/OR tools.

The Strategic Analysis Phase is the top phase for both MS/OR samples, and evaluating Alternative Strategies is the top strategic task. This reflects the traditional role of MS/OR to develop models as a means of investigating alternative systems or options. The level of MS/OR tool involvement in the Strategic Implementation phase is comparatively low (20-35%) given the traditional role of MS/OR in resource allocation and operational planning. These results reflect in part the modelling/analyst role which the majority of the practitioners are performing for management of their own or other external organisations.

In the next section, the tools which are being used in practice for each of these tasks will be presented and discussed.

7.4 Top Tools Used In Practice

The SM process model was also used to collect information on the tools which are currently used in practice. In the questionnaire, space was provided for respondents to record the names of the tools which they use for each task.

A checklist was not provided for this section as it was felt that this would restrict the responses to the named subset of tools available. With the diversity of tools expected from the two disciplines, it was also determined that a very long checklist would act as a deterrent for many potential respondents; having to find each of their tools on a master list would increase their time required to complete the questionnaire.

Many respondents included multiple tools for each of the tasks that they are involved with. A master list of 440 approaches was prepared from all four surveys prior to collation of the results. For comparative purposes only the **top tools** will be reported in this chapter for each of the strategic areas; this provides an indication of the most frequently used tools for each task. This is an average result from the whole sample based on current practice and therefore reflects the status quo. Unfortunately, it cannot at the same time incorporate the diversity of approaches which are used for each task; that will be addressed separately.

For some tasks many tools were highly rated, but for others there were no clear "leaders" as all of the respondents were using different tools. The small size of the NZOR sample means that no tools will be reported for many of the tasks as no clear "leaders" were found. In this chapter up to five top tools will be reported for each task.

7.4.1 Top Tools Used in Phase 1: Situation Assessment

The top tools used for the Phase 1 Organisational and Environmental analysis tasks by the UKOR and NZOR samples will be presented in this section.

A. Top Tools Used for Organisational Analysis

The most frequently mentioned top tools for each of the Organisational tasks are summarised in Table 7.9 for the two MS/OR samples. For the organisational features (at the top of the table), top tools are reported for three of the six tasks from the UKOR sample only. Brainstorming and Spreadsheets appear in the top sets for all three of these tasks, and Porter's Five Forces features twice. MS/OR practitioners have not traditionally been involved with these tasks; it is interesting to see that the top tools include these non-

traditional approaches.

Top tools are reported for seven of the resource areas from the UKOR sample and five from the NZOR sample. Spreadsheets stand out as the tool which is most widely used in both samples; this demonstrates the importance of Spreadsheet Modelling as a technological support tool for a wide range of the resource areas. Statistics occur in the top set for five resource areas in the UK. Both Forecasting and Simulation contribute to four resource areas in the UK and two in the NZOR sample. Finally, Math Programming features three times in the NZOR top tool sets.

Table 7.9 Organisational Analysis Top Tools

Task	UKOR	NZOR
Mission	Brainstorming, Spreadsheets, Porter's 5 Forces, Soft Systems	
Objectives	Brainstorming, Spreadsheets, Porter's 5 Forces	
Strategy	Simulation, Spreadsheets, LP, Heuristics, Brainstorming	
Structure		
TopM style		
Culture		
Resources:		
Financial	Spreadsheets, Lotus, Financial Models, Forecasting	Spreadsheets, iThink
Human	Spreadsheets, Simulation, Forecasting, Statistics	
Mktg/Distbn	Spreadsheets, Statistics, Forecasting, Simulation	Spreadsheets, Databases, Math Programming
Prodn/Opns	Simulation, Spreadsheets, LP, Statistics, Surveys	Simulation, Math Programming, Spreadsheets
Physical	Simulation, Spreadsheets, Statistics, Forecasting, Heuristics	Forecasting
Info Systems	LP, Spreadsheets, Databases	
Admin Systems		
Intangibles		
R and D	Spreadsheets, In-house models, Statistics	Forecasting, Math Programming, Simulation

B. Top Tools Used for Environmental Analysis

Table 7.10 summarises the top tools for each of the Environmental Analysis areas for the

UK and NZ samples.

Table 7.10 Environmental Analysis Top Tools

Task	UKOR	NZOR
Operating Environment		
Industry	Spreadsheets, Forecasting, Regression	
Markets	Spreadsheets, Forecasting, Statistics	Forecasting, Statistics
Competitors	Spreadsheets, Forecasting, Modelling, LP	
Customers	Spreadsheets, Statistics, Forecasting, Surveys	
Suppliers	Spreadsheets, Forecasting	
Stakeholders	Soft Systems, Spreadsheets	
Remote Environment		
Economic	Forecasting, Statistics, Spreadsheets, Lotus	Forecasting, Statistics
Govt/political	Spreadsheets, Financial Models	Forecasting
Legal	Risk Analysis	
Social trends	Forecasting, Statistics, Spreadsheets	
Technological	Spreadsheets	

For the Operating Environmental tasks, Spreadsheet Modelling and Forecasting are the top tools in the UK for almost every task; and Statistics is in the top set for two of the tasks. Only one result from the NZOR sample: Forecasting and Statistics are the top tools for evaluating Markets. Some approaches which achieve top ranking for one of the tasks in the UK sample include Surveys, Modelling, Regression and Soft Systems.

In the Remote Environmental areas, Spreadsheet Modelling is again the tool that features most often in the UK top tools. Statistics and Forecasting also feature for two of the Environmental tasks in the UK. In the NZ sample, top tools were recorded for two of the tasks: Forecasting is used for both of these areas, and Statistics for the evaluation of Economic trends.

7.4.2 Top Tools Used in Phase 2: Strategic Analysis

The top tools for each of the Strategic Analysis tasks are listed in Table 7.11.

Table 7.11 Phase 2: Strategic Analysis Top Tools

Task	UKOR	NZOR
To generate alternative strategies	Spreadsheets, Simulation, In-house models, LP	Delphi, Simulation
To evaluate alternative strategies	Spreadsheets, Simulation, Cost Benefit, LP, Statistics	Spreadsheets, Cost Benefit, Net Present Value, Simulation, SAS
To select a specific strategy	Spreadsheets, Simulation, LP, Cost Benefit	Cost Benefit, Spreadsheets, SAS

For the UKOR sample a common set of top tools for all three Strategic Analysis tasks includes Spreadsheet Modelling, Simulation and LP; Cost Benefit Analysis occurs in the top tool sets for two of the tasks. In the NZOR top tool results, Spreadsheet Modelling, Simulation, Cost Benefit and SAS all appear twice.

7.4.3 Top Tools Used in Phase 3: Strategic Implementation

Table 7.12 summarises the top tools for each of the Strategic Implementation tasks for both of the MS/OR samples.

Table 7.12 Phase 3: Strategic Implementation Top Tools

Task	UKOR	NZOR
To develop plans to implement the strategy	Project Management, Spreadsheets, Simulation, In-house Models	PERT, Critical Path
To assist with implementation of the strategy	Project Management, Spreadsheets, In-house Models, Simulation	
To monitor/review the strategic performance	Spreadsheets, Statistics, Project Management, Simulation	Spreadsheets, SAS

For the UKOR sample the common set of top tools for all three Implementation tasks includes Project Management, Spreadsheet Modelling and Simulation; In-house Models also occur in the top tool sets for two of the tasks.

7.4.4 Conclusion

These results provide evidence of the top tools which are used for each of the strategic tasks in practice by MS/OR practitioners in the UK. It is interesting to see that

Spreadsheet Modelling emerges as the dominant top tool in each of the three phases. Another tool which features strongly in all three phases is Simulation; however, in the Environmental Analysis tasks Simulation is replaced by Forecasting as the dominant approach. In Phase three Project Management features in the top tool sets along with Spreadsheet Modelling and Simulation.

In the UK, Forecasting featured in the top tool sets for the phase one resource evaluation, Porter's Five Forces in the Operating Environmental analysis, and PEST and Scenarios were dominant in the Remote Environment area. The NZ sample was too small for leading tools to emerge for many of the tasks; this means that country-specific differences and commonality comparisons have not been possible.

In general, the results confirm the use of a range of different types of tools for most of these strategic tasks. The majority of the top tools are general approaches, rather than specific to the particular task or area; furthermore, most of the top tools focus on content rather than aspects of the modelling process. While the top tools are predominantly quantitative approaches, there are also some qualitative approaches such as Porter's Five Forces, Brainstorming and Delphi appearing. It is interesting to see that Soft Systems occurs in the top tool set for two of the strategic tasks in the UK sample, as it is one of the 'newer soft' approaches developed in the UK. In conclusion, these findings demonstrate the range of top tools which are used in practice by MS/OR practitioners for these strategic tasks.

7.5 Familiarity with MS/OR Tools

A sample of twenty five MS/OR tools was used to investigate the levels of awareness, familiarity and usage of tools in both countries. Respondents were asked to indicate how familiar they were with each of these tools by selecting one of the options: (1) Don't Know, (2) Know About, (3) Know Well Enough To Apply, or (4) Have Used. The comparative results for the both countries will be presented, starting with the tools which are highly ranked for usage (option 4), and working through to those which are not known (option 1).

7.5.1 Tools which Respondents "Have Used"

The tools which have been used by over 20% of the UKOR sample are listed in descending order in Table 7.13. In addition, the corresponding proportion and ranking for

each tool from the NZOR respondents are included.

Table 7.13 Tool Familiarity: Tools Used

Tool	UKOR		NZOR	
	Rank	Have Used %	Rank	Have Used %
Spreadsheets	1	83.7	1	91.7
Simulation	2	71.3	3=	70.8
Forecasting	3	62.2	2	75.0
Project Management	4	49.6	5	66.7
Math Programming	5	49.2	6	62.5
Cost Benefit Analysis	6	45.1	3=	70.8
Decision Support Systems	7	42.6	8=	21.7
Heuristics	8	34.6	7	26.1
Inventory Modelling	9	30.5	11=	20.8
Corporate Models	10	24.1	11=	20.8
Decision Analysis	11	22.0	8=	21.7

The top tool for usage in both countries is Spreadsheet Modelling; this is consistent with the results from the previous section. Simulation occurs in second place in the UKOR sample and Forecasting is ranked second by the NZOR sample. Although the comparative rankings vary, for three of the listed tools the usage proportions are essentially the same for both samples (within 5%); a further three of the tools are used by only 5-10% more, in one of the samples. The remaining five tools show over 10% variation in usage proportions: Cost Benefit Analysis (25.7%), Project Management (17.1%), Math Programming (13.3%), and Forecasting (12.8%) have higher usage frequencies in NZ; while Decision Support Systems (20.9%) are have been used by more of the UKOR practitioners.

Three of the tools in the UK have been used by over 60% of the MS/OR practitioners; however, in the NZOR sample six tools were above this level of usage. The top three tools are the same in both samples, although the second and third ranked tools are interchanged. Simulation and Forecasting are commonly used by the MS/OR practitioners for a wide range of the strategic tasks (as outlined in section 7.4). This subset of tools also contains basic approaches for financial evaluation (Cost Benefit Analysis), project implementation (Project Management), technological support (Decision Support Systems) and resource allocation (Math Programming). Finally, these tools are all general

approaches which focus on content, rather than aspects of the modelling process.

7.5.2 Tools which Respondents "Can Apply"

The tools, which over 20% of the UKOR respondents "Know well enough to apply", are listed in descending order in Table 7.14, along with their corresponding proportion and rankings from the NZOR survey.

Table 7.14 Tool Familiarity: Can Apply

Tool	UKOR		NZOR	
	Rank	Can Apply %	Rank	Can Apply %
Math Programming	1	34.8	4=	25.0
Decision Analysis	2	33.9	2	34.8
Project Management	3	30.8	7	20.8
Cost Benefit Analysis	4	27.1	8=	16.7
Inventory Modelling	5=	25.2	1	45.8
Forecasting	5=	25.2	8=	16.7
Game Theory	7	22.5	4=	25.0

This category was included to distinguish between the tools which are *actually* used and those which are *well known*, but *not applied*, for whatever reasons. Only seven tools were rated in this category by more than 20% of the UKOR sample, and five of these tools were also over 20% in the NZOR sample. The UK proportions are 8-10% higher for four of these tools; Inventory Modelling has a 20.6% margin in the NZOR sample proportion, which is the largest variation between the two samples.

These tools, which can potentially be applied without any additional training, are again general approaches which are primarily quantitative. The top three tools in this category are traditional MS/OR techniques for resource allocation, evaluating options and project planning.

7.5.3 Tools which Respondents "Know About"

The tools which respondents have heard about, but do not know well enough to apply or use, were also identified. Table 7.15 summarises those tools which over 20% of the UKOR sample "Know About", and includes the corresponding proportions and ranking from the NZOR survey.

Table 7.15 Tool Familiarity: Know About

Tool	UKOR		NZOR	
	Rank	Know About %	Rank	Know About %
Expert Systems	1	57.7	1	54.2
Game Theory	2	53.5	3	50.0
Soft Systems	3	48.0	15	13.6
Multiple Criteria DM	4	43.3	5	41.7
Cognitive Mapping	5	41.3	13=	17.4
System Dynamics	6	39.1	10	29.2
Heuristics	7	36.2	4	43.5
Delphi	8	33.6	6	37.5
Decision Analysis	9	32.3	7	34.8
Corporate Models	10	31.6	17=	17.4
Decision Support Syst	11	31.0	2	52.2
Inventory Modelling	12	27.5	8=	33.3
Robustness Analysis	13	27.0	12	22.7
Critical Success Factors	14	23.7	8=	33.3
Strategic Options Devel and Analysis (SODA)	15	22.2	25	0
Cost Benefit Analysis	16	21.8	17=	12.5
Strategic Choice/AIDA	17	21.6	24	4.3
Influence Diagrams	18	20.6	11	27.3

There were eleven tools in the UKOR sample and nine in the NZOR sample, which over 30% of the samples rated in this category. Six of the tools were essentially the same in both countries (within 5%), and a further six tools were familiar to 5-10% more of the respondents in one survey. The tools with over 10% difference in proportions included: Soft Systems (34.4%), Cognitive Mapping (23.9%), SODA (22.2%), Strategic Choice (17.3%) and Corporate Models (14.2), which were higher in the UK; and Decision Support Systems (21.2%) which was higher in the NZ sample.

The tools which are highly ranked in this subset are mostly "newer" approaches which have been developed/promoted during the 1980s. For example, technological tools such as Expert Systems and Decision Support Systems; and qualitative process approaches including Soft Systems and Cognitive Mapping.

7.5.4 Tools which respondents "Don't Know"

The tools which over 20% of the UKOR respondents "Don't Know" are listed in

descending order in Table 7.16. In addition, the corresponding proportion and ranking from the NZOR respondents are included for each tool.

Table 7.16 Tool Familiarity: Unknown Tools

Tool	UKOR		NZOR	
	Rank	Don't Know %	Rank	Don't Know %
Process Improvement	1	80.5	6	60.9
Analytical Hierarchy	2	80.2	3=	78.3
Strategic Options Develop and Analysis (SODA)	3	67.5	1	95.7
Strategic Choice/AIDA	4	67.2	2	91.3
Robustness Analysis	5	54.8	7	59.1
Influence Diagrams	6	52.4	10	50.0
Delphi	7	44.3	12=	29.2
Critical Success Factors	8	43.5	11	54.8
System Dynamics	9	39.8	8=	54.2
Cognitive Mapping	10	38.1	3=	78.3
Corporate Models	11	30.1	8=	54.2
Soft Systems	12	24.0	5	77.3

The tools which were "unknown" by the highest proportions were quite different in both countries; only three of the tools were within a 10% margin in the two samples. More of UK sample do not know Process Improvement (19.6%) and Delphi (15.1%) approaches; while more of the NZ sample do not know about Soft Systems (53.3%), Cognitive Mapping (40.2%), Strategic Options Development and Analysis/SODA (28.2%), Strategic Choice/AIDA (24.1%), Corporate Models (24.1%) and System Dynamics (14.4%).

These results show that significant proportions (24-96%) of both samples do not know these twelve tools. As in the previous category, these are mostly "new" tools and many are quite specific qualitative approaches. For example, Process Improvement involves a series of simple steps and procedures to identify and improve performance of processes and systems; Analytical Hierarchy Process is a prioritising procedure which can handle qualitative elements.

Several of these approaches have been developed and/or promoted in the UK; yet the tools are not known by significant proportions of the UKOR sample. For example, the SODA Methodology and the Strategic Choice approach were both developed in the UK and have

been promoted there in Seminars, Conferences and Journals, yet two thirds of the UKOR sample indicated that they do not know about them. This raises both general questions about the promotion of new tools, and specific questions about the promotion and performance of these particular approaches. Does tool promotion follow a systematic process or is it more accurately described as a 'random walk'? Who engineers the promotion of new tools? What is the role of the tool developers in tool promotion? How quickly do new tools become included in academic courses? in professional development programmes? Looking at the promotion and performance of specific approaches would be useful to provide information on tool "life cycles". However, when a new tool does not appear to "take off", it seems appropriate to also query it's capabilities and effectiveness.

7.5.5 Conclusion

The levels of familiarity, awareness and usage of a sample of twenty five MS/OR tools in NZ and the UK has been examined. The subset of tools at the extreme ends of this continuum of familiarity (Have Used, Don't Know) are almost identical in both countries; and these categories have the highest sample proportions. The highest usage results were for Spreadsheet Modelling, Simulation and Forecasting; the high "unknown" tools were mostly "newer" qualitative approaches.

Looking at the types of tools which feature prominently in each category subset: the highly rated "Have Used" tools are all general approaches which focus on content, rather than aspects of the modelling process; and the "Can Apply" subset are also general tools which are primarily quantitative. The tools which feature highly in the two remaining categories, "Know About" and "Don't Know", are mostly "newer" qualitative approaches which have been developed/promoted during the 1980s.

The results also confirm and quantify high levels of unfamiliarity with half of the sample of MS/OR tools. This raises many questions about the promotion of new tools in general, and about the specific promotion and performance of these particular approaches; thereby signalling the need for further research on these issues. Many of the issues which affect tool usage, including External, Organisational and Personal Factors, will be considered in the next chapter. In the next section, the use of tools for the first time and the functions of tools will be discussed.

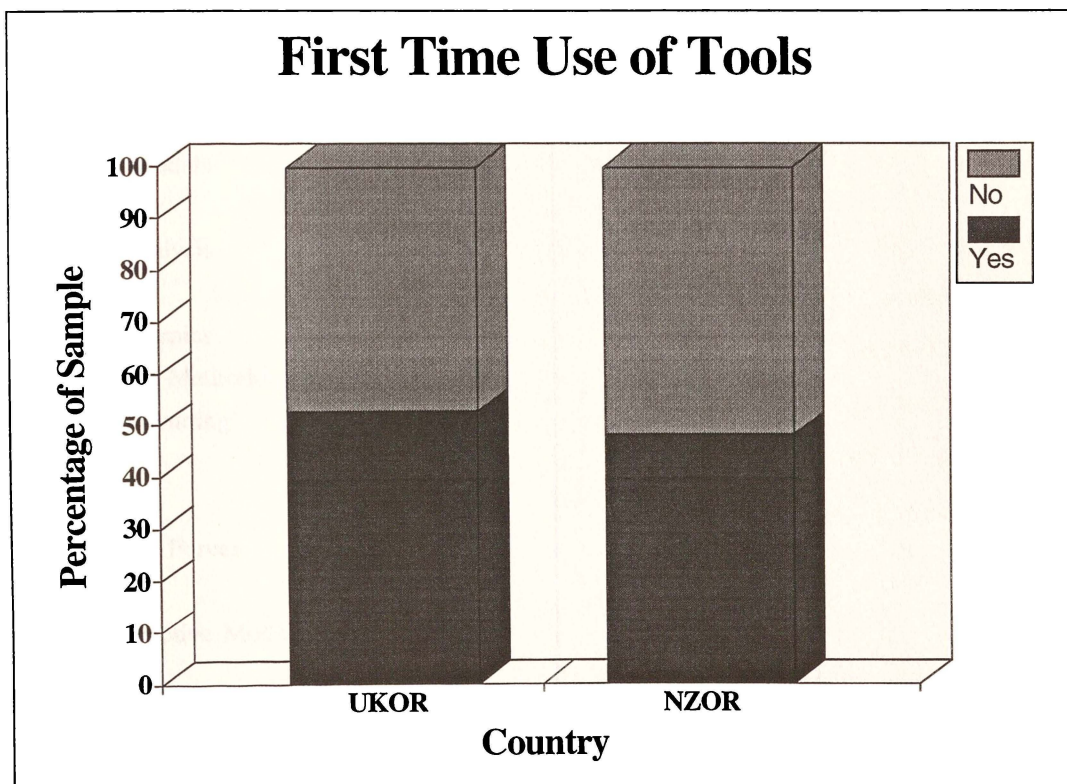
7.6 Use of "New" Tools

Perpetual mobility of staff and positions, combined with continuous development of new approaches, create a scenario which necessitates on-going professional development. Given this context, the incidence of "new" tool usage and the types of tools which are being used for the first time were examined to provide evidence of the status quo. These results from the MS/OR questionnaires will be presented in this section, along with results on the main functions which tools perform.

7.6.1 First Time Use of Tools

The proportion of the MS/OR samples trying a tool for the first time, within the previous two year period, was investigated in the questionnaire. This was included to gauge the responsiveness to new approaches and the types of approaches which were "new" to individual MS/OR practitioners. Figure 7.13 shows the proportions of the UKOR and NZOR respondents samples who indicated "Yes" and "No" responses to this question.

Figure 7.13 First Time Use of Tools



As the graph clearly demonstrates, the proportions of MS/OR practitioners who have used a tool for the first time are almost identical in both samples. Furthermore, the majority of respondents have tried at least one new approach within the previous two year period. Significant proportions of both samples have changed to their current position within that

period, so may need to apply some approaches which are "new" for them. The types of tools which are "new" for the respondents were also collected. A summary of the twenty four most frequently mentioned "new" tools for the UKOR sample, ranked in descending order of frequency, is shown in Table 7.17; the corresponding NZOR frequencies are also listed.

Table 7.17 MS/OR Tools Used for the First Time

"New" Tools	UKOR	NZOR
Strategic Choice	6	
Cognitive Mapping	5	
Simulation	5	1
Expert Systems	5	
Project Management	4	
Multi-Criteria	4	
Spreadsheet Modelling	4	1
Cost Benefit Analysis	3	
Data Envelopment Analysis	3	
Linear Programming	3	1
Statistical Modelling	3	
Demographic Modelling	2	1
Corporate Models	2	3
Game Theory	2	1
Decision Analysis	2	1
Forecasting	2	3
System Dynamics	2	
Soft Systems Methodology	2	
Math Programming	2	
Witness	2	
See Why	2	
Porter's Five Forces	2	
Judgement	2	
Visual Interactive Modelling	2	

There were 55 different tools used for the first time by the UKOR sample, compared with 15 from the NZOR sample. The average number of "new" tools was 1.7 in the UK with a range from 1-5; only one person indicated that all of the tools were "new" and four responded that they were using "many" new tools without specifying the tool names. For the NZOR sample the average was 1.9 "new" tools with a range from 1-4.

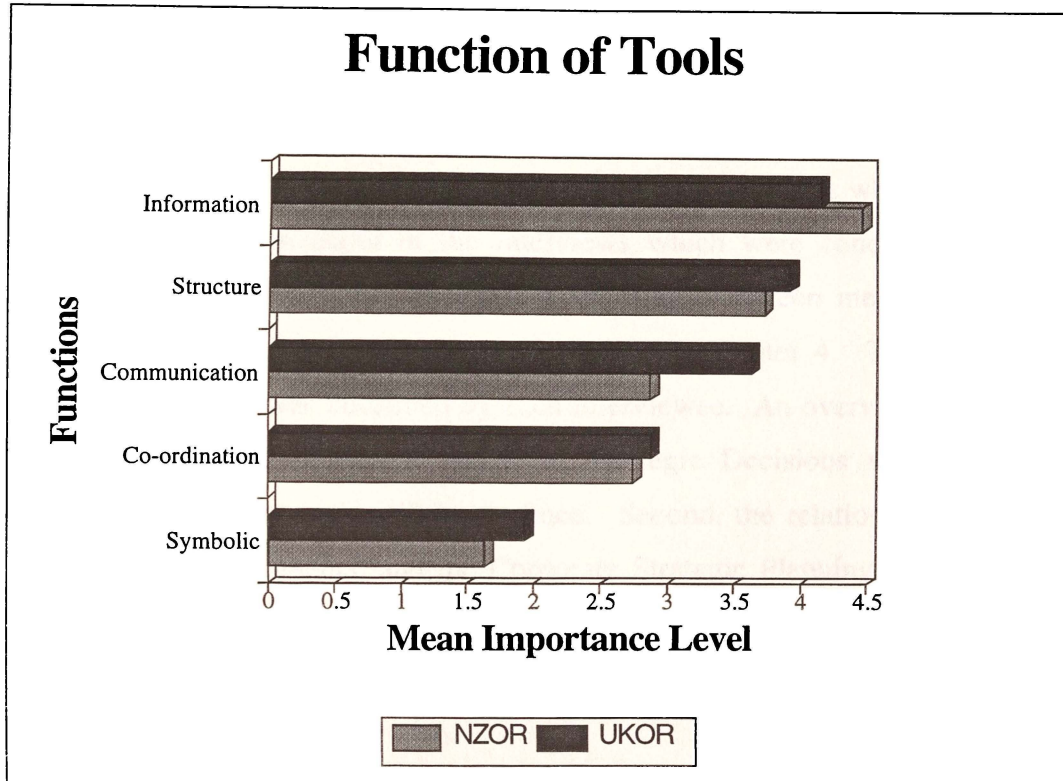
Clearly a wider range of tools were being tried for the first time by the UKOR practitioners including traditional 'hard' approaches (Linear Programming), some of the newer 'soft' approaches (Soft Systems), as well as newer technological approaches (Expert Systems) and some specific software (See Why). The top "new" tool in the UK sample was Strategic Choice which has been developed in the UK and promoted there; and in the NZ sample the most frequently mentioned "new" tools were Corporate Models and Forecasting. While most of the "new" tools in the NZ sample are standard MS/OR approaches, some non-traditional approaches (eg Porter's Five Forces) were tried by the MS/OR practitioners in the UK. It is interesting to see that two UK respondents indicated that they used 'Judgement' for the first time; as it seems unlikely that any practitioner would not have used this fundamental approach before, these are assumed to be new graduates who are in their first positions.

7.6.2 Function of Tools

The main purpose or function of tools was also investigated in the questionnaire using the set of functions proposed by Langley (1988, 1991) and Day (1986). Respondents indicated the level of importance of each function on a horizontal numerical scale from 1 (not important) to 5 (extremely important). The mean values for each function for both the UKOR and NZOR samples are presented in a profile chart format in Figure 7.14.

The functions have been ranked in descending order of the UKOR mean values. This layout shows that the NZOR mean value is higher than the UKOR mean for the first 'Generating information for decision making' function, but less than the UKOR values for all of the other main functions. Although the Communication function was ranked as the third most important function by both samples, the UKOR sample mean was much higher than the NZOR mean. In both samples the use of tools for Symbolic Purposes ranks last and is only "slightly" important.

Figure 7.14 Function of Tools



7.6.3 Conclusion

The same overall pattern of similarity between the two countries was reported for the proportions of tools being used for the first time and the functions of tools. A larger sample of more varied tools had been tried for the first time in the UK. Although the NZOR sample of "new" tool users is much smaller than the UK sample, the NZ average number of new tools is 12% higher than the UK average.

The types of tools being tried for the first time include both traditional 'hard' approaches and some of the newer 'soft' approaches, as well as newer technological approaches and some specific software tools. It is interesting to see the Strategic Choice approach at the top of the UK list, given its high "unknown" rating in the previous section.

The main function of strategic tools, for both practitioner samples, is to 'Generate information for decision making'. To 'Provide a structure for analysis' was ranked in second place, and to 'Encourage the communication of ideas' was the third ranked function.

In the next section the nature of personal involvement in strategic level MS/OR will be

discussed.

7.7 The Nature of Strategic MS/OR Involvement

The nature of personal involvement in strategy will have a major impact on the actual strategic tasks and activities performed, and hence the types of tools which are used. This topic was investigated in depth in the interviews which were conducted with eleven members of the UK Operational Research Society and fourteen members of the New Zealand Operational Research Society, as described in chapter 4. The nature of their involvement in strategy was described by each interviewee. An overview level summary will be presented here. First, the types of Strategic Decisions which the MS/OR practitioners are involved with, will be outlined. Second, the relationships between the MS/OR groups or departments, and the Corporate Strategic Planning personnel in their organisations, will be considered. Finally, a series of roles for MS/OR in strategy will be proposed.

7.7.1 Types of Strategic Decisions

The twenty five MS/OR interviewees, who were employed in a range of different positions (Appendix XIX) were asked to indicate the types of Strategic Decisions that they were personally involved with in their organisations. The responses were recorded from the transcripts and generalised to maintain confidentiality. The similar decisions were grouped together and then categorised into a series of eight Strategic Decision types. This categorisation process enables the diversity of the MS/OR involvement to be described in a summary format. The types of Strategic Decisions are listed below (with the industrial/service areas of the organisations in brackets).

1. Strategic

- evaluating potential strategic alliance partners (airline transportation, manufacturing)
- evaluating mergers and acquisitions (manufacturing)
- evaluating national expansion options (banking, airline)
- evaluating alternative modes of service provision (banking, health)

2. Marketing

- evaluating market potential (banking, health)

3. Human Resources

- human resource modelling to establish HR policies (energy)

4. Financial

- evaluating capital expenditure investments (communication)
- inter-divisional charges (communication)
- pricing decisions (communication)
- modelling major investment decisions (energy)
- evaluating charges for computer database services (computers)

5. Information Technology

- developing IT strategies (manufacturing)
- evaluating IT investments for inter-bank transfer payments (by consultant)
- evaluating telecommunications network capacity (telecommunications)
- evaluating telecommunications equipment options (by consultant)

6. Environmental

- evaluating alternative energy sources (energy)
- assessing the potential impact of external factors (telecommunications)
- developing macroeconomic forecasts for resource allocation decisions

7. Manufacturing

- modelling inventory management strategies (by consultant)
- evaluating turbine technology options (energy)
- developing manufacturing strategy (manufacturing)

8. Services

- modelling social services (local govt)
- modelling pharmaceuticals for health sector policies (health)
- modelling regional allocations for health funding (health)

This summary contains a very broad range of strategic modelling and evaluative projects. While many of these Strategic Decisions reflect typical MS/OR project areas, it is interesting to see the evaluation of strategic alliances and acquisitions, and the strategy development options, included in the MS/OR repertoire. Collectively, this list demonstrates the breadth of strategic application areas for the MS/OR discipline, and significant potential for a major MS/OR contribution to strategic decision making.

7.7.2 Relationships with Corporate Strategy Groups

Another perspective on the involvement of MS/OR in Strategy is to examine the relationships between the MS/OR groups or departments and their Corporate Strategy counterparts. Three distinct types of relationships emerged from the MS/OR interview

responses. These reflect different levels of personal strategic involvement which will influence access to strategic projects, and hence the types of strategic projects conducted by the MS/OR practitioners. To illustrate the diversity here, ten of the organisations from the interview sample will now be listed under these three inter-group relationship categories.

1. MS/OR Group is the Corporate Strategy Group

- * MS/OR group of 10 form the only Corporate Strategic Planning group (energy SOE)
- * MS/OR group of 8 form the only Corporate Strategic Planning group (transportation SOE)

2. MS/OR Group works for/with the Corporate SP Group

- * MS/OR Dept of 10 working at Corporate level (transportation company)
"main customers are the Corporate Strategy Dept" of 50
- * MS/OR group of 30 in Management Services consulting area (telecommunications company) *"providing advice and assistance to Corporate Strategy group" of 20*
- * MS/OR group of 17 in Information Systems Computing Dept (energy company)
"one of our bigger clients is Group Planning"
- * MS/OR group of 25 in Management Services consulting area (communication SOE)
"working on projects for the Strategic Directors"
- * MS/OR group of 3 in R and D Dept work with the Corporate Strategic Planning group of 3 (banking company)
- * MS/OR group of 15 in Management Services consulting area reporting to the Director of Business Development- (manufacturing/engineering company)
"assisting with the development of strategies"

3. MS/OR Group works independently (of Corporate SP Group)

- * MS/OR group of 15 in Information Systems consulting Dept work on Strategic and Operational projects related to IS/IT issues; there is another Strategic Planning consulting group of 18 in the same organisation (consulting company)
- * MS/OR Dept of 22 in Operational Planning division; this organisation has a separate Corporate Strategic Planning group of 10, and other Strategic Planning group of 6 (energy company) who do most of the strategic projects:
"...at the very high levels in the company we don't have the profile or the corporate presence to be able to do it [facilitation]"

This summary contains examples of each of the three types of relationships described by the MS/OR interviewees. It is interesting, perhaps surprising, to see the MS/OR groups performing the Corporate Strategy role; however, this reflects the reliance in both of these organisations on quantitative modelling support for their Strategic Decisions. The second type of relationship, which is co-operative and consultative, is the more common pattern for MS/OR to contribute towards strategic decision making. However, MS/OR groups in the third category are not positioned to provide significant input directly to their Corporate Strategic Planning personnel; they may still be called upon to provide input for specific strategic projects within areas for which they have recognised expertise within their organisations.

7.7.3 Roles for MS/OR in Strategic Management

In addition to the different relationships between MS/OR and Corporate Strategy groups, the types of roles which individual MS/OR practitioners can perform at the strategic level were considered. From the interview responses a series of six different potential roles for MS/OR were identified as follows:

1. Modeller/Analyst Support Role

- to provide predominantly quantitative analysis
- to develop models to evaluate/explore alternative scenarios

2. General Consultancy Support Role

- to cover a broader range of areas/issues
- to assist with problem structuring

3. Soft OR Role

- to act as a facilitator
- to serve as an idea generator

4. Educator Role

- to transfer knowledge/skills of tools
- to monitor and evaluate new tools
- to provide guidance and support on tools

5. Technology Support Role

- to assist with the design of administrative databases so that they can also provide information for modelling/analysis
- to assist with the development of competitor tracking databases
- to assist with the development of external environmental databases

6. Model and Software Development

- to develop models and software to support strategic tasks/tools

This is a comprehensive series of potential roles which covers both traditional MS/OR activities, and some which arise from more recent developments in qualitative approaches and technological advances. Two of these roles are conceivably more difficult as they involve research. The Educator role is intended to involve a proactive, specialist role performing tool evaluation, as well as other educational functions. Although some educational activities may be implicitly performed by MS/OR practitioners, this is a new tool function. Model and Software Development requires a combination of technical competence, design skills and creativity. It is definitely challenging and potentially has a high risk return tradeoff.

The roles are not intended to be mutually exclusive as individual practitioners would most likely perform several of these roles. The ability of individuals to perform these roles will depend on their personal skills and technical competency.

These potential strategic MS/OR roles will be evaluated by considering MS/OR capabilities in the light of the requirements and needs of the SM discipline; a summary of this evaluation will be included in chapter 10.

7.7.4 Conclusion

The nature of strategic involvement by MS/OR practitioners has been investigated in the interviews. A summary of twenty four different Strategic Decisions grouped in eight categories was presented. This demonstrates the breadth of strategic modelling application areas for the MS/OR discipline. Furthermore, it indicates significant potential for a major MS/OR contribution to strategic decision making.

Three distinct types of relationship between MS/OR groups and Corporate Strategy personnel were identified from the interview responses. These reflect different levels of personal strategic involvement which will influence access to strategic projects. At one extreme, the MS/OR groups were acting as the only Corporate Strategic Planning groups for their organisations; and at the other extreme, the MS/OR groups were operating independently of the Corporate Strategists with limited access to the major strategic projects. The intermediate position, which appeared to be the most common pattern,

involved a co-operative and consultative role between the MS/OR groups and their Corporate Strategy counterparts. This relationship seemed to provide the prerequisite linkage between the two disciplines, and hence to facilitate/catalyse MS/OR involvement in key Strategic Decisions.

Six potential support roles were identified for individual MS/OR practitioners to participate in Strategic Management. These include both traditional activities (e.g. Modeller/Analyst), new recent developments in qualitative approaches (e.g. Soft OR) and technological advances (e.g. Technology Support). Two of the roles are more difficult as they involve research activities; they are the Educator role and Model and Software Development. Therefore, these six potential strategic roles incorporate the full range of MS/OR activities, as well as providing opportunities for expansion of MS/OR expertise.

7.8 Gaps in the Strategic MS/OR Toolkit

To identify deficiencies in the current strategic MS/OR toolkit, data was collected from the MS/OR interview samples in both countries on their need for new tools? of specific types? or for specific tasks? In this section an overview level summary of the responses will be presented by first discussing the main responses to the basic question on the need for new tools. Following this, a series of new tools which were proposed to fill gaps in the current toolkit, will be outlined.

7.8.1 Need for New Tools?

The perceived need for new strategic tools was examined in the MS/OR interviews. There were four main responses to this question: (1) Yes, (2) No, (3) Use More of the Existing Tools, and (4) Improve the Existing Tools. Each of these responses will be discussed now.

Yes

The most common YES response was that there is always a need for new tools. This need for new tools arises when new practices emerge, and the scope for new tools is enhanced by information technology and conceptual developments. New tools may also be required when the tools available "don't fit our specific problems". The difficulty of seeing the types of developments which could be useful was reported; and the entrepreneurial response "if I knew the answer it would be commercially valuable, so I wouldn't tell you" was also noted.

No

The NO responses came from people who indicated that tools are available, and adequate for, the types of analysis that they are required to do. Others were "not aware of any areas requiring new tools".

Use More of the Existing Tools

There is also recognition of the need for greater knowledge and understanding of existing tools in order to make better use of "what we have". Some of the ideas to enable this to happen and areas mentioned for personal development were:

- need to know which tools to use for our specific problems;
- need to know which tools work well in which context;
- need to know which tools go well together;
- desire to see interesting applications of existing tools;
- apply more OR techniques in other areas of our organisation;
- to develop soft OR skills;
- sensitivity analysis to improve spreadsheet modelling;
- to use spreadsheets better.

However, it was reported that in some cases applying the available techniques to specific problems is actually a research problem.

Make Improvements to Existing Tools:

In addition to making more use of the tools which are available, this response proposes making improvements to existing tools. For example, using existing tools in more creative ways, or making on-going refinements to existing tools to improve their performance.

These four responses were not mutually exclusive options, but rather they were proffered in combination; both 'Yes' and 'No' responses being followed by indications of the 'Need to Use More Existing Tools' or to 'Make Improvements to Existing Tools'. The need for more understanding of the objectives, problems and purposes of strategic decision making and strategic planning by MS/OR practitioners was raised by one of the interviewees. A typical MS/OR catch-all response was also proposed: "if you can't find an appropriate methodology, you use simulation".

This summary shows that there is a perceived need for improvement in utilisation of existing tools, however in some contexts current tools are considered to be sufficient. In the next section, the types of new tools which were proposed by the 'Yes' respondents, will be discussed.

7.8.2 Expanding the Toolkit

From the MS/OR interviews, gaps in the existing strategic toolkit were identified. The development of new tools to fill these gaps will effectively expand the current toolkit. Some of these new tools support or enhance existing approaches, while others may require new theoretical developments. The new tools which were suggested have been grouped into six categories as follows:

a. **Problem Structuring**

- tools for the early stages;
- better ways of getting people to confront problems and structure problems in a friendly way at the front end.

b. **Forecasting**

- to calculate perfect demand patterns.

c. **Technological**

- to develop industry specific software packages;
- software to assist with facilitation;
- enhanced software for Project Management;
- presentation software.

d. **Modelling**

- dynamic analysis;
- to be able to model stochastic processes;
- need a general modelling language.

d. **Behavioural**

- to get people's views in a more structured and formalised way;
- tools that get people working together;
- to negotiate acceptable compromises where there are wildly divergent worldviews.

e. **Mathematics**

- *"We just don't have enough mathematics to solve the problems that we've got. Nothing like enough."*

These new tools include a wide range of both qualitative and quantitative approaches. The problem structuring and behavioural approaches reflect the importance of process, rather than content-based tools. Further, most of the new technological software developments will also support aspects of the MS/OR modelling process. The proposal of more Mathematics as the mechanism for solving strategic problems, reflects the traditional MS/OR linkage with numerical approaches, rather than any specific unresolvable strategic issue; it is not a surprising recommendation from a MS/OR sample which includes many mathematicians, but it also illustrates the tendency to "use what we know to solve new problems".

7.8.3 Conclusion

In this section the need for new tools was examined and a series of new tools was proposed to fill gaps in the current MS/OR toolkit. The new tools include qualitative behavioural and problem structuring approaches, as well as technological software developments to support the MS/OR modelling process. In addition, there were proposals for more quantitative approaches to enhance the MS/OR toolkit. However, for many MS/OR practitioners, there is also an acknowledged need to make better use of **more** of the existing MS/OR tools and frameworks.

7.9 Conclusion

Results from empirical studies of strategic MS/OR tool usage in the United Kingdom and New Zealand have been described in this chapter. These results provide new evidence of the current state-of-the-art in strategic level MS/OR in these countries. This is the first empirical research project to focus on strategic level MS/OR tool usage. To provide a structure for the tool evaluation a series of core strategic tasks were developed based on the normative Strategic Management process model.

Replicating the study in two countries has added a comparative dimension to the study. This has generated some interesting findings, including the almost identical patterns of tool user proportions in both countries which occur in spite of quite marked differences in organisational factors. The majority of the top tools which are used by the MS/OR practitioners for the strategic tasks are general, quantitative and content-oriented; however, qualitative approaches also feature for a few of the tasks.

Familiarity, awareness and usage of a sample of twenty five MS/OR tools revealed the

similarity between the two samples at the two ends of the continuum of familiarity (Have Used, Don't Know). The highly rated tools at the usage end of the continuum were all general approaches which are primarily quantitative, while the "unknown" tools were mostly "newer" qualitative approaches. Significant proportions from both countries were not familiar with half of the tools in the sample; this finding raises many questions about the promotion of new tools in general, and specific questions about the promotion and performance of these particular approaches. Further, it signals the need for more investigation of these issues in future.

The nature of strategic level involvement by MS/OR practitioners was investigated in depth in the interviews. The main types of Strategic Decisions that the practitioners were personally involved with were outlined to demonstrate the diversity of strategic application areas for the MS/OR discipline. Three main relationships between the MS/OR groups and their Corporate Strategy counterparts were proposed; these reflect different levels of access to strategic projects. Six potential strategic roles for individual MS/OR practitioners were identified which incorporate the full range of MS/OR activities, as well as providing opportunities for expansion of MS/OR expertise.

Finally, the need for new tools was considered, and a series of new approaches was proposed to fill gaps in the current MS/OR toolkit. The new tools include qualitative behavioural and problem structuring approaches, as well as new technological tools to support the MS/OR modelling process; and a number of quantitative approaches. The need to make better use of more of the existing MS/OR tools was also advocated.

In the next chapter, the results from the exploratory investigation of strategic tool selection will be outlined. Inter-disciplinary comparisons and external comparisons with previous research will be discussed in chapter 9.

Chapter 8 Strategic Tool Selection

8.1 Introduction

In the preceding chapters the diversity of techniques, tools and approaches which are available for use in Strategic Management has been clearly demonstrated. One major implication arising from the vast array of strategic tools, is that tool usage is a function of choice; this means that tool selection, in practice and concept, is an important issue. There is currently limited comparative information available on strategic tools, and no empirical studies were found on this topic of tool selection. Therefore, the identification of the factors involved in strategic tool selection is an original research objective; it will also be useful to improve understanding, and to assist with interpretation of tool usage practices. The choice of a specific tool is an extremely complex decision, as it automatically incorporates a wide range of factors and influences, both consciously and intuitively.

Prior to this empirical study, a series of potential factors affecting strategic tool selection were identified (Appendix XX) and grouped into four main categories: (1) factors which involve features and resources of the **Organisation**, (2) elements or influences from the **External** environment, (3) factors associated with the **Personal** capabilities, preferences and backgrounds of the individuals concerned, (4) and the **Characteristic** features of the **Tools** themselves. In the postal questionnaire the perceived level of importance of a set of thirty six of these factors was examined, to provide quantitative evidence and comparative rankings of these tool selection factors; the results of this investigation from all four of the surveys are described in section 8.2.

The second part of this exploration of strategic tool selection factors was performed concurrently with the first, but using the qualitative interview data. This involved content analysis of the interview transcripts to identify additional factors which were mentioned as the tool users discussed the tools which they use, and their rationale for using them. As the interviews were conducted at the same time as the postal surveys (for financial and logistical reasons), it was not possible to incorporate the additional factors identified from the interviews in the surveys. However, the incidence of each factor was determined to provide a means of comparing the factors. The results from this second investigation are presented and discussed in section 8.3.

In the third part of this exploratory research on strategic tool selection, the potential interactions between the individual factors within each of the main factor types will be considered. The linkages between the key factor types will be discussed and an overview model of strategic tool selection presented in section 8.4. The roles, types and level of involvement of the individual factors will be considered to illustrate the complexity of the strategic tool selection process. Finally, a research agenda for further work in this area will be proposed; and the chapter will conclude with an overview level summary.

8.2 Evaluation of Strategic Tool Selection Factors

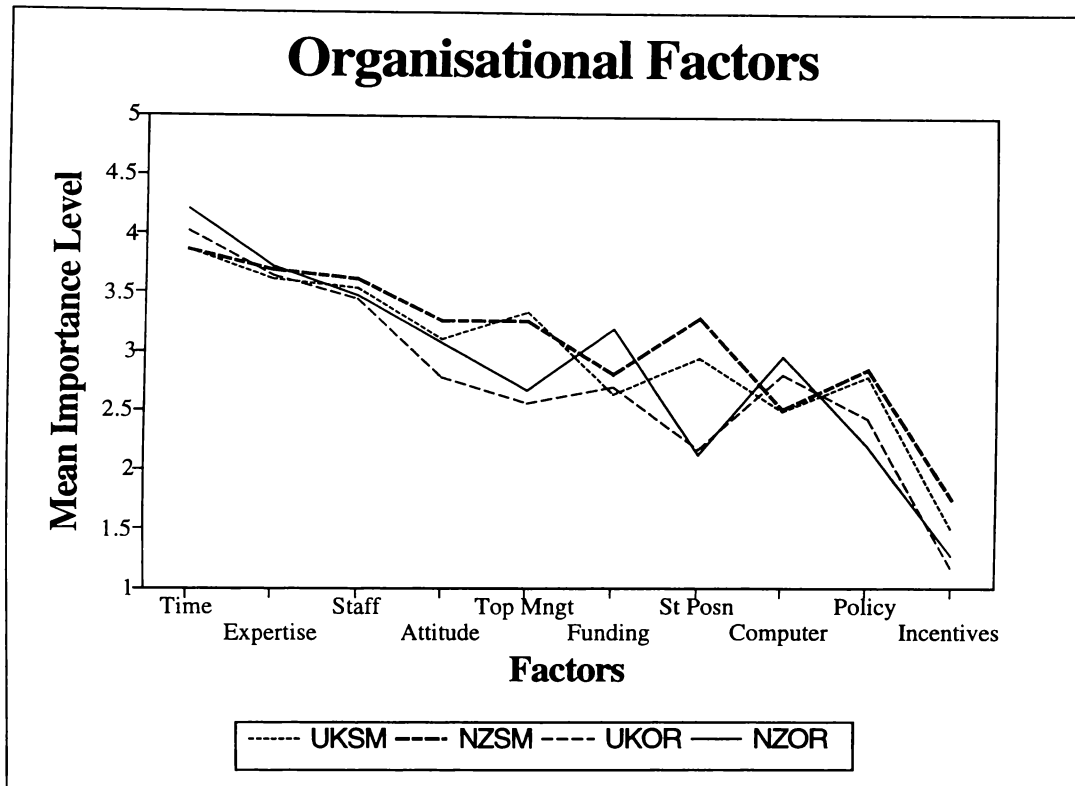
The perceived level of importance of a series of factors which potentially influence the selection of strategic tools was examined in the postal questionnaire. Respondents indicated the level of importance for each factor on a horizontal numerical scale from 1 (not important) to 5 (extremely important). The mean importance values were calculated for each factor for all four of the survey samples: (1) UKSM, (2) NZSM, (3) UKOR and (4) NZOR. The mean provides an aggregate measure from the whole sample of the overall importance of the factor. In this section the mean importance values will be presented for all the factors grouped according to the four different types of influence: Organisational, External, Personal and Tool Characteristics.

For comparative purposes, the mid-point rating of three for the combined mean importance level was chosen to provide a benchmark. The factors which are ranked above this level will be identified, and the number of these factors for each of the four types of factors will be compared.

8.2.1 Organisational Factors

Tool selection may be influenced by a number of factors which are related to the organisation, its features, resources and position. Figure 8.1 shows the mean importance levels for the four survey samples of a series of Organisational Factors; the factors are ranked in descending order of their combined mean values.

Figure 8.1 Tool Selection: Organisational Factors



The results show an overall pattern of similarity of the mean importance level for the four samples. This was confirmed by statistical significance testing as only three of the factors (30%) were found to be significantly different at the .001 level (Appendix XXI). The factors which were different include Top Management Preferences, the current Strategic Position of the organisation and the Incentive/Reward Systems in place.

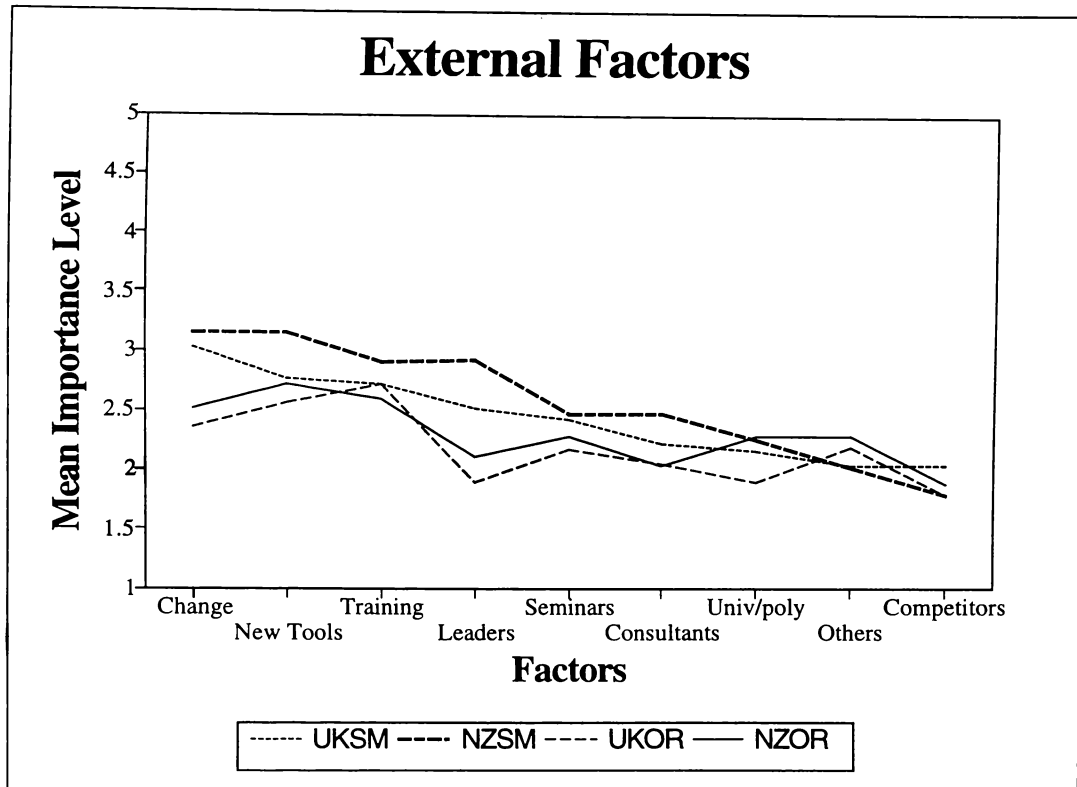
Five of the Organisational Factors had a combined mean importance rating over three. These include: the '**time** available to do the analysis', the '**availability of expertise**', the '**staff** available to do the analysis', the '**attitude towards innovation and change**', and '**top management preferences**'. Most of these top rated organisational resources reflect the people within the organisation, their attitudes and preferences, rather than the tangible or physical assets of the organisation. Indeed, physical resources (e.g. Computers) and official/formal organisational systems (e.g. Policy Requirements, Incentives/Rewards) were the Organisational Factors with the lowest importance ratings. For all four samples, Incentive and Reward Systems was the lowest rated Organisational Factor.

8.2.2 External Factors

There are also External Environmental factors which potentially impact on the choice of strategic tools. Most of these are specific elements or influences from the immediate or

Operating Environment. Figure 8.2 shows the mean importance levels for the four survey samples of a series of External Factors; the factors are ranked in descending order of their combined mean values.

Figure 8.2 Tool Selection: External Factors



More variation is observed in the mean importance level results for the External Factors; statistical significance testing found that four of these nine External Environmental Factors were significantly different. These include the '**rate of change** in the environment', the '**availability of training** on new approaches', the '**tools used by world-leading organisations**', and the '**tools used by consultants**'.

None of these External Factors had a combined mean importance rating over three. As the same scale was used for all of these factors in the questionnaire, this result suggests that these External Factors are relatively less important than most of the preceding set of Organisational Factors.

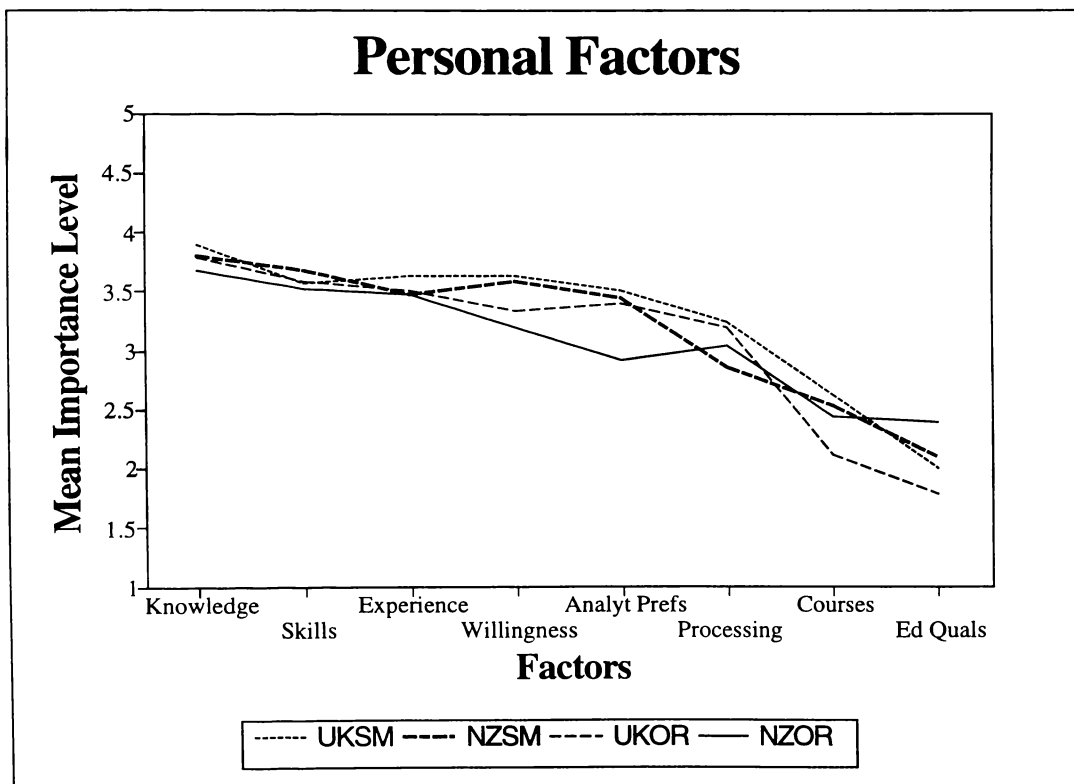
The top three of the External Factors were: the '**rate of change** in the environment', the '**development of new approaches**', and the '**availability of training** on new approaches'. These top External Factors are all related to change. At the other extreme, the '**tools which our competitors are using**' was the factor with the lowest mean importance value.

This result implies that while organisations monitor the strategies of their competitors, cognizance of tool use by their competitors is not an important determinant of their own tool selection practices. Similarly, the ‘tools used by **other** organisations in their industry’, is rated at the low end of this series. This suggests that there is limited industry-specific transfer of tool information for tool selection purposes.

8.2.3 Personal Factors

There are a number of Personal Factors which may potentially have a major influence on the tools which are selected and used. These include the capabilities and preferences of the individuals involved, as well as aspects from their personal backgrounds. Figure 8.3 shows the mean importance levels for the four survey samples of a series of Personal Factors; the factors are ranked in descending order of their combined mean values.

Figure 8.3 Tool Selection: Personal Factors



The results again show a very high pattern of similarity of the mean importance level for the four samples. There were only two factors which were significantly different statistically; these included the ‘training **courses** attended’, and ‘**educational qualifications**’.

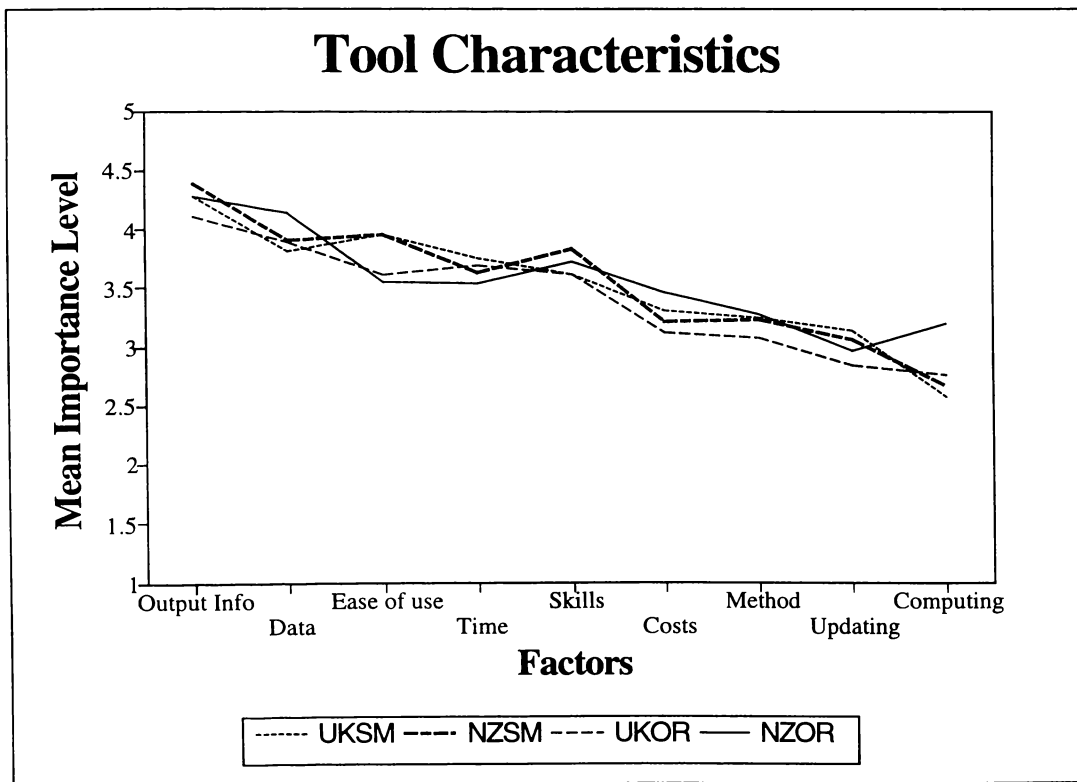
Six of the Personal Factors had a combined mean importance rating over three. These

include: ‘my **knowledge** of the tool’, ‘my **skills and proficiencies**’, ‘previous **experience** with the tool’, ‘my **willingness** to try **new** approaches’, ‘my **preferences** for certain types of analysis’, ‘my **ability** to do all the **processing** involved’. These top Personal Factors include all the basic personal attributes and some key attitudes. The least important Personal Factors in selecting strategic tools were the background factors of the ‘**training courses** attended’ and ‘**educational qualifications**’; however, often these provide the intrinsic foundation knowledge on which these decisions are made.

8.2.4 Tool Characteristics

The Characteristic features of the Tools themselves are also likely to have a major impact on the tool selection process. These Tool Characteristics include basic process factors, as well as specific attributes and resource requirements. Figure 8.4 shows the mean importance levels for the four survey samples of a series of Tool Characteristics; the factors are ranked in descending order of their combined mean values.

Figure 8.4 Tool Selection: Tool Characteristics



The overall pattern of similarity of the mean importance level results for the four samples is again illustrated diagrammatically in this graph. The only factor which was found to be significantly different statistically was the ‘**ease of understanding and use**’ of the tool.

Eight of the nine tool characteristic factors have combined mean importance values over three. These include: the ‘**information** produced’, the ‘availability of **data**’, the ‘**ease of understanding and use**’, the ‘**time** it takes to do the analysis’, the ‘**skills** required to do the analysis’, the ‘**costs** to complete the analysis’, the ‘**method** of analysis involved’, and the ‘**frequency of updating** required’. The two top factors in this category are the basic process features of the ‘**output produced**’ and the ‘**input data** required’. The third highest ranked factor is the ‘**ease of use**’ attribute. At the other extreme, the ‘availability of **computing** requirements’ is the factor with the lowest mean importance rating; this mirrors the Organisational Factor results in which the physical resources were also rated at the low end of the importance rankings.

8.2.5 Conclusion

The importance of a series of factors which potentially affect strategic tool selection has been examined. The overall similarity in the mean importance values for the factors from all four of the samples was observed; only ten of the thirty six factors (28%) were found to be significantly different.

This evaluation confirms that there are a range of different types of factors which impact on the selection of strategic tools. The most important factors of each type were identified; nineteen of the factors had a combined mean importance value over the midpoint on the importance scale. The proportions of each factor type ranked above this benchmark level were:

Tool Characteristics	89%
Personal Factors	75%
Organisational Factors	50%
External Factors	0%

This shows that on the basis of this importance rating, the External Factors are not perceived to be as important, on average, as the other three types of factors. Further, these results suggest that the Tool Characteristics are the most abundant group of important factors affecting tool selection. Personal Factors are also very important, and have a higher proportion of important factors than the Organisational Factors.

Interpretation of this comparison needs to proceed carefully, as this is an aggregate result based on sample averages; in the averaging process smoothing of the extremes occurs. In some cases a single factor may be paramount; in other situations a small group of factors

may interact to form a linked network or cluster of critical factors. The context in which tool selection is performed, which will be a specific strategic task or decision, will drive the tool selection process. As a consequence, the importance of specific factors may vary. The relationships between individual factors will be considered in more detail in section 8.4, and an overview level model of the strategic tool selection process proposed.

In the next section the results from the second part of this strategic tool selection investigation will be outlined. This involves the identification of additional factors which may potentially impact on strategic tool selection.

8.3 Identification of Strategic Tool Selection Factors

As a means of identifying additional factors that impact on strategic tool selection, content analysis of the interview transcripts was conducted. Krippendorff's (1980) method was followed for this analysis; however time and cost considerations precluded the use of a panel of independent coders. As preliminary results from the questionnaire and interview samples showed that the inter-disciplinary differences were greater than the intra-disciplinary differences, one sample from each discipline used for this analysis: the UKOR and the UKSM samples.

As new factors were identified, the transcripts were reviewed iteratively until both samples had been completed. In this way it was possible to not only produce the complete list of factors, but also generate frequency data for each factor. First, the incidence of each factor was determined. This frequency was converted into a proportion of the cumulative total for the factor type, using the same four general factor types. The proportion of the interview samples who mentioned each factor was also calculated. Both of these measurements were combined in graphical format.

First, the cumulative totals for the four general factor types will be presented and discussed. Then the frequency results will be presented for each of the four general factor types: Organisational, External, Personal, Tool Characteristics.

8.3.1 Cumulative Factor Type Results

In the interviews the tool users discussed the tools which they use and the rationale for using them. A list of factors was produced, these were grouped into similar topics and then classified into the four categories of factors (Appendix XXII). The total number of

factors found in each of the factor types is as follows:

Organisational Factors	24
External Factors	13
Personal Factors	13
Tool Characteristics	<u>107</u>
Total	157

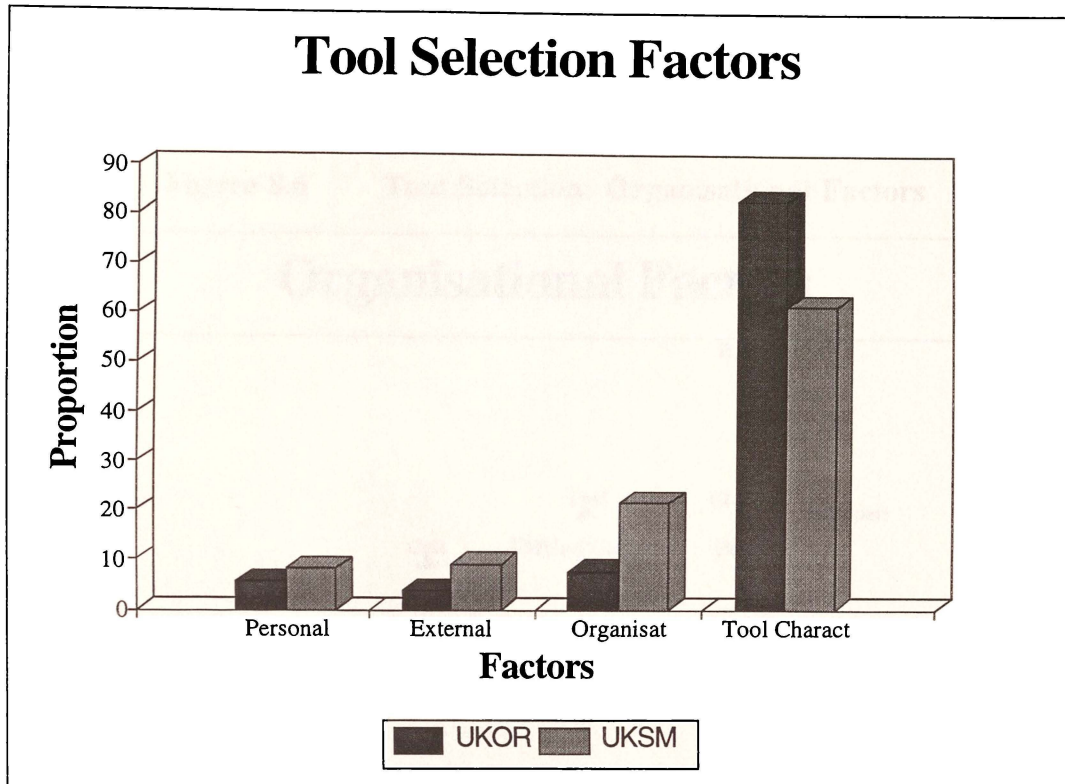
This result is interesting as it shows that there are potentially many more factors which are involved in strategic tool selection than the sample of thirty six included in the previous section. The majority of additional factors are features or Characteristics of the Tools; and significant numbers of extra Organisational Factors were also found. From the results in the previous section, it is clear that these totals cannot be used as surrogate measures for the importance of factor types. For example, a single Personal Factor may have more influence than ten of the Organisational Factors or Tool Characteristics. These total numbers of factors merely indicate the breadth or range of each factor type.

As similar, but not identical questions were being discussed by the SM and MS/OR interviewees, within-sample proportions of each factor type are used for the comparisons. Figure 8.5 shows the aggregate proportions of each of the four factor types for both the UKOR and UKSM samples; these were obtained from the aggregate total for each factor type as a proportion of the cumulative total for each sample.

The graph shows that **Tool Characteristic** Factors were the dominant type in both samples; comprising 83% of the UKOR cumulative factor total and 61% of the UKSM sample total. **Organisational** Factors were the second ranked category for both samples, however their proportions were much lower than for the **Tool Characteristics**; in addition the samples have switched places with respect to their actual proportion level: 7.7% and 21.3% respectively for the UKOR and UKSM samples. For the UKOR sample **Personal** Factors were ranked third and **External** Factors were in fourth place; these positions are reversed in the UKSM sample and the proportions are higher than the UKOR aggregates.

This cumulative overview sets the scene for the results of the four general factor types; these will be outlined in the following sections.

Figure 8.5 Factor Type Proportions: UKOR vs UKSM



8.3.2 Organisational Factors

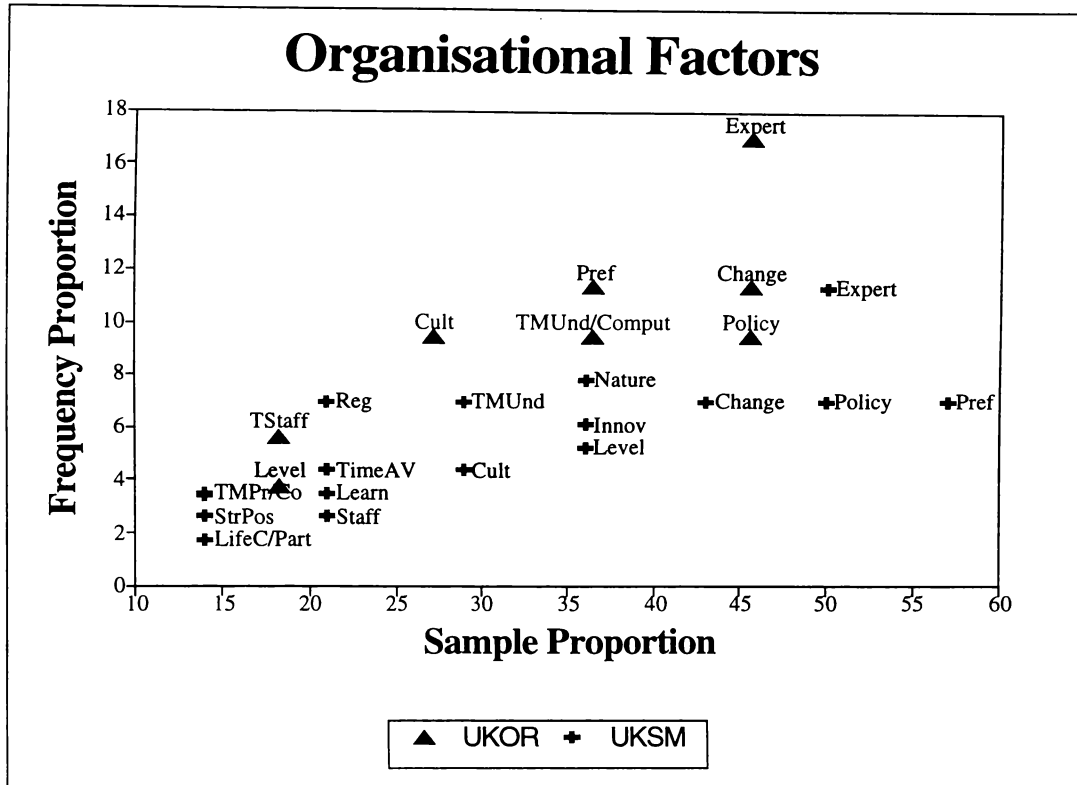
The Organisational Factors which impact on strategic tool selection include aspects of the features of the organisation, its resources and position. Figure 8.6 shows the factor type frequency and the sample proportion for the Organisational Factors which were mentioned by over 10% of the UKOR and UKSM interview samples.

The graph shows that twice as many Organisational tool selection Factors were identified from the UKSM sample as from the UKOR sample; eighteen and nine factors were mentioned by the UKSM and UKOR samples respectively. Above the 30% sample proportion level, the number of factors mentioned by both samples is similar; however, there is a cluster of eight more factors below this level in the UKSM results.

The highest sample proportion (57%) was recorded by the UKSM sample for 'organisational **preferences**'. The same three factors were mentioned by 40-50% of both sample; these include 'internal organisational **policies**', the 'availability of **expertise/skills**' and the '**attitude to change**'. In the 30-40% sample proportion range there were also three factors from each sample, but this time it is a different set of factors: **preferences**, '**top management understanding**' and '**computer resources**' in the UKOR sample; and

the ‘**nature** of the business’, the ‘**level of management** involved’ and the ‘**attitude to innovation**’ in the UKSM sample. The ‘**availability of expertise/skills**’ was the factor with the highest factor type proportion for both samples.

Figure 8.6 Tool Selection: Organisational Factors

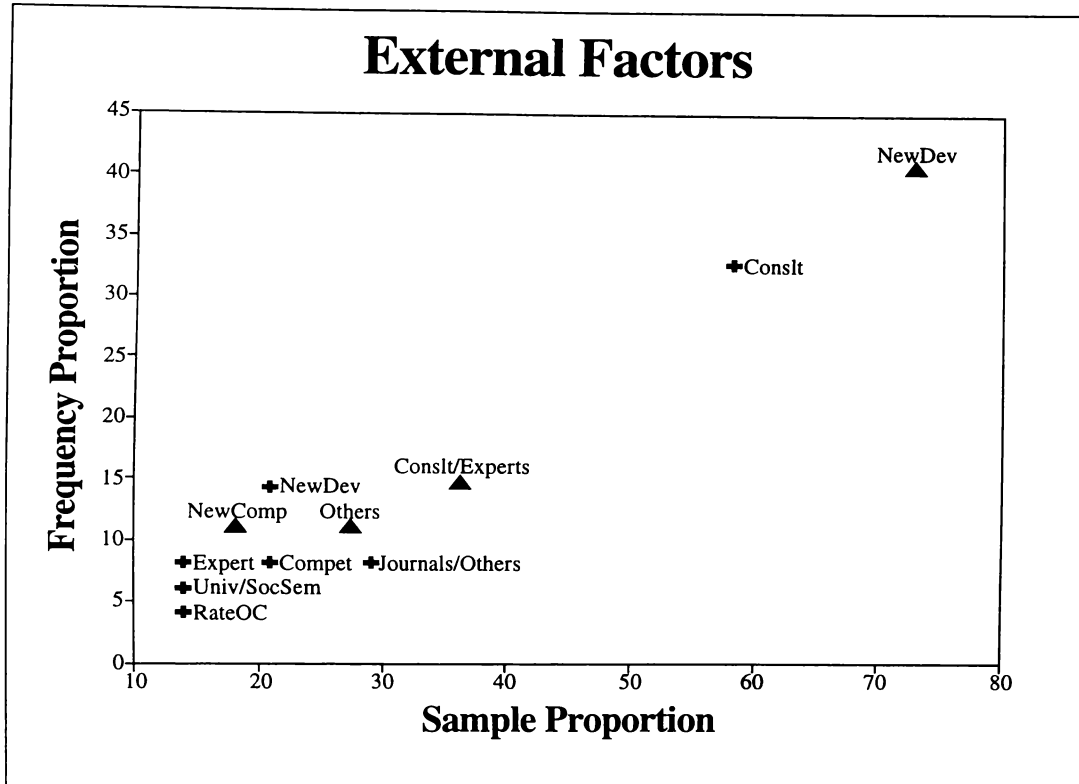


The top set of Organisational Factors is very similar for both samples. They reflect the range of different Organisational Factors from formal systems and resources, through to attitudes. While there is no single type of Organisational Factor which stands out, the feature which is common to many of these top factors is that they are intangibles. Further, most are associated with the people within the organisation, their attitudes, preferences and skills.

8.3.3 External Factors

External Environmental Factors which impact on strategic tool selection include specific elements from the immediate or Operating Environment, as well as more general Remote Environmental influences. Figure 8.7 shows the factor type frequency and the sample proportion for the External Factors which were mentioned by over 10% of the UKOR and UKSM interview samples.

Figure 8.7 Tool Selection: External Factors



Again the ratio of the tool selection factors in the UKSM:UKOR samples is almost 2:1 for the External Factors; nine and five factors were found in the UKSM and UKOR samples respectively. Above the 30% sample proportion level there is only one factor from the UKSM sample and three from the UKOR sample. As with the Organisational Factors, the UKSM has a cluster of six more External Factors than the UKOR sample, below this level.

‘Information on **new developments**’, in the UKOR sample, was the External Factor which recorded the highest sample proportion (73%), and also the highest factor type proportion (40.7%). **Experts** and **consultants** were the only other External Factors which were mentioned by over 30% of the UKOR sample. In the UKSM sample, the influence of **consultants** was the top External tool selection Factor. So, the top sets of External Factors are very small.

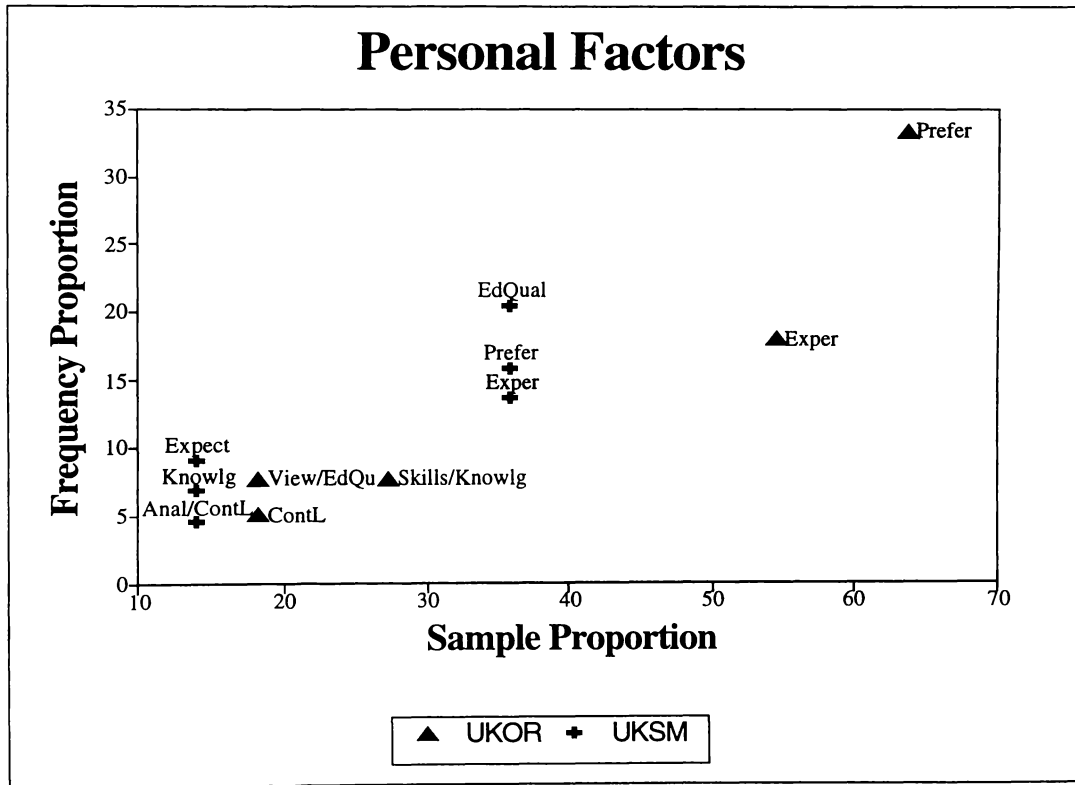
In general, the UKSM sample is concerned with a wider range of External influences for tool selection than the UKOR sample: from **competitors**, other **industry** players and **consultants**, through to **journals** and ‘information on **new developments**’.

8.3.4 Personal Factors

Personal Factors which impact on strategic tool selection include the capabilities and

preferences of the individuals involved as well as aspects of/from their personal backgrounds. Figure 8.8 shows the factor type frequency and the sample proportion for the Personal Factors which were mentioned by over 10% of the UKOR and UKSM samples.

Figure 8.8 Tool Selection: Personal Factors



The graph shows seven Personal tool selection Factors for both of the samples; of these factors, five are common to both samples. Above the 30% sample proportion level there are three factors from the UKSM sample and two from the UKOR sample. The distribution of Personal Factors below the 30% level is also similar in both samples.

Personal preferences, in the UKOR sample, was the Personal Factor which recorded the highest sample proportion (64%) and also the highest factor type proportion (33%). **Experience** was the only other Personal Factor which was mentioned by over 30% of the UKOR sample. In the UKSM sample, the set of three top Personal tool selection Factors were **personal preferences**, **experience** and **educational qualifications**. Two of these top Personal Factors are the same for both samples.

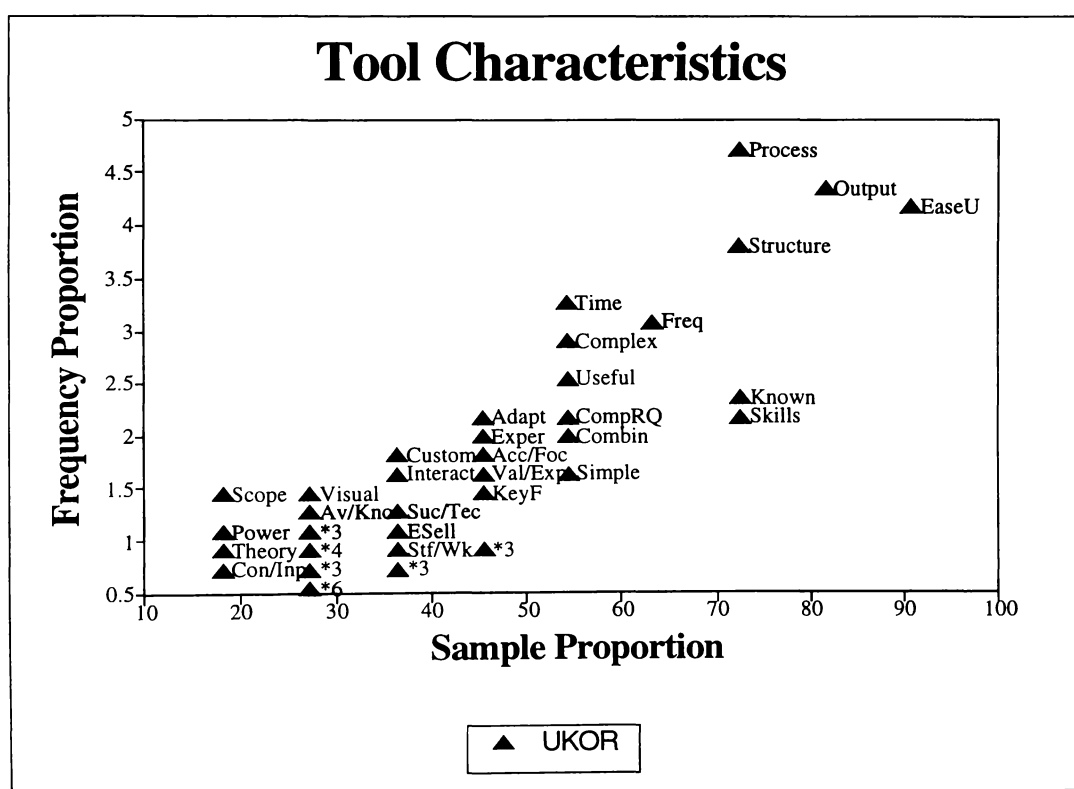
In general, the Personal Factors which influence strategic tool selection include the full range of personal attributes and attitudes. The results do not cluster on any particular type

of Personal Factor. However as discussed above, there is a high degree of similarity between the two samples for the top Personal tool selection Factors.

8.3.5 Tool Characteristics

The Characteristic features of the Tools themselves which impact on strategic tool selection include elements of the basic process, specific attributes and resource requirements. To show comparable information with the other factor types, the Tool Characteristics results will be presented in separate graphs. First, the UKOR sample Tool Characteristic Factor frequency and sample proportions are shown in Figure 8.9.

Figure 8.9 Tool Selection: UKOR Tool Characteristics



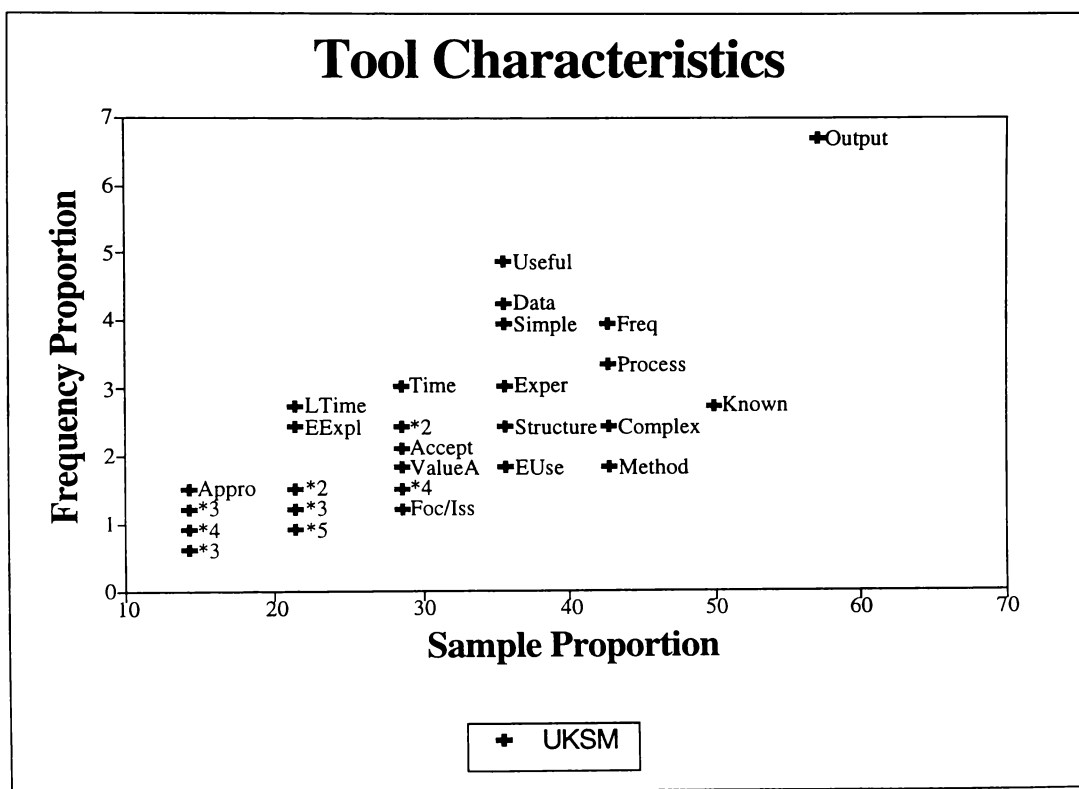
There were seventy one Tool Characteristic Factors raised by the UKOR sample (Appendix XXII); approximately half of these factors were mentioned by over 30% of the sample. Above the 50% sample proportion level there were thirteen factors recorded, another ten factors in the 40-49% range, and eleven more factors reported by 30-39% of the UKOR sample.

Ease of understanding was the tool feature which recorded the highest sample proportion (91%); the ‘**output** produced’ by the tool was the second highest characteristic (82%) for the UKOR sample. The next four top factors (all 73%) include: the ‘**process** involved

with the tool', the tool 'providing a **structure**', '**familiarity** with the tool', and 'the **expertise/skills** which are required'. The '**frequency of use**' of a tool was the only factor in the 60-69% range, but there were six factors in the 50-59% range including **computer** and **time requirements** of the tool, its potential for 'use in **combination** with other approaches', the **simplicity** and **complexity** involved, and the perceived '**usefulness** of the approach'.

The Tool Characteristic Factor results from the UKSM sample are shown in Figure 8.10.

Figure 8.10 Tool Selection: UKSM Tool Characteristics



There were forty eight Tool Characteristic Factors raised by the UKSM sample; one quarter of these were mentioned by over 30% of the sample. Only two of these factors were at the 50% sample proportion level, or above. There were four factors in the 40-49% range and six factors reported by 30-39% of the UKSM sample.

The '**output** produced' was the tool feature which recorded the highest sample proportion (57%); '**familiarity** with the tool' was the second highest characteristic (50%) for the UKSM sample. The next four top factors in the 40-49% range include: the '**process** involved' with the tool, the '**method** involved', the '**frequency of use**' of a tool and the '**complexity** involved'. The six factors in the 30-39% range include: the tool 'providing

a **structure**', the 'availability of **data**', the '**ease of use**' of the tool, the '**experience** of the users', the '**simplicity** involved', and the perceived '**usefulness** of the approach'.

Although the UKSM sample proportions were lower, eight of the top set of Tool Characteristic Factors were common to both the UKOR and UKSM samples. The top Tool Characteristic Factors include a wide range of different tool features representing aspects of the process, the content and resource requirements; there are also marketability features, usage factors and the perceived attributes of the tools. As indicated, the results do not appear to cluster on any particular type of these Tool Characteristic Factors, rather they are spread across the full spectrum of tool features.

8.3.6 Conclusion

Content analysis of the interview transcripts identified 157 different tool selection factors. These were classified into the four general factors types: 24 Organisational Factors, 13 External Factors, 13 Personal Factors and 107 Tool Characteristic Factors. Within-sample aggregate proportions of these factor types show that the Tool Characteristic Factors were dominant in both samples. While Organisational Factors ranked second for both samples, Personal and External Factors were ranked third and fourth respectively on the basis of cumulative levels in the UKOR sample; the order of the later two factor groups was reversed in the UKSM sample.

Graphical summaries were presented for comparative purposes of the factors mentioned by more than 10% of both samples. Twice as many different Organisational and External Factors were found in the UKSM sample as in the UKOR sample. The number of Personal Factors was the same for both samples; and there were only two thirds as many Tool Characteristics Factors in the UKSM as in the UKOR sample.

Comparisons were also made of the top set of factors for each of the general factor types. A high level of similarity was found between the samples for the Organisational, Personal and Tool Characteristics Factors. Within each of the sets of top factors, a wide range of different factors was found; the results did not appear to cluster on any specific types of factors. The Organisational Factors included mostly intangible features associated with the people within the organisations, their attitudes, preferences and skills. The Personal Factors included the full range of personal attributes and attitudes, and the Tool Characteristics Factors were spread across the complete spectrum of tool features. For the

External Factors the top set was very small, and the UKSM had a wider range of External influences involved in tool selection than the UKOR sample.

These results confirm the complexity of strategic tool selection. By identifying the factors involved in strategic tool selection in this exploratory research, the information is available for further research in this area. For example, the factors can be used to provide a detailed checklist for survey or case study research.

8.4 Strategic Tool Selection

The factors which influence strategic tool selection have so far been considered as four separate types of factors. In this section, an overview level model of strategic tool selection will be proposed, and the relationships between the factor types discussed. Additional features of the nature of strategic tool selection will be discussed, and a research agenda proposed for future research in this area.

8.4.1 Overview Model of Strategic Tool Selection

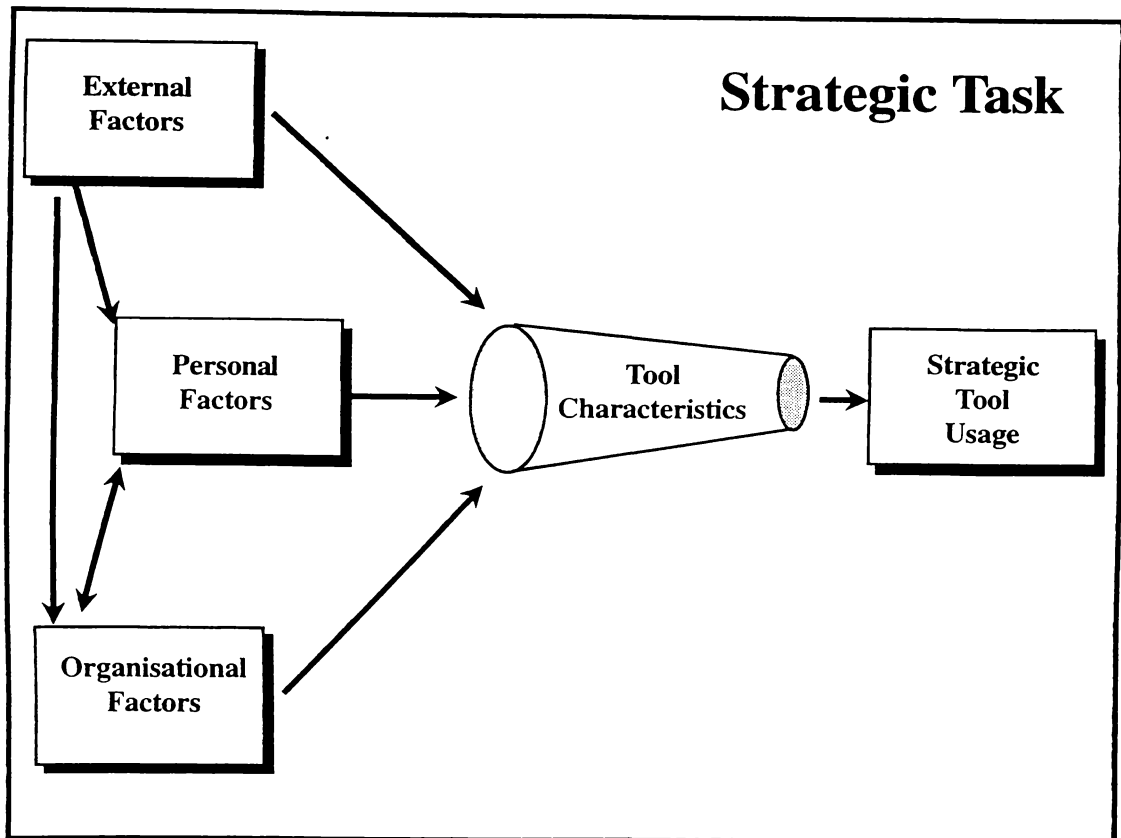
To provide an overview level summary of the strategic tool selection process a model has been developed which shows the relationships between the key factor types. This overview model is shown in Figure 8.11. The relationships and linkages illustrated in the model diagram will now be described.

First, the strategic task provides the context for the strategic tool selection process. Furthermore, as the task also defines the essential components of the content involved in the situation, it serves as a major determinant of tool usage. In this way the tools which are selected and used, will match the strategic task situation.

Personal Factors play a key role in strategic tool selection and usage, as tools are both selected and implemented by individuals, working alone or in teams. This means that tool selection is primarily a function of personal choice. Therefore, the personal capabilities and preferences of the individuals involved are essential elements of the process.

There is a very strong and direct link between the Organisational Factors and the Personal Factors. This linkage arises from the human resource components of organisations; many of the Organisational Factors reflect the people within the organisation, their collective skills and preferences.

Figure 8.11 Overview Model of Strategic Tool Selection



Some of the factors which are External to the organisation are also potentially linked to the Personal Factors. An example of this type of linkage occurs when experts and/or consultants provide specific inputs or direct assistance with tools, thereby enabling the individuals to proceed with implementation of a particular approach. In this situation, the External Factor may potentially influence the tool selection decision as well as the outputs of the strategic decision. External Factors may also influence an individual's willingness to try a new approach, and/or their personal preferences. Further, by supplementing their experience, the External sources may potentially reduce the impact of a lack of personal experience.

Similarly, External Factors may potentially influence the Organisational Factors through the people component; for example, the availability of training may impact on the organisational ability to upgrade staff skills. In addition, some of the other external elements such as competitors, may impact on the strategic position and policies of the organisation; or the rate of change in the environment may potentially affect the organisation's receptiveness to innovation and change.

The features or Characteristics of the Tools will determine their suitability for a specific strategic task. However, the tool selection process necessitates matching the tool with the task by the individual manager; therefore it incorporates all of the individual's personal attributes. Moreover, all of the key Organisational attributes and External influences will also be automatically included within this matching process.

Strategic tool usage is a function of the strategic tool selection process which is illustrated in this overview level model. The linkages between the factors types have been discussed using examples as appropriate. In the next section the nature of the tool selection process, which is not simple or straightforward, will be considered.

8.4.2 Nature of Strategic Tool Selection

Strategic tool usage is a function of an extremely complex strategic tool selection process which incorporates a wide range of diverse factors. The nature of the process will be considered in this section, by examining a series of relationships between the factors.

First, the specific set of factors involved and their relative importance in tool selection, will be **variable** for different individuals; it is also expected that the factors would vary over time. Furthermore, the type of influence which a factor has may be **direct** or **indirect**. A direct influence occurs when the factor itself contributes to the tool selection decision; however, there are also many factors which impact on other factors, thereby creating a sequential or indirect impact on the tool selection process.

A further distinction can also be made in terms of the involvement of the factor separately or with a cluster of other factors. In some situations, a single factor may become critical to the selection decision on its own (i.e. **independently**); however, in other cases, it will be groups of multiple factors in **combination**, which determine the tool selection outcome.

The nature of the factor's influence may be positive, in which case the factor will encourage or **enhance** selection of specific tools; or the factor may have a negative impact on the process, thereby acting as an **inhibitor** for the tool selection process. This enables the factors for a specific context to be distinguished as potential enhancers or inhibitors.

In this research the factors which are **actively** involved in the tool selection process have been identified and compared. However, there are other factors which are potentially

involved in a more **passive** role as they contribute almost intrinsically or inherently; for example, as part of the context, or the organisational or personal backgrounds.

The **intensity** of the involvement of specific factors in strategic tool selection provides a further series of dimensions for developing understanding of the nature of the process. Examples include strong vs weak influences, major vs minor impacts, primary vs secondary roles, and principal or key determinants.

The tool selection process may be performed in varying modes: **deliberate**, when information is specifically sought and overtly considered; **habitual**, when tool selection relies upon previous decisions or patterns from the past; **instinctive**, when tool selection occurs almost intuitively without consciously seeking or using any additional information. Combinations of these three modes are also possible.

Finally, the complexity of the strategic tool selection process has been clearly demonstrated in this chapter by examining the results and looking at the many different types of relationships that exist between the disparate factors. Next, a research agenda for further research in this area will be proposed.

8.4.3 Research Agenda

This exploratory research project has sought to fill a gap in the literature by investigating this area of strategic tool selection. The results from these investigations provide a basis for further research on the topic. In this section, a series of specific follow-on research topics will be outlined.

1. The extended set of tool selection factors from the interview data can be used to provide a detailed checklist for a survey focussed on tool selection factors and/or for case study research.
2. Use factor analysis on the quantitative results of the complete set of tool selection factors to identify a smaller set of composite factors.
3. Examine the extent to which each of a defined set of factors enhances or inhibits the selection of a specific approach.
4. Examine in more detail the comparative importance in tool selection of the different types of tool characteristic factors.
5. Identify clusters of tool selection factors which work together for a specific

strategic task.

6. For a series of different strategic tasks, identify and examine the sets of factors which dominate the selection for each task.
7. Examine tool selection for a series of specific industries.
8. Investigate the importance of personal factors in tool selection for organisations with teams of Strategic Planners.
9. Investigate the passive tool selection factors.
10. Develop tool selection profiles for different managerial levels.
11. Investigate tool selection in a series of different organisational types.
12. Examine the modes of tool selection used for specific strategic tasks.

This research has been the first project to examine the strategic tool selection process. It has generated both specific results on a range of strategic tool selection factors, and insight on the relationships between the factor types and the selection process. It sets the scene for a wide range of both qualitative and quantitative research projects to further develop knowledge in this area. A series of twelve such follow-on research topics have been proposed.

8.4.4 Conclusion

An overview level model of the strategic tool selection process has been proposed which shows the relationships between the key factor types. The complexity of the process has been demonstrated by examining the variable roles of the factors. Finally, a series of follow-on research projects have been proposed to further develop knowledge in this area.

8.5 Conclusion

As the process of strategic tool selection underlies, and thereby determines, strategic tool usage, it is appropriate to examine both topics simultaneously. Furthermore, as no previous research was available on strategic tool selection, the research has sought to identify and explore concurrently, the factors which are involved in the strategic tool selection process.

The importance of a pre-identified set of factors was examined in the postal questionnaire. Using the mean importance values of the factors for comparison, a high level of similarity overall was found for the four samples, with only 28% of the factors testing as significantly different statistically. Nineteen of the factors were above a benchmark

importance rating: eight of these were Tool Characteristic factors, six were Personal factors, and five were Organisational Factors; none of the External Factors had a combined mean rating above this level.

Simultaneously, additional tool selection factors were identified by using content analysis of the interview transcripts. These were classified into the four general factor types as follows: 107 Tool Characteristic Factors, 24 Organisational Factors, 13 Personal Factors and 13 External Factors. Graphical summaries were presented of the results from the UKSM and UKOR samples for each of the factor types, and comparisons were made between them. Comparisons were also made of the top set of factors for each of the general factor types: a high level of similarity was found between the samples for the Organisational, Personal and Tool Characteristic Factors; however differences were noted between the samples in the small set of top External Factors. A wide range of different factors was found within each of the four general factor types.

The relationships between the general factor types were examined and an overview level model of the strategic tool selection process was proposed. The relationships and linkages were identified by examining the potential interactions between the individual factors within each of the main factor types. The variable roles, types, and levels of involvement, of individual factors within the strategic tool selection process was considered to further demonstrate the complexity of the process.

Finally, as the results from this project will provide a basis for future work, a series of follow-on research projects have been proposed to further develop knowledge in this area. This research has important implications for both managerial and tertiary educational programme development, as well as for tool developers.

In the next chapter, the strategic tool usage results will be compared with previous research, and inter-disciplinary comparisons from within this project will be presented.

Chapter 9 Strategic Tool Usage Comparisons

9.1 Introduction

It is standard research procedure to compare new results with previous research in the same or closely related areas (Howard and Sharp, 1983). This provides perspective by examining the study in the context of prior research. Further, it provides a means of identifying, and accentuating, similarities and differences in the results. By differentiating the results, this comparison demonstrates their significance and helps to clarify their contribution to the discipline. In addition, the comparative process may lead to further insights which help to explain the results, and to the identification of potential areas for further research.

In this chapter comparisons will be made **externally** with previous tool usage research from both the SM and MS/OR disciplines, and also with an accepted SM framework. Further, as this research is primarily exploratory, the project was designed to enable inter-disciplinary comparisons to be made; these **internal** comparisons will also be outlined in this chapter. The contribution of this research project and the areas for further research will be discussed in chapter ten.

9.2 External Comparisons

It is difficult to make direct comparisons with previous research when the project is exploratory as the research is quite different from the earlier studies. Nevertheless, some comparisons can usually be made with previous research in related areas. Furthermore, the comparative process itself is useful as it generates a range of outputs as mentioned above.

In this section the strategic tool usage results will be evaluated by making a series of external comparisons with significant prior research. First, the empirical tool usage results from the Strategic Management discipline will be considered. Second, comparisons will be made with previous MS/OR research. Finally, to conclude the external comparisons, a theoretical SM framework will be applied in an attempt to provide a further external reference point for the new evidence on the current status of strategic tool usage.

9.2.1 Previous SM Tool Usage Research

There are a range of methodological differences between each of the SM tool usage

surveys; when coupled with disparity in definitions and variation in timing, direct comparisons are difficult as explained in chapter 3. Nevertheless, there are insights which can be gained from comparisons with previous research. In this section the SM tool usage results will be compared with previous SM tool usage research: first, by examining two sets of specific results, and then by focussing on a series of more general issues.

To minimise timing differences, the most recent studies were required for this comparison; to provide the highest number of tools in common, the surveys with the largest sets of tools were desirable. Olson's (1991) survey of NZ managers and the Belgium survey by Caeldries and Van Dierdonck (1988) were chosen, as they were the most recent studies involving comparatively large sets of tools; these surveys both included ten of the same tools as this project. Table 9.1 shows the tool usage proportions for these two previous studies and the proportion of UKSM and NZSM respondents who indicated that they "Have Used" each of the sample of thirty SM tools. Both of the previous surveys reported the percentage of firms using tools in the development of a strategic plan. As the SM process tool user proportions in this project were linked to specific tasks, the UKSM and NZSM results in this comparison are taken from the tool familiarity question.

Looking first at the Belgium results: most of the ten tools are used by lower proportions of the Belgium managers than in this project; however, there are two exceptions, Market Segmentation and Product Life Cycles, which are within 10% of both the UKSM and NZSM results. Portfolio Models is also anomalous as it is close to the NZSM sample proportion, but much lower than the UKSM sample proportion; Caeldries and Van Dierdonck (1988) linked the low result to the absence of multiple business units in the Belgium firms, and this rationale also reflects the similar structure of NZ organisations. Finally, there was one tool which appears to report a higher usage proportion in the Belgium sample, Porter's Five Forces; however, this difference may be linked more to definitional differences than to actual usage levels, as Caeldries and Van Dierdonck use a more generic name for this tool, viz. industry analysis.

Looking now at the comparison of the ten tools included in the recent NZ survey by Olson (1991). The proportion of Olson's NZ managers using six of the tools is within 10% of both the UKSM and NZSM results; four of these tools fall between the proportions for the two samples in this project. Three more of the tools are used by much lower proportions in the Olson survey: SWOT, Product Life Cycles and Value Chain Analysis.

Table 9.1 SM Tools Used

Tool	This Project		Previous Research	
	UKSM % <i>n=147</i>	NZSM % <i>n=129</i>	Olson % <i>n=43</i>	Belgium % <i>n=81</i>
SWOT	88.9	88.9	69.77	74/58 ¹
Budgeting	82.1	88.2	90.70	54
Forecasting	81.1	66.9		28
Spreadsheets	76.4	69.0		
Critical Success Factors	72.6	76.2		22
Financial Ratios	63.6	62.1	62.79	
Market Segmentation	56.6	48.8		56
Cost Benefit Analysis	55.3	70.2	58.14	
Focus Groups	49.3	62.3		
Portfolio Models	43.7	26.7	34.88	23
Porter's 5 Forces	43.4	34.4	39.53	64 ²
Market Opportunity Analysis	41.7	39.2		
Corporate Models	40.1	28.8		15
Benchmarking	40.1	43.4		
Product Life Cycles	38.2	29.5	13.95	30
Value Chain Analysis	36.4	37.7	11.63	
Simulation	33.8	30.8	27.91	
Multiple Scenarios	33.6	35.3		
Core Competences	29.2	50.8	37.21 ³	
Driving Forces	24.5	23.9		
Process Mapping	22.6	30.8		
Market Signalling	18.8	15.4		
Delphi	16.7	21.5		5
Management Profiles	16.3	20.8		
Strategic Software	15.8	10.9		
McKinsey 7-S	15.6	16.8		
SODA	15.4	14.4		
Reverse Engineering	11.0	11.4		
Strategic Choice/AIDA	8.8	3.4		
Strategic Funds Prog	3.7	7.6		

Notes: 1 Strength/Weaknesses 74%; Opportunities/Threats 58%.

2 Called Industry Analysis in Belgium research.

3 Includes core and distinctive competences in Olson study.

Sources: Olson, M. (1991) is a survey of New Zealand managers
Belgium survey by Caeldries and Van Dierdonck (1988)

The higher proportions for these three tools in this project may reflect the specialist nature of the samples, compared with Olson's 'general' management sample frame. Finally, the Olson sample proportion using the Core Competences approach is higher than the UKSM sample proportion, but lower than the NZSM sample proportion. This may reflect the inclusion by Olson of Distinctive Competences, as well as Core Competences, in his result. However, the higher NZSM Core Competences proportion is largely attributable to the promotion of this approach within the NZSM Society's seminar programme by Prahalad (one of the developers of this tool).

At a more general level, there is evidence of standard, as well as customised approaches, being widely used by the Strategic Managers in both countries; this contrasts with the findings by Wee et al. (1989) of limited tool usage and customised planning systems in Singapore firms. Similarly, by including a wider range of tools and a series of specific tasks in this study, there is evidence of both quantitative and qualitative tools in the top tool usage proportions and rankings; this contrasts with the small non-quantitative top tool set found by Ackelsberg and Harris (1989) in their Danish survey.

Previous surveys by Hooley (1984), Houlden (1985), Caeldries and van Dierdonck (1988), and van der Walt et al. (1989) reported a pattern of non-familiarity and low usage of tools in practice. The levels of familiarity and usage of a sample of thirty SM tools was included in this project (see section 6.5). As the UKSM and NZSM samples are composed of comparative specialists, it is not surprising that some very high proportions were found for some of the tools in this project; the highly rated tools at the usage end of the continuum were all general approaches. However, significant proportions from both countries were not familiar with one third of the SM tools in this sample; these "unknown" tools were quite specific approaches. This raises many issues and questions about the promotion of SM tools and the reasons for the lag between theoretical tool developments and current practice (discussed in sections 6.5. and 7.5). Further, as the pattern of non-familiarity still persists in the 1990s, these results signal the need for further research on these issues in future.

9.2.2 Previous MS/OR Research

As there are no previous surveys focussed on the use of MS/OR tools at the **strategic** level, there are no directly comparable survey results available. However, to enable some insights from comparative analysis, previous research on the *general* use of MS/OR tools

in practice will be considered. The implicit assumption here is that strategic MS/OR is a specialist subset of general MS/OR activities. In this section, two sets of specific results will be considered, before looking at some more general MS/OR tool usage issues.

The most recent survey on MS/OR tool usage in the UK was conducted by Jones et al. (1994) as part of their European Management Science Survey project. The other major UK study by Carter (1987) surveyed the OR Society members and included a set of fourteen MS/OR tools; although these results are becoming dated, it remains the most comprehensive UK survey of MS/OR practitioners. The other recent UK surveys are all focussed on a different set of specific tools, so there is no overlap with this project. Further, there are no recent NZ surveys on MS/OR tool usage available for comparison. Table 9.2 summarises the tool usage results for the two previous studies and the proportion of UKOR and NZOR respondents who indicated that they "Have Used" each of the sample of twenty five MS/OR tools. Seven of the tools were common to these two previous surveys and this project.

Jones et al. (1994) used a weighted score for tool usage which is not directly comparable with these results, so their UK sample 'awareness' proportions are reported here. In general, awareness is usually higher than usage, as managers do not necessarily have all the skills or opportunities to apply all of the tools that they are 'aware' of. Therefore it is not surprising to find that three of the results are much higher in the Jones survey than in this project. Similarly, Project Management is higher than the UKOR proportion, but less than the NZOR proportion. It is surprising to see that awareness of Simulation is lower in the Jones sample; this may reflect the nature of the samples: Jones et al. (1994) surveyed 'general' managers, whereas the UKOR sample is composed of more 'specialist' modellers for whom Simulation is a standard tool.

Awareness of Linear Programming in the Jones sample is equivalent to usage of Math Programming in the UKOR sample; however, only about 20% of the sample are aware of other programming approaches which fit within the Math Programming group, such as Integer, Goal and Dynamic Programming.

Table 9.2 Tool Familiarity

Tool	This Project		Previous Research	
	UKOR % <i>n=139</i>	NZOR % <i>n=26</i>	Jones % <i>n=104</i>	Carter <i>n=1436</i>
Spreadsheets	83.7	91.7		
Simulation	71.3	70.8	58	2.66 ²
Forecasting	62.2	75.0		2.62 ³
Project Management	49.6	66.7	57	
Math Programming	49.2	62.5	47/21*	1.89 ¹⁰
Cost Benefit Analysis	45.1	70.8		
Decision Support Systems	42.6	21.7		
Heuristics	34.6	26.1		2.23 ⁵
Inventory Modelling	30.5	20.8		1.88 ¹¹
Corporate Models	24.1	20.8		1.93 ⁹
Decision Analysis	22.0	21.7	68	1.80 ¹²
Expert Systems	19.2	8.3	31	
Critical Success Factors	19.1	20.8		
Multiple Criteria DM	18.9	12.5		
Influence Diagrams	13.5	9.1		
Systems Dynamics	11.7	4.2		
Game Theory	10.9	4.2	37	
Delphi	10.7	16.7		
Soft Systems Methodology	10.4	4.5		
Robustness Analysis	10.3	13.6		
Process Improvements	7.3	21.7		
Cognitive Mapping	6.3	4.3		
Analytical Hierarchy	4.0	0		
Strategic Choice/AIDA	3.2	0		
SODA	3.2	0		

Notes: * Linear Programming 47%; Integer Programming 21%.

Sources: Jones et al. (1994) % awareness from UK sample stratified by size

Carter (1987) usage frequency from UK sample of OR Society members using horizontal numerical scale:1 (never used) to 5 (frequently used), and ranking of tool (out of 14).

Looking now at the Carter (1987) survey: it is more difficult to make comparisons with the Carter results as they are usage frequencies, which are reported as the average score on a numerical scale from 1-5, instead of sample usage proportions. However, it is possible to compare their rankings with the UKOR tool rankings. There is a high level of similarity for five of the seven approaches which are common to both projects; these are clustered in two groups: Simulation and Forecasting ranked in second and third place,

and the Inventory Modelling, Corporate Modelling and Decision Analysis in ninth, tenth and eleventh places respectively. The two tools with different results include Math Programming, which has a higher ranking in this project, and Heuristics, which has a higher ranking in the Carter survey.

At a more general level, it is interesting that the overall proportion of tool users in the Jones sample is equivalent to the strategic tool user proportion in the UKOR sample. Furthermore, the pattern observed in the Jones sample of low awareness and use of specific tools, although the overall proportion of tool users is comparatively high, was also noticeably present in this project. This implies that many of the tool users may have a comparatively small repertoire of the basic or general approaches in the area. Tool usage, as discussed in chapter 8, will also reflect a wide range of other Organisational, Personal and External factors. Finally, the overall results were broadly similar in the three countries compared by Jones; this project has also found high levels of similarity between the tool usage results in the two countries examined.

9.2.3 Theoretical Frameworks

Another mechanism for external comparison of the research results is to examine them in terms of an accepted theoretical model or framework. In the Strategic Management literature, the Gluck, Kaufman and Walleck (1980, 1982) framework for the evolution of Strategic Planning within organisations, has been used to evaluate tool usage results (Caeldries and Van Dierdonck, 1988; Matthew, 1992). This model proposes that there are four sequential phases in the evolution of strategic planning, each with a different value system and set of activities; these are summarised in Table 9.3. With increasing complexity of business problems and the pace of change in the environment the focus of the organisation changes. Gluck et al. suggest that the cumulative development of "attitudes and capabilities" is required to cope with the increasing planning sophistication; hence the sequential model. With this model, the types of tools which are frequently used are considered as a surrogate measure of the sophistication or maturity of the SM practices within the organisation.

Table 9.3 Phases in the Evolution of Strategic Decision Making

Phase #	Phase 1	Phase 2	Phase 3	Phase 4
Title	Financial Planning	Forecast-based Planning	Externally Oriented Planning	Strategic Management
<i>Effectiveness of strategic decision making increases!</i>				<i>Orchestration of all resources to create competitive advantage</i>
			<i>Increasing response to markets and competition</i>	Strategically chosen planning framework, Creative flexible planning processes,
		<i>More effective planning for growth</i>	Thorough situation analysis and competitive assessment, Evaluation of strategic alternatives, Dynamic allocation of resources.	Supportive value system and climate.
	<i>Operational control</i>	Environmental analysis, Multi-year forecasts,		
	Annual budget, Functional focus.	Static allocation of resources.		
Value System	Meet Budget	Predict the Future	Think Strategically	Create the Future

Source: Gluck, Kaufman and Walleck (1982)

Caeldries and Van Dierdonck (1988) linked the relative importance of financial tools (Budgeting and Investment Analysis) to the maturity of the strategic planning system. Combining this result with a series of other factors, they suggested that the average Belgium firm in the sample was at the phase 2/3 position along this continuum. Further, they used the Gluck model to propose recommendations for further development to improve the effectiveness of the strategic planning systems.

The Gluck model was also used to examine the sophistication of strategic planning

practices by Matthew (1992) in his NZ project. Drawing on Olson's (1991) tool frequencies data, and evaluation of a series of strategic case studies, Matthew concluded: "Generally speaking those firms that do plan are at Phase 2 (forecast based planning) or Phase 3 (externally oriented planning)." Matthew defined NZ strategic planning practices as "low sophistication and low incidence", and advocated upgrading of strategic planning systems and "wider use of the many tools which are available". While these recommendations are pertinent, the strategic position proposed appears to be overly reliant upon Olson's very small sample of managers.

By linking tool usage with specific strategic tasks, this project has demonstrated that many different tools are appropriate for different tasks within the SM process. This substantially increases the level of detail which is available on tool usage practices, and establishes a greater understanding of the complexity of the contribution of tools within the process. This project has also shown that individual practitioners may only be involved with tools for a small set of strategic tasks. Therefore, these results indicate that aggregate tool user proportions are inadequate as surrogate measures of the maturity of strategic planning practices. When the tools used, and the tool user proportions, are linked to a series of strategic tasks, the Gluck model does not appear to provide a simple mechanism for distinguishing between phases of maturity. For example, financial tools are recognised as appropriate for certain primarily financial tasks, rather than assumed to signal strategic immaturity; many of the strategic tasks involve a range of tools *including* financial approaches. To establish a set of standards for this type of comparison would necessitate developing specific tool profiles for every strategic task to match each of Gluck's four phases. However, even this would not be sufficient on its own, as the linkages between strategic and operational decision making also need to be evaluated. The tool data is necessary, but not sufficient on its own, to define the phases in Gluck's model. This finding signals a warning for SM researchers to avoid attempting to apply simplistic classifications based on aggregate tool usage results.

From the interview and survey results, the Core Competences approach featured strongly in the NZSM sample. This is a comparatively new SM approach which provides a structure for developing strategies based on the organisation's distinctive strengths or competences. It is distinctly different from other major SM developments philosophically, and fits naturally with the approach and systems described as Phase 4 of the Gluck model. Core Competences can be applied at personal through to industrial level with comparative

ease; although it is more difficult to apply in the service sector as most of the literature to date reflects manufacturing industries. Furthermore, it appears that it can be used to establish and drive strategic planning processes by individual managers who are new to the area/SM position; thereby avoiding the necessity of spending years developing skills in a multitude of different approaches. In this way, the Core Competences approach appears to provide a "fast track" for organisations to reach a high level of SM maturity without having to pass through the four stages sequentially. This finding suggests that the sequential evolutionary approach to SM development does not apply when organisations use this approach. This in turn raises questions about the applicability of the Gluck model? does the progressive SM development model still apply in the 1990s? does it only apply in certain situations or contexts? is Core Competency the only approach to provide this "fast track" SM development? Although further work will be required to examine this finding in detail, it is exciting in prospect for SM practice in the future.

9.2.4 Conclusion

External comparisons have been made with previous empirical tool usage research in both the SM and MS/OR disciplines. These intra-disciplinary comparisons have focussed on tool usage proportions for sets of specific tools which have the most overlap with this project. As well as identifying similarities and differences in the specific results, some more general patterns and trends have been discussed.

To provide an additional external benchmark for the strategic tool usage results, the Gluck, Kaufman and Walleck (1980, 1982) model was considered. This SM framework has been used by previous researchers to indicate the sophistication or maturity of SM practices. This comparison revealed a number of new insights which are surprising and potentially significant new developments. Extending the level of detail on tool usage practices by linking tools with specific tasks, demonstrates the inadequacy of the Gluck model to distinguish between phases of SM maturity on the basis of aggregate tool user proportions. Further, the NZSM Core Competences results raise questions about the applicability of the sequential evolutionary development of SM within organisations which the Gluck model assumes.

In the next section, a series of inter-disciplinary comparisons will be made using the results collected within this project.

9.3 Internal Comparisons

As this research is exploratory, the project was designed to enable inter-disciplinary comparisons to be made. Collecting data simultaneously using the same framework in both disciplines facilitates a range of comparative evaluations from **within** the project. These internal comparisons overcome the timing problems associated with sequential comparative research designs. However, they also remove many of the methodological problems associated with comparisons involving different sampling strategies. Furthermore, this design was chosen to enable the strategic contribution of MS/OR to be evaluated within a SM context.

Detailed cross-country comparisons of the SM and MS/OR tool usage results have already been outlined and discussed in chapters 6 and 7 respectively. In this section inter-disciplinary comparisons for selected key results from all four survey samples will be made: (1) UKSM, (2) NZSM, (3) UKOR, and (4) NZOR. First, the SM tool usage proportions for each of the three SM process phases will be compared. The tools used in practice for each SM process phase, and the tool familiarity results, will also be considered. The use of "new" tools within each discipline will be discussed, and finally the functions of tools will be compared.

9.3.1 Tool Usage in SM Phases

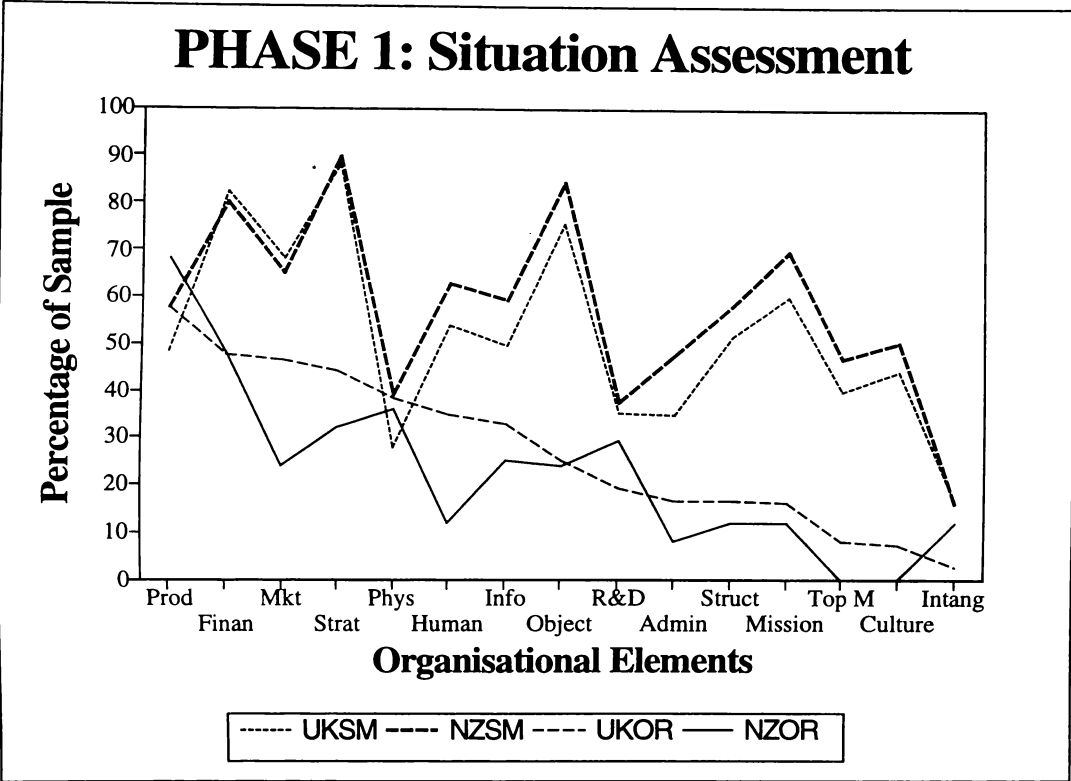
The SM process model was used to collect information on strategic tool usage by practitioners in both disciplines. In this section the tool user proportions for all four surveys for each of the three SM process phases will be compared.

A. Phase 1 Situation Assessment

The use of tools in Phase 1 to evaluate the current strategic position of the organisation was considered. Figure 9.1 shows the tool user proportions for each of the Organisational areas for the four surveys in a line graph format; the results are arranged in descending order of the UKOR results.

The graph highlights the *similarities* in the results (previously discussed in chapters 6 and 7) *within* the disciplines. Further, it accentuates the *differences* in the tool user proportions *between* the two disciplines. Statistical testing confirms that all but two of the results are significantly different (Appendix XXIII). Evaluating the Production/Operations and Physical Resources are the only two Organisational areas for which the results are

Figure 9.1 Phase 1 Organisational Analysis

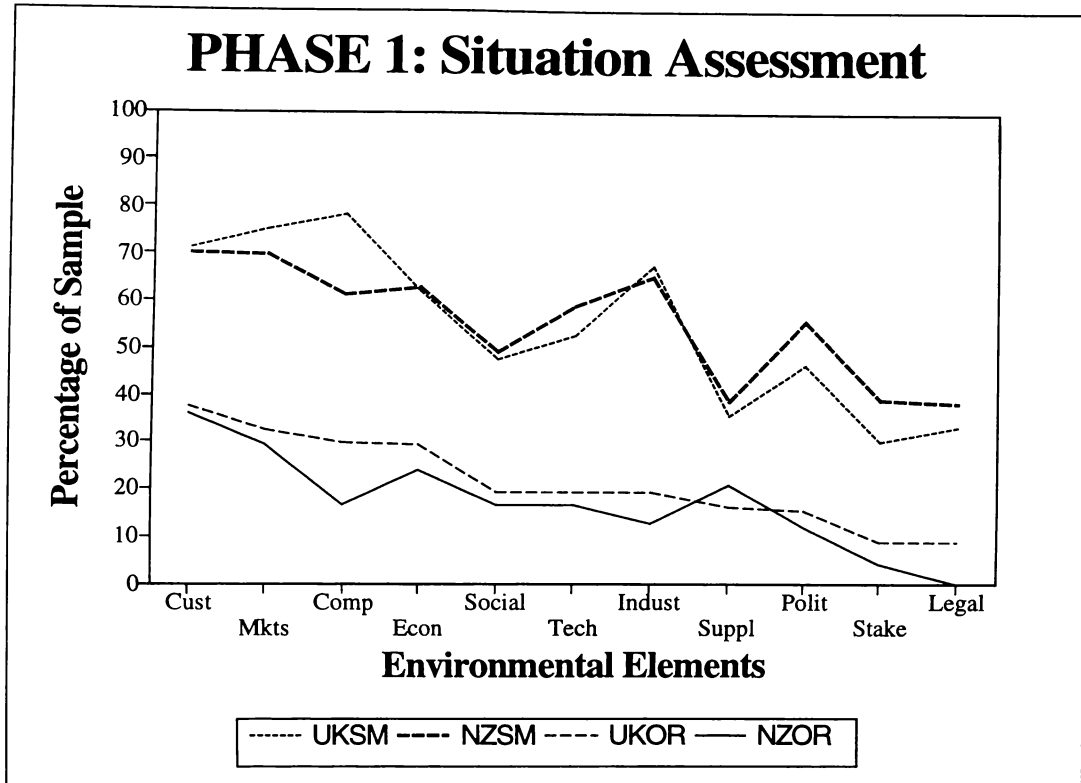


essentially the same in both disciplines. Although these are two of the traditional areas for MS/OR application, it is an interesting result nonetheless, as it signals the same level of strategic tool usage in both disciplines for these strategic tasks. Given the lack of recognition of a strategic role for MS/OR, these results indicate potential contribution for MS/OR for most of these strategic tasks.

The tool user proportions for each of the Environmental areas for the four surveys are shown in a line graph format in Figure 9.2; once again the results are arranged in descending order of the UKOR results. This graph shows even more clearly the pattern of *similar* results *within* the disciplines (i.e. the two SM and the two MS/OR surveys). Further, it contrasts the much higher proportional level of tool involvement by the SM samples for all of these Environmental tasks. The tool user proportions for all of these strategic tasks are significantly different statistically (Appendix XIII). Although the proportion of MS/OR tool involvement is comparatively low, it indicates the status quo position, and signals potential application areas for the discipline in future.

The higher level of tool usage for the Phase 1 Organisational and Environmental areas by the SM samples is also reflected in higher mean number of these tasks which the SM tool users are involved with. The mean values for all four samples for each of the SM process

Figure 9.2 Phase 1 Environmental Analysis



phases are summarised in Table 9.4. The ratio of the number of tasks performed by the SM practitioners, compared with the number of these tasks carried out by the MS/OR tool users, is approximately 2:1 for the Organisational tasks, 2.5:1 for the Operating Environmental tasks, and 3:1 for the Remote Environmental tasks.

Table 9.4 Mean Numbers of Strategic Tasks

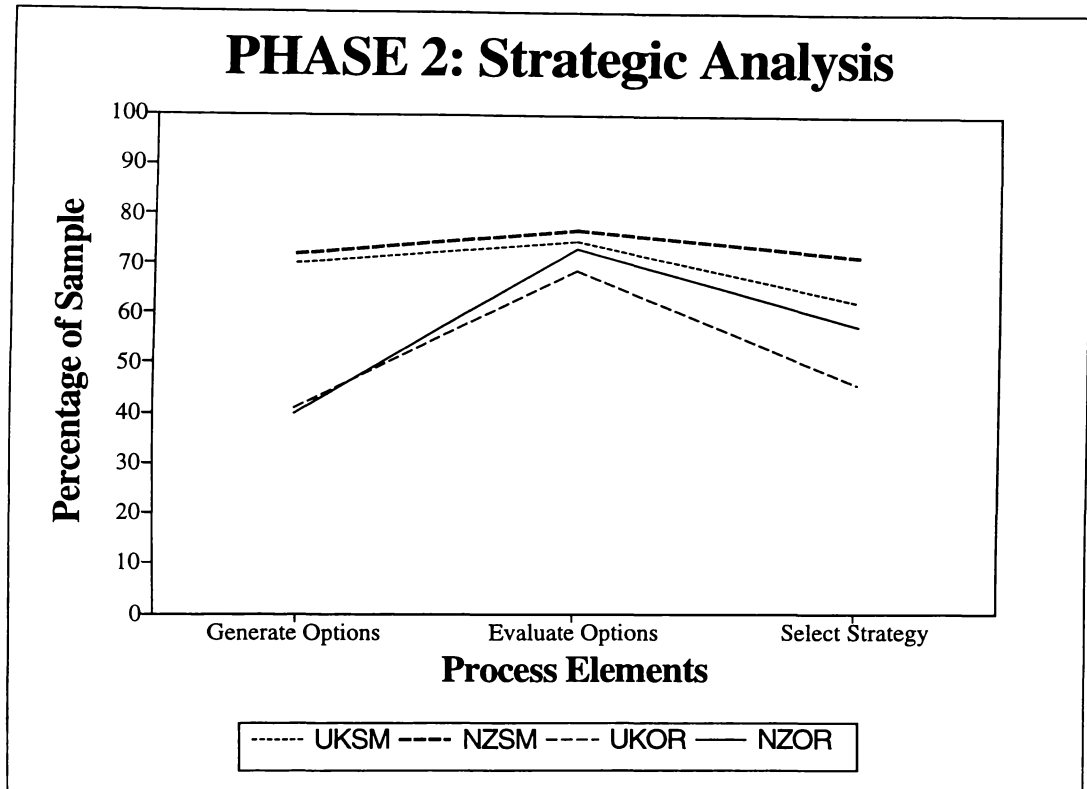
SM Process Phases	UKSM	NZSM	UKOR	NZOR
Phase 1: Situation Assessment				
Organisational Areas (n=15)	6.9	7.9	3.8	3.3
Operating Environment (n=6)	3.3	3.2	1.4	1.1
Remote Environment (n=5)	2.1	2.4	0.86	0.65
Phase 2: Strategic Analysis (n=3)	1.97	1.98	1.47	1.69
Phase 3: Strategic Implementation (n=3)	1.6	1.7	0.76	0.73

B. Phase 2 Strategic Analysis

Phase 2 involves three key Strategic Analysis tasks to identify/select the best strategy for the future. The tool user proportions for each of the Strategic Analysis tasks for the four

surveys are shown in a line graph format in Figure 9.3.

Figure 9.3 Phase 2 Strategic Analysis



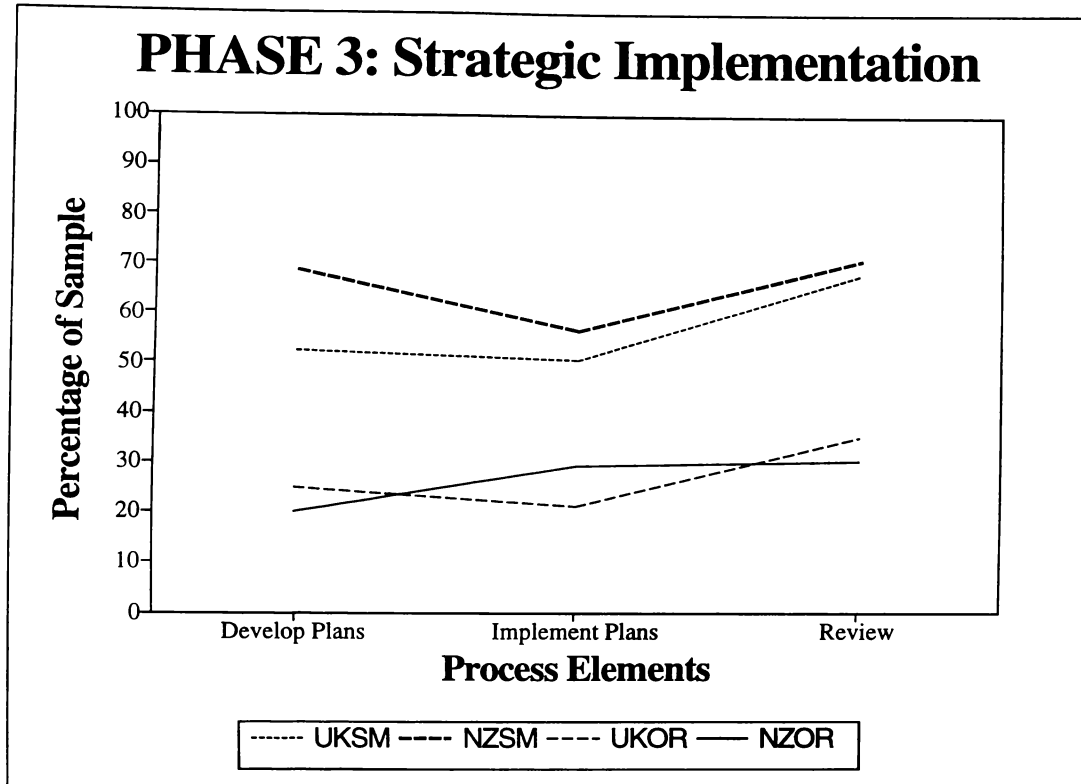
The proximity of the tool user proportions for the top task of Evaluating Options is confirmed by statistical significance testing; this is the only Strategic Analysis task for which the results were not different significantly (Appendix XXIII). The evaluation of alternatives is one of the traditional MS/OR modelling tasks; however, this result represents applications which are beyond the traditional scope of MS/OR (i.e. these are all at the strategic level). The level of MS/OR tool use in this phase is higher than the other SM phases; this contributes to the comparatively higher mean values and the resulting lower ratio of 1.25:1 for the SM:MS/OR task numbers. These results suggest that MS/OR can extend its contributions to the strategic level.

C. Phase 3 Strategic Implementation

Phase 3 involves three key tasks which enable/facilitate Implementation of strategy. Figure 9.4 shows the tool user proportions for these Strategic Implementation tasks all four survey samples.

For these Phase 3 tasks the same pattern of results occurs as in Phase 1: the tool user proportions *within* each of the disciplines are *similar*, but quite *different between* the

Figure 9.4 Phase 3 Strategic Implementation



disciplines. The differences for all three tasks were confirmed by statistical significance testing (Appendix XXIII). The higher proportions of the SM practitioners using tools for these Strategic Implementation tasks is encouraging as it symbolises the attention given to support the implementation of the strategies. The comparatively low MS/OR results signal an area of opportunity for the MS/OR discipline to expand its strategic contribution.

9.3.2 Top Tools Used in Practice

The SM process model was also used to collect information on the tools which are currently used in practice for each of the strategic tasks. The top tools which were used for each task were presented and discussed in sections 6.4 and 7.4. In this section, the top tools in the two disciplines will be compared. (Note: for many of the tasks no top tools were reported for the NZOR sample, as it was too small for clear "leaders" to emerge).

A. Phase 1 Situation Assessment

The top tools for each of the Phase 1 Organisational and Environmental analysis tasks were determined. There was a very high degree of similarity in the top tool sets for the two SM samples for both the Organisational and Environmental tasks. Intra-discipline MS/OR comparisons were only possible for a few of the Phase 1 tasks, however some overlap was found for most of these tasks.

At the inter-disciplinary level, there is a very limited commonality in the top tool sets. For five of the organisational resources there was at least one common tool in the top tool sets; and for two of these tasks, two common tools were found. Forecasting was the top tool which was common to the SM and the MS/OR samples for each of the following resource areas/tasks: Financial Resources, Marketing/Distribution, Production/Operations, Physical Resources, and Research and Development. Spreadsheet Modelling was the second top tool in common for the evaluation of Financial Resources and Production/Operations resources. No common tools were found in the top sets of the six organisational features.

In the Environmental Analysis area there was a single top tool in common to both disciplines for two of the Operating Environmental (OE) tasks and for two of the Remote Environmental (RE) tasks. Forecasting was included in the top tool set for evaluating Industries (OE), Economic trends (RE) and Govt/Political influences (RE). Surveys were common to both disciplines for evaluating Customers (OE), and Spreadsheet Modelling was also included in the top tool sets for evaluating Economic trends (RE).

For the Phase 1 tasks the dominant top tool which is common to both disciplines is Forecasting. Spreadsheet Modelling is the second top tool, which features in the top sets for three of the tasks.

B. Phase 2 Strategic Analysis

Phase 2 involves three key Strategic Analysis tasks to identify/select the best strategy for the future. A very high level of similarity was reported between the top tool sets for both of the SM samples for all three Strategic Analysis tasks; and some similarity between the MS/OR samples was also found.

At the inter-disciplinary level, Spreadsheet Modelling occurs in the top tool sets for all three Strategic Analysis tasks; and Cost Benefit Analysis was also common to both disciplines for Evaluating Options and Selecting a Strategy for the future.

C. Phase 3 Strategic Implementation

Phase 3 involves three key tasks which enable/facilitate the Implementation of strategy. Once again the pattern of *similarity within* the two disciplines was observed in the top tool sets for these three Implementation tasks. Furthermore, the inter-disciplinary results for these tasks also reflect the pattern observed in other phases of limited commonality.

However, there was one tool in common for all three of these strategic tasks: Spreadsheet Modelling.

In conclusion, the dominant top tool which is common to both disciplines was Forecasting for the phase 1 tasks, and Spreadsheet Modelling for both SM phases 2 and 3. Forecasting has been a prominent tool in MS/OR practitioner surveys in the past. This result confirms the literature analysis finding (Clark, 1992) that it is also an important tool for strategic level decision support. Likewise, these results demonstrate that Spreadsheet Modelling is an important technological tool which provides quantitative modelling support for strategic decisions. The contribution of Spreadsheet Modelling for strategic level decision modelling has not previously been generally recognised within the SM discipline; evidenced by the lack of promotion in academic and professional SM seminars, conferences and publications. It is a general approach which provides basic computing capability for both routine and specific numerical analysis. MS/OR modellers have the mathematical modelling and technical competence to use Spreadsheets for strategic applications.

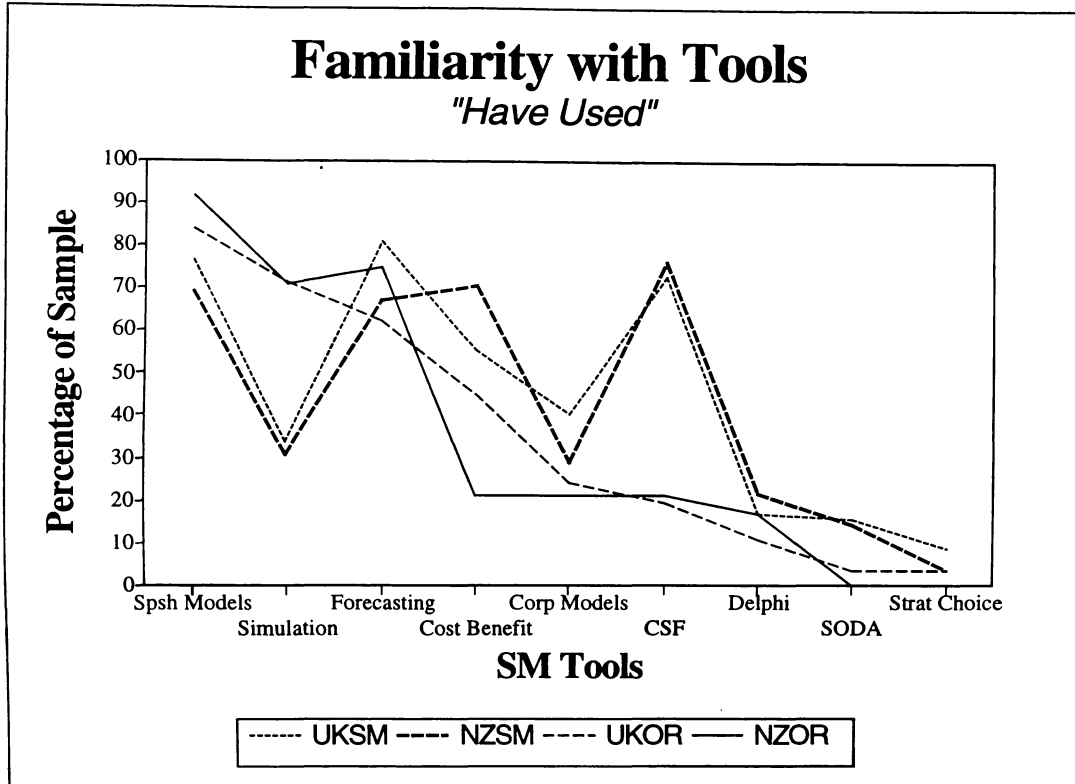
Apart from these two common top tools, the remaining top tools are quite different for these two disciplines. In the next section, the levels of familiarity and awareness of a small sample of tools will be compared.

9.3.3 Tool Familiarity

To investigate the levels of awareness, familiarity and usage of tools, a sample of thirty SM tools was evaluated in the SM surveys and a sample of twenty five MS/OR tools was included in the MS/OR surveys. To enable inter-disciplinary comparisons to be made, a subset of nine tools was included in both of these samples. In this section the results from both disciplines for these nine tools will be compared. First, the proportions of the samples who "Have Used" each of these tools will be considered, and then the sample proportions who indicated that these tools are "Unknown" to them will be discussed.

Figure 9.5 shows the proportions from each of the four surveys who indicated that they "Have Used" each of these tools. The results are arranged in descending order of the UKOR sample proportions. The graph shows a range of different patterns for these nine tools. First, there are high results which are similar in both disciplines, such as the proportions who have used Spreadsheet Modelling and Forecasting. There are tools which

Figure 9.5 Tools Used

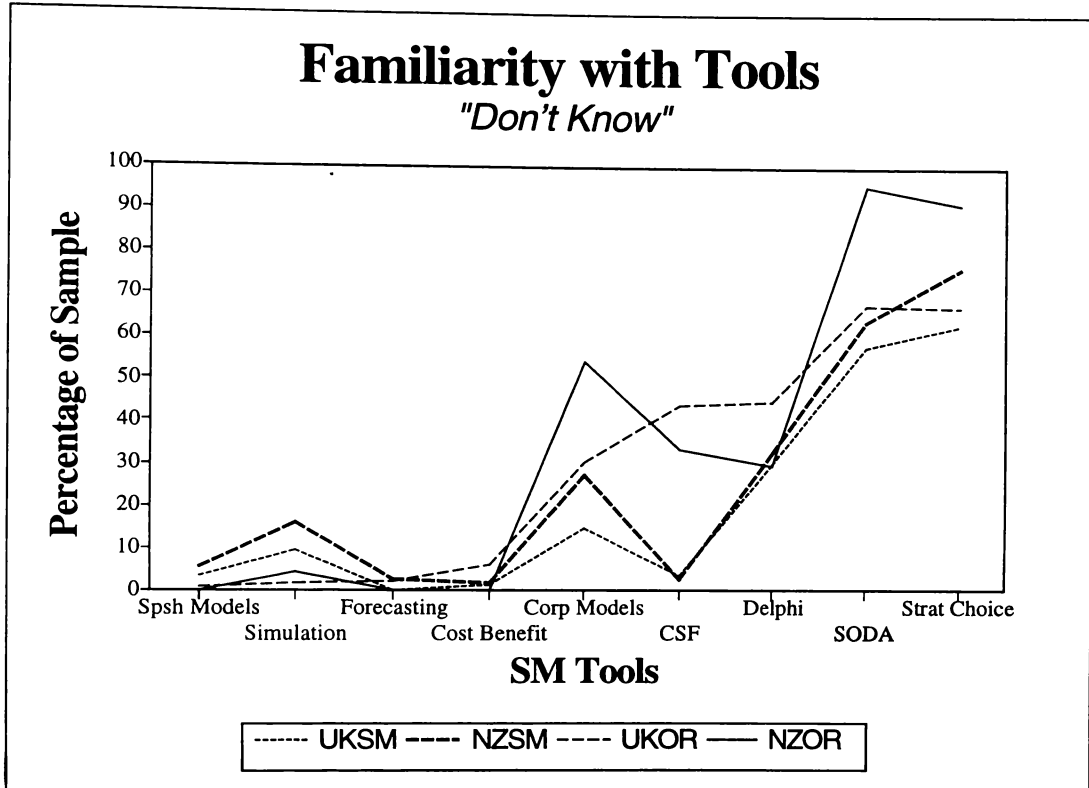


have high results in one discipline, but comparatively low results in the other; these include Simulation which is higher in the MS/OR samples, and Critical Success Factors which is higher in the SM discipline. Looking at the three tools at the lowest usage levels, (Delphi, SODA and Strategic Choice), there is a very high similarity between all of the samples. In the mid-range, Corporate Models have similar results in all four samples, while Cost Benefit Analysis results are quite different for all four samples (ranging from 21 to 70%).

As a contrast, the proportions of the samples for whom these tools are "unknown" are shown in Figure 9.6. The nine tools are listed in the same order as in the previous graph, which shows that the overall pattern in these results is reversed. The tools which were least used, are the same as the tools which are "unknown" by the highest proportion of all of these samples: SODA and Strategic Choice. The NZOR sample stretches the range of these least well known tools, as over 90% of these NZOR respondents "Don't Know" these approaches. For the Delphi approach, there were significant proportions from all of the samples who know about the Delphi approach, but do not use it.

In general, the tools which were used the most above, have the lowest "unknown" proportions for all four samples, e.g. Spreadsheet Modelling and Forecasting. Simulation

Figure 9.6 Unknown Tools



was used by a smaller proportion of the SM samples, but is known to most of the SM and MS/OR samples. Likewise, Cost Benefit Analysis is known by almost all of the practitioners from both disciplines, although the usage proportions are variable.

The only tool which shows higher results in one discipline than the other is Critical Success Factors; higher proportions of the MS/OR samples "Don't Know" this approach. Finally, the tool which has different results for each of the four samples is Corporate Models (ranging from 14 to 54%); again the NZOR sample has the highest proportion of respondents who do not know this approach.

For this sample of nine tools there is a complex series of patterns between the disciplines for the levels of familiarity and usage. The similarities and differences have been discussed. For most of the tools there is an inverse relationship between the usage and awareness proportions. An exception to this rule is Cost Benefit Analysis, for which the usage results are all quite different, but the awareness results are all very similar. Further, inter-disciplinary usage differences for Simulation were not evident in the awareness results; however they are observed for the Critical Success Factors approach. The tools with the lowest awareness proportions are specific qualitative approaches, in contrast to

the quantitative approaches which appear at the high usage end of the continuum.

9.3.4 Use of "New" Tools

The responsiveness to new approaches and the types of tools which were being used for the first time was investigated in the four surveys. The respondents indicated whether they had tried any tools for the first time within the previous two year period, and provided the names of the tools which were "new" for them. In this section the inter-disciplinary results will be considered; the proportions of all four samples who indicated "Yes" and "No" responses, and the numbers of "new" tools involved, are shown in Table 9.5.

Table 9.5 Use of "New" Tools

	UKSM	NZSM	UKOR	NZOR	Prob.
Yes (tried a "new" tool)	76.8	77.9	52.6	48.0	.0000
No (used the same tools)	23.3	22.1	47.4	52.0	
Average per person	3	2	1.7	1.9	
# of different tools	92	53	55	15	

The pattern of high *similarity within* the two disciplines is clearly evident here. The *differences between* the two disciplines were confirmed by statistical testing to be significant. These results demonstrate that the majority of the practitioners (more in the SM area) are involved with applying tools for the first time. This is attributable in part to the level of mobility in the sample; as new positions often involve new tasks, which in turn require specific tools, which may be different from the tools which the individual has used previously.

There is considerable variation *within* each discipline in terms of both the numbers of different tools being applied, and the actual tools being used for the first time; this makes the inter-disciplinary comparisons more difficult. The UKSM sample has both the widest range of "new" tools being applied and the highest average per person. In general, a different set of "new" tools was described by the two disciplines; the only tools which were common to the most frequently mentioned sets (described in sections 6.7 and 7.6) were Forecasting, Simulation and Porter's Five Forces. The practitioners are trying a wide range of tools for the first time. The samples include some tools which have been developed more recently, and a mixture of the basic approaches associated with each

discipline. They include both general and specific approaches, and also a mixture of both qualitative and quantitative approaches.

9.3.5 Function of Tools

The main purpose or function of tools was also investigated in the four survey samples. To facilitate inter-disciplinary comparisons, the mean importance value for each function from each of the samples is shown in Table 9.6.

Table 9.6 Function of Tools

	UKSM	NZSM	UKOR	NZOR	Prob.
Generate information	4.00	4.26	4.14	4.46	.0331
Provide structure	4.12	4.18	3.91	3.72	.0076
Communication	3.83	3.95	3.62	2.88	.0000
Co-ordination	3.51	3.95	2.88	2.74	.0000
Symbolic purposes	1.80	1.99	1.94	1.63	.2772

Statistical significance testing shows that the sample means are significantly different for the first four of these five functions. ‘Generating information for decision making’ is a very important tool function in both disciplines; on average the NZ samples have rated this function higher than their UK counterparts. ‘Providing a structure for analysis’ is also highly rated by both disciplines, but it is perceived to be equivalent to the information generation function by the SM samples. Likewise the Communication and Co-ordination functions are more important for the SM practitioners than they are for the MS/OR practitioners. Finally, Symbolic Purposes are not perceived to be an important function of tools for either discipline. These ratings reflect the different mix of tools being used in the two disciplines. Further, as tools will often fulfil multiple functions simultaneously, they signal the complexity of the functions which tools perform.

9.3.6 Conclusion

Inter-disciplinary comparisons have been made for the key results from the survey samples. These results describe the current status of strategic tool usage by practitioners in both disciplines. Therefore, the identification of similarities and differences ensures that the strategic potential of MS/OR has been evaluated in a SM context.

For the series of strategic tasks in all three phases of the SM process, the level of tool use

is higher in the SM samples. The MS/OR tool user proportions were at the same level as the SM samples for only three of these thirty two tasks: the evaluation of the Production and Operations Resources and Physical Resources in Phase 1, and the evaluation of Strategic Alternatives in Phase 2. While these are traditional MS/OR areas, these applications are at the strategic level; which is beyond the traditionally recognised scope for MS/OR. The level of tool involvement by MS/OR practitioners for most of the strategic tasks is significant as it indicates the current status of strategic level MS/OR tool usage. Although the MS/OR proportional levels are lower than the SM results, they indicate potential contribution for MS/OR for most of the strategic tasks. This signals a wide range of potential strategic application areas for the MS/OR discipline in the future.

The tools which are being used in practice for each of the strategic tasks were determined and compared. In general the top tool sets from the two disciplines were quite different. The dominant top tool which is common to both disciplines was Forecasting for the Phase 1 tasks, and Spreadsheet Modelling for both Phases 2 and 3. While Forecasting is generally well known in both disciplines, Spreadsheet Modelling has not previously been widely promoted as a support tool in the SM discipline; evidenced by the lack of promotion in the academic and professional SM seminars, conferences and publications. However, these results indicate that Spreadsheet Modelling is an important technological tool for providing quantitative modelling support for strategic decisions.

The levels of familiarity, awareness and usage were compared for a subset of nine tools which were included in the tool samples for both disciplines. A complex series of patterns was found between the disciplines for the levels of familiarity and usage. In general, there was an inverse relationship between usage and awareness proportions. Further in this subset, the tools with the lowest awareness proportions were specific qualitative approaches, whereas the high usage tools were primarily quantitative.

The proportions of the samples involved with using any tools for the first time were *similar within* each discipline, but quite *different between* the two disciplines. However, the numbers of different tools being applied, and the actual tools which they were using for the first time, *varied* considerably *within* each discipline. The only "new" tools which were common to both disciplines were Forecasting, Simulation and Porter's Five Forces. The results demonstrate that the practitioners are trying a wide range of new tools, including a mixture of both recently developed and basic approaches.

Finally, inter-disciplinary comparisons were made of the perceived importance of a series of key functions of tools. Significantly different mean values were reported for four of the five tool functions. This result reflects the different mix of tools being used in the two disciplines, and demonstrates the complexity of the functions which tools perform.

9.4 Conclusion

To provide perspective and to distinguish the results from previous research, a series of external comparisons have been made in this chapter. Further, to evaluate the strategic potential contribution of MS/OR, a series of internal inter-disciplinary comparisons have been made. The SM results provide a description of the current status of strategic tool usage and thereby serve as a benchmark for evaluating the MS/OR tool usage results. Similarities and differences in the level of tool involvement and the tools which are used in practice have been discussed.

In the final chapter, conclusions and contributions of this research will be discussed, and ideas for further research proposed.

Chapter 10 Conclusions and Further Research

10.1 Introduction

In this thesis the role of MS/OR at the strategic level has been examined in a multi-disciplinary, comparative, empirical investigation. A normative framework of strategic tasks was developed to provide a representative set of core strategic tasks for the evaluation. The levels of MS/OR tool use for each of these tasks was determined for practitioner samples from the New Zealand and United Kingdom Operational Research Societies. For comparative purposes, the empirical research was simultaneously replicated using practitioner members of the Strategic Management/Planning Societies in these two countries. Cross-country comparisons within each discipline have been outlined in chapters 6 and 7. Inter-disciplinary comparisons have been presented in chapter 9, along with external comparisons of key results with prior research.

This final chapter will start by summarising the conclusions for the central research theme on the role of MS/OR in Strategic Management. Next, key findings on the two related research questions which are concerned with SM tool usage and strategic tool selection, will be presented. The contribution of this research to current knowledge will be considered, and managerial implications of the findings discussed. Finally, a research agenda of follow-on research topics will be proposed.

10.2 The Role of MS/OR in Strategic Management

The role of MS/OR at the strategic level has been explored in this project using an empirical investigation of current practice. Focussing primarily on tool usage for a representative series of core strategic tasks, the multi-disciplinary design enabled the strategic potential for MS/OR to be evaluated in a SM context. Simultaneous replication in two countries increased the scope and internal validity of the research. A multi-method research design facilitated both breadth and depth of inquiry in this exploratory investigation.

In this section conclusions from the Strategic level MS/OR tool usage investigation will be presented first. From the interview responses, the types of Strategic Decisions and the relationships with Corporate Strategy groups will then be summarised. Finally, a series of potential strategic roles for MS/OR will be discussed, and an overall conclusion drawn.

10.2.1 Strategic MS/OR Tool Usage

The MS/OR results from the three SM Process phases (which were outlined in chapter 7 and compared with the SM results in chapter 9) indicate that MS/OR practitioners are involved with most of the strategic tasks. While all of the individuals were involved in multiple areas, only small numbers were involved with tools for more than half of the tasks in each phase. For three of the strategic tasks the proportions of MS/OR tool use were the same as the SM level; these included the evaluation of Production/Operations Resources, and Physical Resources in Phase 1, and the evaluation of Strategic Alternatives in Phase 2. Although the MS/OR proportional levels are generally lower than the SM results, nevertheless they indicate potential contribution for MS/OR for most of these strategic tasks. This is an interesting finding as it confirms and signals a wide range of potential strategic application areas for MS/OR in the future; these are beyond the traditionally recognised scope for MS/OR.

The tools which are being used in practice for each of the strategic tasks were also determined and compared. The top tool sets from each discipline were quite different. The dominant top tool which was common to both disciplines was Forecasting for the Phase 1 Situation Assessment tasks, and Spreadsheet Modelling for both Phase 2 Strategic Analysis and Phase 3 Strategic Implementation.

The tools which the practitioners have used for the first time in the previous two year period was investigated. Again a different set of tools was described by the two disciplines; the only tools which were common to the most frequently mentioned sets were Forecasting, Simulation and Porter's Five Forces.

10.2.2 Types of Strategic Decisions

The types of strategic decisions which the MS/OR practitioners were personally involved with were provided by the twenty five MS/OR interviewees (see section 7.7.1). These were categorised into a series of eight strategic decision types:

1. Strategic
2. Marketing
3. Human Resources
4. Financial
5. Information Technology
6. Environmental

7. Manufacturing
8. Services

This summary contains a very broad range of strategic modelling and evaluative projects. It demonstrates the diversity of strategic application areas for the MS/OR discipline. Furthermore, it signals the significant potential for MS/OR to contribute to strategic decision making.

10.2.3 Relationships with Corporate Strategy Groups

Three types of relationship were found between the MS/OR groups or departments and their Corporate Strategy counterparts (see section 7.7.2):

1. MS/OR Group *is* the Corporate Strategy Group
2. MS/OR Group *works for/with* the Corporate Strategy Group
3. MS/OR Group *works independently* (of Corporate Strategy Group)

These different levels of personal involvement will have a strong influence on access to strategic projects and hence the type of strategic projects which are conducted by MS/OR practitioners. From the interview sample (who were *all* involved with Strategic projects) the second co-operative, consultative relationship was the most common. It was noteworthy to find MS/OR groups performing the Corporate Strategy role for two of the NZ organisations reliant upon quantitative modelling support for their strategic decisions. Yet, even the independent MS/OR groups can provide significant input for strategic projects within their *recognised* areas of expertise.

10.2.4 Strategic Roles for MS/OR

From the interview responses a series of six different *potential* roles for MS/OR at the strategic level were identified (see section 7.7.3). These included: (A) Modeller/Analyst Support Role, (B) General Consultancy Support Role, (C) Soft OR Role, (D) Educator Role, (E) Technology Support Role, and (F) Model and Software Development. These will now be discussed in turn.

A. Modeller/Analyst Support Role

The predominant role performed by MS/OR practitioners is the quantitative Modeller/Analyst role; and the traditional domain for this has been the operational area. The ability of MS/OR modellers, and their models, to handle strategic problems and issues has generally been dismissed in the past on the basis that strategic decisions were primarily qualitative or they were too complex to model. However, the results from this project

demonstrate that MS/OR practitioners *can* perform this role for certain strategic level decisions.

B. General Consultancy Support Role

There is evidence that many MS/OR practitioners can also perform well in a more General Consultancy role. This involves applying the MS/OR process to a broader range of areas and issues; these process and problem structuring skills can potentially be applied at the strategic level. Many organisations now expect/require their MS/OR practitioners to fulfil this role. For many staff this may necessitate extending their personal competency to include more basic management tools (e.g. Surveys, Focus Groups), which were *not* included in their MS/OR training. To operate effectively in a strategic support capacity, it would be advisable to also learn some of the basic SM approaches (e.g. SWOT Analysis, Porter's Five Forces).

C. Soft OR Role

The 'Soft OR' role is used here to refer primarily to facilitation and idea generation. This is an essential element of Strategic Management. Practitioners with expertise in these areas will be able to make a major contribution to the development of strategies. However, the ability of MS/OR practitioners in general to perform this role is doubtful. Although, there have been a number of 'Soft OR' approaches developed and promoted through the 1980s and 1990s, the results suggest that these approaches are still not widely known or used. These tools require specific skills which the developers can demonstrate with flair, but many others seem to struggle to grasp. This appears to leave the 'Soft OR' role in the "too hard" basket for *most* MS/OR practitioners; whether the application is strategic or operational seems to be immaterial.

D. Educator Role

The thesis results suggest that there is a need within both disciplines for individuals to perform an Educator role. The gap is stronger in the SM discipline as it has no recognised tool focus in academia or in practice. The returns from this role are likely to be more pervasive in the SM discipline; improvements in strategic tool use will potentially have a major influence on the effectiveness of strategic planning, and flow through to improvements in organisational performance.

Mobility of staff and positions creates pressures for managers to upskill, however there is

limited time available for this training. As there is a lack of detailed comparative and evaluative information on SM tools, managers are vulnerable to fads and consultants (whose knowledge is often limited to a specific area or subset of the tools available). There is a need for a systematic evaluation of new tools, as well as education, guidance and support on basic and new approaches. As MS/OR training is generally tool focussed, some MS/OR practitioners may have the qualities to fulfil this Educator role.

E. Technology Support Role

There is a very definite need for practitioners to carry out a Technology Support role in SM. For example, to assist with the development of competitor tracking databases or other external environmental databases; and/or to assist with the development of administrative databases to ensure that they produce information for their primary function, as well as for modelling and analysis. MS/OR practitioners will generally have the computer literacy and technical skills to perform this vital role. These types of technological support, for monitoring internal capability and external activities, provide essential inputs for the SM process.

F. Model and Software Development

There is limited software available which will support existing SM approaches and specific core strategic tasks. Many organisations have developed their own customised models and software, but these are usually proprietary for confidentiality and competitive reasons. There is a vast market for commercial models and software, but the development of new models and software requires creativity, design skills and technical competence. The ability of MS/OR practitioners to fill this gap by performing this role is uncertain.

There will be some individual MS/OR practitioners who have the personal skills and technical competence to perform many of these six Strategic Support roles. However, for the majority of MS/OR practitioners the three roles which they can most likely perform readily include: (1) the Technology Support role, (2) the Modeller/Analyst role, and (3) the General Consultancy role. The Educator role and the Model and Software Development role, are both more difficult and challenging because they involve research; however, if the tool information and model/software outputs produced are able to be disseminated, the potential return for the SM discipline as a whole from these activities will be significant.

10.2.5 Conclusion

Many opportunities exist for MS/OR practitioners to provide support for strategic decisions. Many of these involve some expansion of their repertoire of skills and personal competencies, as well as learning or developing new tools. As continuous change has become the 'norm', lifelong learning provides the mechanism to meet these new opportunities and challenges.

The thesis results have confirmed the ability of MS/OR to make a contribution at the strategic level. Therefore, formal recognition by the profession of a new study area: Strategic MS/OR - is recommended.

10.3 Strategic Management Tools

The SM results provided a benchmark for comparison of the MS/OR results. However, the SM tool study also generated significant additional findings for the SM discipline as this was the first broad-based empirical study of SM tool usage. In this section conclusions from the SM tool usage investigation will be presented. From the interview responses, the findings on the Corporate Strategy roles will be summarised. A new SM tool typology will be discussed, and the section will finish with an overview level conclusion.

10.3.1 SM Tool Usage

The SM tool usage results for each of the SM Process phases were outlined in chapter 6. This was the first project to examine SM tool usage for a series of specific strategic tasks. The striking similarity in the tool user proportions from the two countries was confirmed by statistical significance testing; only two of the thirty two tasks were significantly different. All of the respondents were using tools in multiple areas, with very small proportions involved with all of the tasks. For most of the strategic tasks (72%) the levels of tool usage were at, or above, 50%, so these results suggest a relatively high level of tool usage in practice.

The top tools used in practice for each of the strategic tasks were reported. The use of multiple tools of different types for each strategic task was an interesting finding. The similarity in the top tool sets from both countries was marked. The dominant common top tool in the Situation Assessment and Strategic Analysis phases was SWOT analysis; Focus Groups featured strongly in all three phases, and Budgeting was dominant in the Strategic

Implementation tasks for both samples. The same types of tools were found for clusters of similar tasks and some of these were almost identical for each country. Some country-specific differences were also noted.

The top tool results demonstrate the diversity of tools which are used to support decision making in Strategic Management. It is interesting to find that the majority of the top tools which are being used by SM practitioners are not in fact 'specific SM' approaches. Other types of tools including basic financial and marketing approaches appear frequently; behavioural and social approaches to structure the interactive SM processes, and technological approaches to support the analytical activities also feature strongly. The use of many tools which are developed and taught within other management specialisms highlights the integrative nature of SM. Further, this multiplicity of tools signals the range of technical competence which is needed by SM practitioners.

The majority of the SM practitioners have tried at least one tool for the first time in the previous two year period. While the proportions of the UK and NZ samples who reported trying a 'new' tool were the same in both countries, many different tools were being tried. In the UK sample a wider range of tools and higher frequencies were found.

10.3.2 Corporate Strategy Roles

The nature of the strategic tasks and roles which are performed by Strategic Managers was investigated in the thirty six interviews (see section 6.7.2). A set of five major roles was identified from the Corporate level strategy responses:

1. Corporate Direction and Strategy
2. Support
3. Education
4. Strategic Review
5. Strategic Issues and Projects

This summary indicates the breadth of responsibilities which are addressed at this strategic level. At the Business strategy level the same basic set of roles was proposed, however these managers operate within the confines of their own business units. These roles may be performed by a single individual or a team of people working with separate and shared responsibilities. Most of the interviewees had multiple areas of responsibility; however some of the Strategic Managers were employed to focus on a specific area such as competitors, or acquisitions, or developing a Strategic Plan. This is further evidence of

the complexity of Strategic Management practice.

10.3.3 SM Tool Typology

There is a vast array of diverse tools which are available and used in Strategic Management. Furthermore, this toolkit is expanding as new approaches are continually being developed and promoted. There is a need for a standard typology of tools to provide a structure for descriptive and analytical purposes; it would be useful for educationalists and practitioners. Previous researchers have examined only small sets of similar tools, so they did not have a need for this type of meta-categorisation system. However in this project, by taking the broad meta-view, the need for such a classification system became apparent.

A preliminary SM Tool Typology has been developed and used in this project to assist with the interpretation of the results. It is an overview level framework containing six categories: Admin/Planning, Financial, Marketing, Technological, Social, and Combination. There are five basic categories of tools, and a sixth combination category for tools which don't fit exactly into just *one* of these groups. Tools are classified on the basis of their primary focal areas into groups of recognisably similar tools. This categorisation of tools is useful as it provides a structure for sorting/ordering, thinking about and understanding the different types of tools which are available/used. It can also be used in a diagnostic capacity to identify areas of deficiency for training purposes.

This SM Tool Typology may need to be refined and tested in follow-on research. For example, sub-categories could be developed and evaluated. The Typology has been partially tested in this project in the interpretation of the tool usage results where it has appeared to be workable. Further, it meets the basic criteria for operationalisation in practice: in terms of size, it contains a small set of categories which are quite distinct; in terms of scope, it appears to be capable of handling any/all approaches, so it is complete; and it uses simple, generally recognisable terminology which will be understandable for practitioners.

10.3.4 Conclusion

Conducting a broad study of SM tool usage practices has generated a vast quantity of new descriptive evidence and new insights on the nature of Strategic Management. The concept of a toolkit from which SM practitioners select appropriate tools for specific tasks

provides a new perspective; specifically it focuses attention on the content of the toolkit and on the tool selection process. The integrative nature of the discipline is reflected in the diversity of SM tools which are used. This signals the need for comparative and evaluative information on SM tools to assist with tool selection; and the importance of SM training programmes to assist the development of SM tool competency. Further, the need for a systematic review of new tools was evident.

The SM framework of core strategic tasks provided a workable structure for this inter-disciplinary comparison. Moreover, as it contains a checklist of the basic organisational and environmental elements, the framework will be useful in educational courses and in practice.

The SM Tool Typology which has been proposed, and the comprehensive research agenda to fill gaps in the existing SM toolkit, are additional outputs from this research which will add value to the SM discipline in the future.

10.4 Strategic Tool Selection

An exploratory investigation of the strategic tool selection process was also included in this thesis (outlined in chapter 8). Two concurrent complementary inquiries were conducted to identify and evaluate the factors involved in strategic tool selection. The factors were grouped into four general types of factors which included: Organisational, Personal, External and Tool Characteristics. An overview level model of the strategic tool selection process was proposed to show the relationships between these key factor types. The complexity of the process was demonstrated further by examining the variable roles of the diverse factors.

10.5 Contributions of the Research

The ways in which the research outputs from this thesis have increased knowledge in these two disciplines will be presented in this section. Contributions from the content of the research areas of MS/OR tool usage, SM tool usage, and strategic tool selection will be considered. In addition, a methodological contribution from the research process will be discussed.

10.5.1 MS/OR Tool Usage

This is the *first* empirical study to focus on MS/OR at the strategic level. The descriptive

results provide *new evidence* of the current status of MS/OR tool usage in Strategic Management in NZ and in the UK. In addition to the organisational and personal contextual statistics, evidence on the MS/OR tools which are used in practice for a series of core strategic tasks was determined. Levels of strategic MS/OR tool usage, coupled with information on personal and group involvement with strategy, has lead to prescriptive conclusions and recommendations for formal recognition of strategic level MS/OR. Potential strategic application areas for MS/OR in future have been identified, along with a series of strategic roles for MS/OR practitioners.

10.5.2 SM Tool Usage

This is the *first* empirical study with a broad focus on SM tool usage in practice which has linked SM tool usage with specific strategic tasks. The descriptive results provide *new evidence* of the current status of SM tool usage in Strategic Management in NZ and in the UK. Organisational and personal contextual statistics were generated, as well as evidence on levels of SM tool usage and the SM tools which are used in practice for each task. In addition, new insights on the breadth and diversity of the tools used by SM practitioners has lead to the development of a new SM tool typology. Further, the research agenda which has been proposed contains an extensive range of new developments to support or improve existing SM approaches, and to expand the SM toolkit in future.

10.5.3 Strategic Tool Selection

This is the *first* study on the factors affecting strategic tool selection. This exploratory research has provided *new evidence* on the strategic tool selection process. Two concurrent inquiries were conducted to identify and evaluate a wide range of factors. Four general types of factors were considered and an overview level model was developed for the strategic tool selection process. A comprehensive research agenda was also proposed to follow-on from this initial investigation to further develop this *new concept* of strategic tool selection.

10.5.4 Methodological Contribution

The originality of the methodology employed provides another potential research contribution (Howard and Sharp, 1983). In this project the research design was created to match the requirements of the specific research questions. The methodological originality arose from the multi-disciplinary and exploratory nature of this research. A normative framework of core elements of one discipline was developed specifically to

provide a structure for the comparative evaluation of current practice in *both* disciplines. This framework approach worked well and could potentially be used for other multi-disciplinary comparisons.

To allow for the exploratory nature of the research topic, simultaneous cross-country comparisons were included. In the absence of direct comparisons with previous research, this enabled internal comparisons of results by providing a benchmark for comparison. Further, the concurrent multi-method approach ensured both breadth and depth of inquiry simultaneously. Although only standard research methods were used, the combination of questionnaires and interviews was complementary.

The research methodology for this thesis is recommended as a template for future comparative research topics. The original features of this design include the multi-disciplinary, multi-country nature of the target populations, and the structure developed for the empirical studies.

Another dimension for evaluating research contribution, which is linked to the methodology and the topic, is the extent to which the research opens up whole new areas for future research (Howard and Sharp, 1983). In this thesis, a very rich source of follow-on research topics has been developed; these will be summarised in section 10.7. Potentially, this project will provide a wide range of new research topics for myself and others in the future!

10.5.5 Conclusion

This thesis has achieved all of the research objectives which were set, and made a series of important contributions to current knowledge in the areas of MS/OR tool usage, SM tool usage, and strategic tool selection. Furthermore, the research design has provided an additional contribution for future multi-disciplinary comparative research.

10.6 Managerial Implications

In this section the practical relevance of the research will be considered and the implications of selected major findings for MS/OR and SM practitioners will be discussed.

10.6.1 Relevance to Practitioners

Thomas and Tymon (1982) proposed a set of five key needs of practitioners which provide

criteria for assessing the practical relevance of research. These include descriptive relevance, goal relevance, operational validity, non-obviousness and timeliness. The usefulness of this research to practitioners will now be considered in terms of these "necessary conditions".

As this study has focussed on identifying current practice, the findings include direct aggregate summaries of responses, with comparisons and interpretations. The findings have not been transposed or distorted in any way which would confuse a practitioner. As the external validity of the results appears to be unquestionable, the *descriptive relevance* of the research is assured.

Goal relevance refers to the linkage of the outcome variables with the "outcomes of concern to the practitioner" (Thomas and Tymon, 1982). As this research was not testing a causal model, specific dependent variables were not defined; therefore it is difficult to apply the *goal relevance* criterion to this project other than in a general sense. This research is applied; it has focussed on descriptive and prescriptive outputs in order to assist practitioners in two disciplines. The spirit of the research approach has been to generate outputs which will facilitate the achievement of goals by managers.

Operational validity for a causal model concerns the ability to manipulate the dependent variables in practice (Thomas and Tymon, 1982). In a general sense, the ability to translate the research findings into actions is the implementation test. The outputs from this research project include prescriptions for practitioners and researchers. The findings provide guidelines which can be directly implemented; this format facilitates *operational validity*.

To be useful, the research findings need to extend the common sense knowledge/ understanding of practitioners in the field; this is the *nonobviousness* criterion. In choosing to identify the "status quo" this research risks reporting findings which are already intuitively known to individual practitioners. However, the research has included exploratory empirical investigations; therefore it is assumed that the findings include new material which goes beyond previous knowledge.

Timeliness requires the research output "to be available to practitioners in time to use it to deal with problems" (Thomas and Tymon, 1982). Thomas and Tymon (1982) suggest

that the stability of findings is a problem in some rapidly changing areas of organisational science. It is anticipated that the findings from this research will be published in 1994 and 1995 (depending on the review processing time for the periodicals chosen). Although, that is a significant lag from the time at which the field work was conducted, it is not assumed to be a problem which will adversely affect the usefulness of the findings to practitioners. The descriptive results provide a snapshot of current practice at a point in time, which later become of historical interest. However, other outputs including insights and recommendations, will be relevant for action by practitioners and researchers well beyond this period. Therefore, it is expected that this research will meet the *timeliness* criterion.

The practical relevance of this research has been evaluated using five criterion. Next, the implications of some key findings for MS/OR practitioners will be considered.

10.6.2 Implications for MS/OR Practitioners

The findings of this research not only contribute to the academic debate on the future of MS/OR, they also provide specific and general information for MS/OR practitioners. The implications of several key findings from this project for the MS/OR profession will now be discussed.

In the same way as the MS/OR profession has extended its boundaries to incorporate new application areas in the past, some changes will need to be made to formally recognise and incorporate strategic applications within the discipline. The publication of the empirical results will initiate the process by confirming the existing levels of strategic involvement by MS/OR practitioners, and proposing the Strategic roles for MS/OR. However, the establishment of a special interest group in Strategy within the UK Operational Research Society could provide the catalyst to drive this new development. A special issue of a MS/OR Journal (such as the UK *Journal of the Operational Research Society*) dedicated to Strategic applications would also help to promote this area. Ultimately changes would be required to extend MS/OR training programmes to include Strategic examples.

The relationship of MS/OR groups to their Corporate Strategy counterparts is another key finding with clear implications for practitioners. Access to Corporate Strategy personnel will be a critical factor in determining the types of strategic projects which MS/OR staff will be involved with. In addition to this *strategic positioning*, it will be important for MS/OR practitioners to have the personal and technical skills to deliver the support which

is required; this may require additional training and study. Further, extensive promotion of strategic modelling capabilities will be required, by both individual practitioners and by the profession, until MS/OR expertise in the strategic area becomes generally recognised by senior management.

In the evaluation of the six potential strategic roles for MS/OR in section 10.2.4, major implications for MS/OR practitioners have already been discussed, so they will not be repeated here. Suffice to say that it is assumed that within the set of six roles which were proposed, there will be *at least one* strategic role which is feasible for all MS/OR practitioners. This means that strategic level MS/OR, at least in concept, is a possibility for *all* MS/OR practitioners.

10.6.3 Implications for SM Practitioners

This study has provided a vast quantity of new descriptive evidence on the status of SM tool usage practices. The implications of several key findings for the SM profession will now be discussed.

The concept of a toolkit from which SM practitioners select appropriate tools for specific tasks provides a new perspective for the SM profession. It focusses attention on both the content of the toolkit and on the tool selection process. The thesis results demonstrate that SM practitioners use a multiplicity of tools from many management specialisms, and not just 'specific SM' approaches. This finding implies that there is a need to ensure that SM training includes this diversity of approaches. Alternatively, when it is feasible to do so, a team approach will be desirable for SM projects, as that will enable individuals with different competencies to combine their skills for the project.

The complexity of the strategic tool selection process was demonstrated in the exploratory investigation. From the content analysis 157 different factors were identified. The features of the tools and personal factors were ranked by the questionnaire respondents as more important, in general, than the organisational or external factors. These results emphasise the importance of the personal backgrounds of SM practitioners; their knowledge, skills, experiences, and preferences will have a major impact on the tools which they will choose to use for their strategic tasks. This finding has implications for human resource hiring policies for SM positions.

The SM tool typology which has been proposed also has practical value by providing a structure for identifying personal capabilities; for example areas of strength and/or weakness. This diagnostic potential is an interesting discovery which became evident during the interviews. It is anticipated that this would be used in a positive way to ensure that the profile of SM project teams included all of the essential areas of tool expertise.

Deficiencies in the current SM toolkit have been identified, and the research agenda which has been proposed includes the development of new technological tools to support or enhance present approaches, as well as new software and databases. It is hoped that these proposals for new tools will be seen as opportunities by the SM specialists with technical skills, so that these gaps will soon be filled. Similarly, the more substantive research issues offer challenges and opportunities for the SM profession.

There is a need for an independent group to act as a 'clearing house' for monitoring and evaluating new SM tool developments. Currently, there is no systematic review of new tools. Often the promotion of new tools is organised by the tool developer, who has a vested interest in the outcome. It would be useful for all practitioners to receive information on the characteristics and capabilities of new and existing tools in a summary format: evaluative information on the qualities of tools, their strengths and weaknesses; and comparative information, to enable the matching of tools with specific tasks. A team of both academics and practitioners would appear to be suitable for this challenge; thereby providing an invaluable service to the SM discipline.

10.7 Research Agenda

New avenues for additional research open up in the process of advancing knowledge (Woodburn, 1979). This research has been primarily exploratory, involving simultaneous investigations of a series of related research questions linked to a major theme. Being focussed on a new research area, it has provided a rich source of new topics for further research in the future. Within each of the results chapters, a research agenda has already been proposed. In this section, these research agendas will be briefly summarised, and a series of additional research topics will be proposed and discussed. However to begin, some areas of further analysis which will be performed in future, will be discussed.

10.7.1 Further Analysis

While this research project has generated a vast collection of empirical evidence, only

selected key results have been presented in this thesis. Therefore, it is planned to conduct further analysis of the questionnaire and interview data, for a series of additional follow-on publications. Some examples of these extra analyses will be briefly described.

To enable inter-disciplinary comparisons, the tool usage proportions for *all* of the tool users have been presented. It will be interesting to examine similarities and differences between high and low tool user subgroups *within* each discipline. As the overall levels strategic tool usage are lower in the MS/OR discipline, appropriately sized subgroups for this analysis will be based on different levels of tool usage. Hence, direct inter-disciplinary comparisons are not feasible for this analysis.

The tool user proportions for each of the SM process phases have been presented as a proportion of the pool of tool users within each sample to enable comparative statistical analysis. These will be re-examined as a proportion of the tool users for each task, and comparisons will be made. Additional analysis is also planned to identify patterns in the tools which are used in practice. Further, the descriptive data from the interviews will be used to develop comparative summaries on the tools which were discussed in detail.

10.7.2 MS/OR Tool Usage Research

Deficiencies in the current strategic MS/OR toolkit were identified and a series of new tools were proposed in section 7.8 to fill these gaps. The new tools include qualitative behavioural and problem structuring approaches, as well as technological software developments to support the MS/OR modelling process. In addition, there were proposals for more quantitative approaches, such as forecasting, modelling and mathematics, to enhance the MS/OR toolkit.

10.7.3 SM Tool Usage Research

Deficiencies in the current SM toolkit were identified and discussed in section 6.8. In addition to new technological tools, a series of major research gaps were put forward. The technological tools include new tools to support or enhance present SM systems and approaches, as well as new database and software developments. The SM research agenda includes a wide range of theoretical developments for new concepts and frameworks. The specific research gaps were grouped into five different areas: marketing, forecasting, technological, educational, and behavioural research. In addition, three categories of general research gaps were identified; these include approaches for the service sector,

dynamic approaches, and a wide range of new integrative frameworks.

10.7.4 Strategic Tool Selection Research

The factors involved in strategic tool selection were also explored in this project. An overview level model was proposed to summarise the relationships between the key factor types. In addition to testing this strategic tool selection model in future, a detailed series of twelve specific follow-on research topics was outlined in section 8.4.3. This provides a major research agenda for further investigation of strategic tool selection in future.

10.7.5 Other Research Issues

In addition to the specific research issues which have been discussed above, the project has also raised a number of other key research issues. Four of these potential research topics will be briefly discussed.

A. The Status of 'Soft' MS/OR

The results from some of the newer 'soft' MS/OR tools, such as SODA and strategic choice, showed that these approaches are not widely known or used, even in the UK where they have been developed and promoted for many years. This raises questions about these approaches in particular, and about the status of 'soft' MS/OR in general. Further research on these issues would be useful for both practitioners and academics.

B. The Linkage of Tool Use to Performance

The effectiveness of tools and their impact on organisational performance is another major research topic which follows from this project. There have been many reviews on the impact of strategic planning on financial performance (Armstrong, 1982; Rhyne, 1986; Chakravarthy, 1986; and Greenley, 1986), but no studies on the linkage of tool use and performance. A longitudinal study of multiple cases would be the preferred research strategy for this topic, as it would enable the process of implementing the tools to be studied in conjunction with monitoring of organisational performance. Non-financial performance measures could also be considered to extend the scope and usefulness of this research.

C. Strategic Tool Life Cycles

The process of developing and introducing new tools can be likened to the development of a new product. Using this analogy, the application of the 'life cycles' concept for a

series of key strategic tools would be an interesting research project which could provide valuable insights for tool developers, educationalists, and others with interests in tool promotion. While some tools appear to "take off" quickly, others are slow on the uptake in spite of significant promotion efforts. Exploration of strategic tool life cycles offers a new and different perspective for identification and comparison of the characteristics of the key strategic tools.

D. Non-Familiarity with Tools

The reasons for lack of awareness of even the *basic* tools of a discipline is a finding which is worthy of a separate research project. In this study of assumed 'specialists' there were significant proportions from both MS/OR and SM who were not familiar with many of the tools in the sample provided. Using the toolkit concept, this means that many individuals are familiar with only a subset of the tools which are available within the discipline's toolkit. Why are there large gaps in the knowledge of practitioners? This is a complex issue which will involve investigation of many potential contributing factors such as the mobility of management, their reliance upon previous experience, and the availability of time for retraining. Looking at this issue from the tools perspective will also involve many questions on factors such as the features of the tools, their promotion and performance.

10.7.6 Conclusion

This exploratory project has set the scene for a very wide range of follow-on research projects. Research agendas developed within the result chapters have been summarised in this section, along with a series of additional research topics. Some further analyses of the empirical data collected in this project were also discussed.

10.8 Finale

An original exploratory research project on strategic level tool usage and tool selection has been designed and conducted for this thesis. The results have been outlined and discussed in chapters 6, 7 and 8. Comparisons with previous research and theoretical frameworks have been made in chapter 9, along with a series on inter-disciplinary comparisons from within the project. In this final chapter, conclusions and contributions of the findings have been discussed, as well as recommendations for further research.

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Appendix I Strategic Management Definitions

In this appendix definitions of basic Strategic Management terminology will be discussed, and a review of the historical development of Strategic Management presented.

Introduction

The concept of strategy has military origins "where it is a broad, rather vaguely defined, 'grand' concept of a military campaign for *application* of large-scale forces against an enemy. Strategy is contrasted to *tactics*, which is a specific scheme for *employment* of allocated resources." (Ansoff, 1986, p.104)

Strategy is commonly used in the management literature with a range of meanings. In the military sense, it can refer to the broad overall concept of the firm's business thereby serving as a general rule for making specific planning choices. However, it is also used for a specific series of moves to achieve a particular product/market programme.

To understand the nature of Strategic Management and the vast literature which is accumulating on strategic issues, it is helpful to begin by considering definitions of the basic concepts and terminology. In addition, a brief overview of the historical development of the planning field will also be presented.

Definitions of Strategy

Strategy is the match between an organization's resources and skills and the environmental opportunities and risks it faces and the purposes it wishes to accomplish (Hofer and Schendel, 1978, p.11)

A strategy may be implicit or explicit; developed informally or through a formal process. While the 'strategic' adjective literally means "of, dictated by, or serving the ends of, strategy", it is increasingly used as a "buzz word for all disciplines trying to stress the importance of their work" (Lyles, 1990, p.363), a decision or an issue. It is also used to imply large or complex situations, involving uncertainty, which may influence the long term future, or relate to the firm's match to its environment.

"Strategies may be looked at as either *a priori* statements to guide action or *a posteriori* results of actual decision behaviour" (Quinn, 1980). The pattern of the stream of decisions is the "real strategy" of the organisation regardless of the formal strategic documents.

Mintzberg (1988) proposed five definitions of strategy as (1) a plan, (2) a ploy, (3) a pattern in a stream of decisions, (4) a position (in the environment), and (5) a perspective.

Johnson and Scholes (1989, p.8) summarised the characteristics of strategic decisions as including:

- * the scope of an organisation's activities;
- * the matching of an organisation's activities to its environment;
- * the matching of the activities of an organisation to its resource capability;
- * the allocation and reallocation of major resources in an organisation;
- * the values, expectations and goals of those influencing strategy;
- * the direction an organisation will move in the long term;
- * implications for change throughout the organisation - they are therefore likely to be complex in nature.

In the business context, Andrews (1980) has defined corporate strategy:

"Corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the economic and noneconomic contribution it intends to make to its shareholders, employees, customers, and communities...[It] defines the businesses in which a company will compete, preferably in a way that focuses resources to convert distinctive competence into competitive advantage." p.18-19

Hax and Majluf (1988) reviewed the definitions of strategy offered by leading scholars in the field to produce the following comprehensive definition:

"Strategy:

- * is a coherent, unifying, and integrative pattern of decisions;
- * determines and reveals the organisational purpose in terms of long term objectives, action programmes, and resource allocation priorities;
- * selects the businesses the organisation is in or is to be in;
- * defines the kind of economic and human organisation the company is or intends to be;
- * attempts to achieve a long-term sustainable advantage in each of its businesses by responding to the opportunities and threats in the firm's environment and the strengths and weaknesses of the organisation;
- * engages all the hierarchical levels of the firm (corporate, business, functional); and
- * defines the nature of the economic and noneconomic contributions it intends to make to its stakeholders."

Strategy is often characterised according to its organizational level. Wheelright (1984) summarised the common definitions of the three hierarchical levels of strategy:

A. Corporate Strategy

1. Selecting the businesses in which the firm will (and will not) participate.
2. Acquiring and allocating resources among the selected businesses to create value for the firm's publics (constituencies).

B. Businesss Strategy

1. Clarifying the boundaries of the business to be served.
2. Selecting the desired competitive advantage to be pursued.

C. Functional Strategy

1. Determining the bases on which the function will support the desired competitive advantage.
2. Integrating and coordinating the function with other functions to which it interfaces.

Finally, strategic decisions are defined as: major decisions which are associated with determining the overall direction and future of an organisation (Marsh, Barwise, Thomas and Wensley, 1988).

Historical Development of Strategic Management

Historically, the development of planning systems has been an evolutionary process in which the sophistication of the planning approach has increased to match the increasing complexity in environmental and organizational factors. There are four major stages in the planning evolution which each "represent a response to different needs for planning capabilities" (Hax and Majluf, 1984, p.2). The four major stages are:

1. Budgeting and Financial Control (1920s-1950s)

The earliest approaches to systematic management were budgeting and financial control. Budgets usually represent projections of revenues and costs for a one year period for all the key activities such as sales, manufacturing, administration, investment and cash management. Standard levels of performance are established; these are compared with actual levels to judge the performance of the organisation as a whole and/or well-defined segments of the organisation.

This type of planning system is based on the assumption that past conditions will continue in the future. It is primarily a financial control system which ignores non-financial objectives; it has a short-term focus which means that long-term developments are not considered; furthermore, it becomes "increasingly dysfunctional when the complexity of the businesses grows" (Hax and Majluf, 1984, p.9).

2. Long Range Planning (1950-1960)

In the 1950s, in response to the unprecedented post World War II growth, many firms adopted long range planning. By extending their budgets over a longer time horizon they were able to meet the required expansions of capacity and find the necessary financial resources. Five-year sales forecasts based on historical projections were used to prepare five-year budgets and corresponding operational plans.

Long range planning is a bottom-up functional process which is suited to conditions of environmental

stability. It is appropriate when there is "high market growth, fairly predictable trends, firms with essentially a single dominant business, and relatively low degree of rivalry among competitors" (Hax and Majluf, 1984, p.11). However, it ignores the total market linkage to sales, assumes the "future will offer a smooth continuity of the past", and allocates resources on a "project-by-project basis instead of having a broader view of the long-term implications for the business development" (Hax and Majluf, 1984, p.13).

3. Strategic Planning (1960s-1975)

In the 1960s-70s, with increasing complexity in business structure and environmental turbulence, past trends were no longer an adequate basis for future planning (Greenley, 1989, p.11). A formal strategic planning process evolved to formulate strategies for each of the strategic business units (SBU) in the light of the mission of the business, and to develop appropriate action programs. The strategy is the end product of the planning process which includes an environmental scan and an internal scrutiny. Portfolio approaches were developed to help managers to position each business according to its competitive strength and the attractiveness of its industry.

Strategic planning at the corporate level is more comprehensive than the business level planning process. It helps to unify corporate directions in pursuit of agreed upon and shared objectives, which would be difficult to achieve without the formalisation and discipline of a systematic process. It improves the segmentation of the firm, introduces a discipline for long term thinking, and acts as an educational device for the participants. The effectiveness of corporate strategic planning may, however, be destroyed by excessive bureaucratization, or a lack of integration with other management systems.

4. Strategic Management (1975-present)

From the mid-70s it became apparent that formal strategic planning systems were useful but not necessarily sufficient to ensure successful implementation of even the best strategic plans. The extra dimensions, beyond the planning process, include integration of the administrative systems and the organizational structure, integration in both the strategic and operational modes, and congruence between the administrative systems, the organizational structure, and the corporate culture.

" Strategic management has, as an ultimate objective, the development of corporate values, managerial capabilities, organizational responsibilities, and administrative systems which link strategic and operational decision-making, at all hierarchical levels, and across all businesses and functional lines of authority in a firm. Institutions which have reached this stage of management development have eliminated the conflicts between long-term development and short-term profitability. Strategies and operations are not in conflict with one another, but they are inherently coupled defining the managerial tasks at each level in the organization. This form of conducting a firm is deeply anchored in managerial style, beliefs, values, ethics, and accepted forms of behaviour in the organization, which make strategic thinking congruent with the organizational culture." (Hax and Majluf, 1984, p.73)

According to Schendel, Ansoff and Channon (1980, p.2) "advanced practitioners are moving beyond the strategic planning perspective, which terminates in decisions, to the strategic management perspective which terminates in strategic changes within the enterprise". They identified four steps in this direction including: concern with the design of corporate capability, concern with the environment-strategy-capability relationship, concern with the management of the strategic change process, and concern with the need to accommodate the new realities of distributed power within organisations. The result being: "Strategic management creates the potential for an organization's future."

"Strategic management is the most advanced and coherent form of strategic thinking. Not only does it attempt to extend the strategic vision throughout all of the operational and functional units of the firm, but it also encompasses every administrative system recognising the central role to be played by the individual and groups within an organisation, and its resulting culture." (Hax and Majluf, 1984, p.106)

This brief review of the historical development of Strategic Management provides clarification of more of the planning terminology by showing the relationship between long range planning, strategic planning and strategic management. However, even within the strategic management literature these terms are not used consistently.

In terms of the breadth or scope of the activities involved in these Strategic tasks: Strategic Management is the most encompassing as it seeks organisation-wide commitment to strategic thinking. Strategic Planning refers to the systematic processes involved in developing a Strategic Plan; these can be quite extensive or implemented by a small specialist team. While Strategic Decision Making involves consideration of specific strategic decisions. These may be one-off decisions which are considered within, or separately from, the Strategic Planning process. As these strategic decisions may be evaluated on their own, this is potentially the most focussed of these three strategic activities.

Appendix II MS/OR Tools

This appendix contains a list of 40 MS/OR tools; these were used in the evaluation of the SM framework.

1. Analytical Hierarchy Process	AHP
2. Cost Benefit Analysis	CBA
3. Cognitive Mapping	CMap
4. Corporate Models	CMod
5. Decision Analysis	Dec
6. Decision Support Systems	DSS
7. Expert Systems	ES
8. Judgemental Forecasting	FC
Sales Force Composite	FC-Sale
Customer Expectations	FC-Cust
Executive Opinion	FC-Exec
Expert Opinion/Delphi	FC-Del
9. Extrapolative Forecasting	
Moving Average	FC-MA
Trend Curve Analysis	FC-Tren
Exponential Smoothing	FC-ExpS
Decomposition	FC-Dec
Box Jenkins	FC-BoxJ
10. Causal Forecasting	
Business Indicators	FC-BusI
Regression/Econometric	FC-Reg
11. Game Theory	Game
12. Graph Theory	Grph
13. Heuristics	Heu
14. Influence Diagrams	InfD
15. Inventory Modelling	Inv
16. Ishikawa Diagrams	IshD
Mathematical programming	MP
17. assignment	AP
18. convex	ConP
19. dynamic	DynP
20. goal	Goal
21. integer	IP
22. linear	LP
23. markov	Mar
24. network	Net
25. nonlinear	NLP
26. quadratic	QP
27. transportation	Tran
28. Multiple Criteria Decision Making	MCDM
29. MS/OR Modelling Process	MSPro
30. PDCA Cycle	PDCA
31. Project Management	PM
32. Queueing Theory	Que
33. Robustness Analysis	RA
34. Simulation	Sim
35. Soft Systems Methodology	SSM
36. Spreadsheet Modelling	SSH
37. Strategic Choice/ AIDA	StrC
38. Strategic Options Development and Analysis	SODA
39. Systems Dynamics	SysD
40. Statistical Analysis	Stat

Appendix III Strategic Management Tools

This appendix contains a list of 66 SM tools; these were used in the evaluation of the SM framework.

- | | |
|---------------------------------|---------------------------------|
| 1. BCG Growth Share Matrix | 34. McKinsey 7-S Framework |
| 2. Benchmarking | 35. Metagame Analysis |
| 3. Capital Asset Pricing Model | 36. Multipoint Competition |
| 4. Cost Benefit Analysis | 37. Nominal Group Technique |
| 5. Corporate Financial Models | 38. Operating Budgets |
| 6. Crescive Model | 39. Payback Period |
| 7. Critical Success Factors | 40. Political and Country Risk |
| 8. Dialectic Inquiry | 41. Porter's 5 Forces |
| 9. Delphi | 42. Product Mkt Evoln Portfolio |
| 10. Discounted Cash Flow | 43. Product Life Cycle |
| 11. Directional Policy Matrix | 44. Product/Market Analysis |
| 12. Driving Force | 45. PIMS |
| 13. Environmental Scanning | 46. Quantit Strat Pl Matrix |
| 14. Experience Curves | 47. Reasoning by Analogy |
| 15. Financial Ratio Analysis | 48. Reverse Engineering |
| 16. Financial Statement Anal | 49. Simulation |
| 17. Focus Groups | 50. Stakeholder Analysis |
| 18. Future Studies | 51. SAST |
| 19. Generic Strategies | 52. Strategic Data Base |
| 20. Imagery | 53. Strategic Funds Program |
| 21. Impact Analysis | 54. Strategic Gap Analysis |
| 22. Indust Attract-Bus Streng | 55. Strategic Group Analysis |
| 23. Indust Maturity-Compet Posn | 56. Strategic Issue Analysis |
| 24. Industry Scenarios | 57. Strategic Mapping |
| 25. Industry Segmentation | 58. Strategic Software |
| 26. Internal Rate of Return | 59. Sustainable Growth Model |
| 27. Management by Objectives | 60. SWOT Analysis |
| 28. Management Profiles | 61. Synergy Analysis |
| 29. Marketing Audit | 62. SPIRE |
| 30. Market Opportunity Anal | 63. Technological Assessment |
| 31. Market Segmentation | 64. Trend Analysis |
| 32. Market Signaling | 65. Value Chain Analysis |
| 33. Market to Book Value | 66. Value-Based Planning |

Appendix IV Management Surveys

This appendix contains details of previous survey based research in SM and MS/OR.

SM Surveys

Author(s)	Population	Sample Size	Response Rate %	Focus
United Kingdom				
Hooley (1984)	12700	1775	14	Mktg
Kono (1984)	494 UK	74	15	LRP plans
	1004 Japan	226	25	
Norburn (1989)	450 CEOs	108	24	CEO
	1350 TMTs	310		
Greenley & Shipley (1992)	1650	264	16	Mktg
Hall (1992)	847	95	11	intangibles
Moore (1992)	250 UK	81	32.4	Manufg
	250 DDR	59	23	Distbn
Robbie et.al. (1992)	208	59	28.4	buy-ins
Houlden (1994)	<i>forthcoming</i>			
New Zealand				
Coviello (1989)	171	83 valid	49	Mkt/Sci
		78 used	46	
Duffy (1989)	150	87 ZBB	58	govt &
		116 MBO	77	private
		94 PPB	63	
Van der Walt et al.(1989)	1240	522	42	mktg
Hooley & Franko (1990)	1004	474	48	NZ Buss
	474	136	29	Inst Pers
	517	173	33	small coys
Olson (1991)	200	55	27.5	IT strategy
Akoorie & Enderwick (1992)	1250	465 returns	37.2	Export inst
		252 usable	20.2	

continued

MS/OR Surveys

Author(s)	Population	Sample Size	Response Rate %	Focus
United Kingdom				
Carter (1987,1988)	3381	1436	42	ORS memb
Doukidis & Paul (1990)	1038	265	26	AI tools
Cornford & Doukidis (1991)	1005	209	20	computers
Mingers (1991)	66	45	68	OR Grps
Naude et al.(1991)	1500	639	43	MBA grads
Jones et al. (1994)	<i>forthcoming</i>			
New Zealand				
Daellenbach (1975)	401	205	51	govt & private
Wright (1981)	185	138	74	listed coys

Appendix V UKOR Questionnaire



Strategic Evaluation of MS/OR Tools

in

the United Kingdom



and

New Zealand



Part A: MS/OR Tool Usage

We are interested in **your** use of Management Science/Operational Research (MS/OR) techniques, tools and approaches for supporting Strategic Planning (SP), Strategic Management (SM) or other Strategic decision making tasks. Please respond giving your own views and experiences rather than attempting to represent your whole organisation. All of your responses will be confidential; only aggregate statistics will be reported.

Throughout this survey, the term '**MS/OR tools**' will be used to represent any or all of the MS/OR methods and approaches, and '**strategic decisions**' will be used for the major decisions which are associated with determining the overall direction and future of an organisation, including developing and implementing strategies.

1. Have **you** ever used any MS/OR tools (i.e. techniques, tools and approaches) for supporting strategic decision making? *(please circle one)*

Yes please go to Question 5
No please go to Question 2

2. If you have **not** used any MS/OR tools for strategic projects, do you see any potential for using any MS/OR tools for **strategic** decision support? *(please circle one)*

Yes please go to Question 5
No please go to Question 3

3. How does your organisation principally support their strategic decisions?

(please rank those that apply starting from 1 = most important)

Using intuitive judgement and reasoning only _____
By delegating the modelling to other analysts within your organisation _____
By employing outside consultants to do the analysis _____
Other (please specify): _____

4. What are your main reasons for not using any MS/OR tools for strategic decision support?

(circle as many as apply; then go to Part C)

Tools are not necessary for my position	1
Tools do not provide the information needed	2
Management is not supportive	3
Money is not available	4
Data is not available	5
Not enough time to use tools	6
Not enough training on tool use	7
Lack of staff with expertise	8
Lack of computer resources	9
No experience with tools	10
No background education on tool use	11
Other (please specify):	_____

5. How important is each of the following functions when you choose a MS/OR tool for a strategic project? *(please circle one of the levels of importance for each of the functions)*

	Not Important	Slightly	Moderately	Very	Extremely Important
(1) to generate information for decision making	1	2	3	4	5
(2) to provide a structure for analysis	1	2	3	4	5
(3) to encourage the communication of ideas	1	2	3	4	5
(4) to assist with coordination by establishing direction	1	2	3	4	5
(5) for symbolic purposes	1	2	3	4	5
(6) other (please specify):	1	2	3	4	5

6. From these 6 functions above, which three are most important to you? *(list their numbers below)*

1	_____	Most Important
2	_____	Second Most Important
3	_____	Third Most Important

7. Evaluating the **current position** of an organisation is an important part of the Strategic Management process. Do **you** use any tools to **model** or **evaluate the status** of the following **organisational resources and features**?

If you use any tools, please circle Yes and write the name(s) of the tool(s) in the space provided; if you do not use any tools, please circle No, or circle NA if the area is not applicable for you.

	Do you use any tools?	Name(s) of any tool(s) used
Financial Resources	Yes / No / NA	_____
Human Resources	Yes / No / NA	_____
Marketing/Distribution	Yes / No / NA	_____
Production/Operations	Yes / No / NA	_____
Physical Resources	Yes / No / NA	_____
Information Systems	Yes / No / NA	_____
Administrative Systems	Yes / No / NA	_____
Research & Development	Yes / No / NA	_____
Intangible Resources	Yes / No / NA	_____
Culture	Yes / No / NA	_____
Top management	Yes / No / NA	_____
Structure	Yes / No / NA	_____
Mission	Yes / No / NA	_____
Objectives	Yes / No / NA	_____
Strategy	Yes / No / NA	_____
Other (please specify):		_____

8. Evaluating the external **environmental influences** on an organisation is another important part of Strategic Management. Do **you** use any tools to **model** or **evaluate** the following **environmental influences**?

If you use any tools, please circle Yes and write the name(s) of the tool(s) in the space provided; if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.

	Do you use any tools?	Name(s) of any tool(s) used
Industry	Yes / No / NA	_____
Markets	Yes / No / NA	_____
Competitors	Yes / No / NA	_____
Customers	Yes / No / NA	_____
Suppliers	Yes / No / NA	_____

Stakeholders	Yes / No / NA	
Economic trends	Yes / No / NA	
Govt/Political factors	Yes / No / NA	
Social trends	Yes / No / NA	
Legal developments	Yes / No / NA	
Technological changes	Yes / No / NA	

9. **Strategic analysis** involves generating and evaluating alternative strategies to select the best strategy for the organisation to adopt. Do **you** use any tools to model or support the following **strategic analysis** activities?

If you use any tools, please circle Yes and write the name(s) of the tool(s) in the space provided; if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.

	Do you use any tools?	Name(s) of any tool(s) used
To generate alternative strategies	Yes / No / NA	
To evaluate alternative strategies	Yes / No / NA	
To select a specific strategy	Yes / No / NA	
Other (please specify):		

10. **Strategic implementation** involves developing plans to implement the chosen strategy, implementation of the strategy, monitoring the achievement of the strategy and reviewing the strategic performance. Do **you** use any tools to model or support these **strategic implementation** activities? (i.e. to make the strategy happen)

If you use any tools please circle Yes and write the name(s) of the tool(s) in the space provided; if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.

	Do you use any tools?	Name(s) of any tool(s) used
To develop plans to implement the chosen strategy	Yes / No / NA	
To assist with implementation of the strategic plans	Yes / No / NA	
To monitor/review the strategic performance	Yes / No / NA	
Other (please specify):		

11. For the sample of MS/OR tools listed below, please indicate how **familiar** you are with each tool. *For each of the tools that you have used or know well enough to apply, please complete the remaining 3 questions.*

- i.e. Does this tool have **potential** to assist or support strategic decision making? *circle Yes or No*
 How **many times** do you use them per year? *e.g. 0, 1, 2, 3, 4, 5, 6,... or monthly, weekly, daily*
 How **many** of these are directly linked to strategic decisions?

	Familiarity with tool? (circle one)				Strategic potential?	Number of times used per year?	Number of strategic applications?
	Don't know	Know about	Know well enough to apply	Have used			
Analytical Hierarchy Process	1	2	3	4	Yes / No	_____	_____
Cognitive Mapping	1	2	3	4	Yes / No	_____	_____
Corporate Models	1	2	3	4	Yes / No	_____	_____
Cost Benefit Analysis	1	2	3	4	Yes / No	_____	_____
Critical Success Factors	1	2	3	4	Yes / No	_____	_____
Decision Analysis	1	2	3	4	Yes / No	_____	_____
Decision Support Systems	1	2	3	4	Yes / No	_____	_____
Delphi	1	2	3	4	Yes / No	_____	_____
Expert Systems	1	2	3	4	Yes / No	_____	_____
Game theory	1	2	3	4	Yes / No	_____	_____
Heuristics	1	2	3	4	Yes / No	_____	_____
Influence Diagrams	1	2	3	4	Yes / No	_____	_____
Inventory Modelling	1	2	3	4	Yes / No	_____	_____
Forecasting	1	2	3	4	Yes / No	_____	_____
Mathematical Programming (includes LP)	1	2	3	4	Yes / No	_____	_____
Multiple Criteria Decision Making	1	2	3	4	Yes / No	_____	_____
Process Improvement (includes PDCA cycle)	1	2	3	4	Yes / No	_____	_____
Project Management (includes CPM and PERT)	1	2	3	4	Yes / No	_____	_____
Robustness Analysis	1	2	3	4	Yes / No	_____	_____
Simulation	1	2	3	4	Yes / No	_____	_____
Soft Systems Methodology	1	2	3	4	Yes / No	_____	_____
Spreadsheet Modelling	1	2	3	4	Yes / No	_____	_____
Strategic Choice/AIDA	1	2	3	4	Yes / No	_____	_____
Strategic Options Development and Analysis (SODA)	1	2	3	4	Yes / No	_____	_____
Systems Dynamics	1	2	3	4	Yes / No	_____	_____

Part B: MS/OR Tool Selection

In this section we are interested in the factors which influence your choice of MS/OR tools for strategic modelling projects. *Please circle the appropriate level of importance for each factor, or use NA if the factor is not relevant for you.*

1. **Organisational Factors:** How important is each of these organisational factors when you select a tool to use?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(1) the availability of funding	1	2	3	4	5	NA
(2) the time available to do the analysis	1	2	3	4	5	NA
(3) the staff available to do the analysis	1	2	3	4	5	NA
(4) the availability of computer resources	1	2	3	4	5	NA
(5) the availability of expertise	1	2	3	4	5	NA
(6) top management preferences	1	2	3	4	5	NA
(7) policy requirements for specific information	1	2	3	4	5	NA
(8) incentive and reward systems	1	2	3	4	5	NA
(9) the current strategic position	1	2	3	4	5	NA
(10) the attitude towards innovation and change	1	2	3	4	5	NA
(11) other (<i>please specify</i>): _____	1	2	3	4	5	

2. **External Factors:** How important is each of these external factors when you select a tool to use?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(12) the tools which others in our industry are using	1	2	3	4	5	NA
(13) the tools which our competitors are using	1	2	3	4	5	NA
(14) the tools used by the world-leading organisations	1	2	3	4	5	NA
(15) the tools used by consultants	1	2	3	4	5	NA
(16) the tools discussed at society seminars, conferences	1	2	3	4	5	NA
(17) the tools included in university/polytech courses	1	2	3	4	5	NA
(18) the development of new approaches	1	2	3	4	5	NA
(19) the availability of training on new approaches	1	2	3	4	5	NA
(20) the rate of change in the environment	1	2	3	4	5	NA
(21) other (<i>please specify</i>): _____	1	2	3	4	5	

3. **Personal Factors:** How important is each of these personal factors when you select a tool to use?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(22) my knowledge of the tool	1	2	3	4	5	NA
(23) my previous experience with the tool	1	2	3	4	5	NA
(24) my ability to do all the processing involved	1	2	3	4	5	NA
(25) my educational qualifications	1	2	3	4	5	NA
(26) the training courses I have attended	1	2	3	4	5	NA
(27) my skills and proficiencies	1	2	3	4	5	NA
(28) my preferences for certain types of analysis	1	2	3	4	5	NA
(29) my willingness to try new approaches	1	2	3	4	5	NA
(30) other (<i>please specify</i>): _____	1	2	3	4	5	

4. From these 30 factors above, which **three** are most important to you? (*list their numbers below*)

- 1 _____ Most Important
 2 _____ Second Most Important
 3 _____ Third Most Important

5. Tool Characteristics: How important is each of these tool characteristics when you select a tool to use?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(1) the information produced	1	2	3	4	5	NA
(2) the method of analysis involved	1	2	3	4	5	NA
(3) the availability of data	1	2	3	4	5	NA
(4) the time it takes to do the analysis	1	2	3	4	5	NA
(5) the costs to complete the analysis	1	2	3	4	5	NA
(6) the skills required to do the analysis	1	2	3	4	5	NA
(7) the availability of computing requirements	1	2	3	4	5	NA
(8) the ease of understanding and use	1	2	3	4	5	NA
(9) the frequency of updating the data	1	2	3	4	5	NA
(10) other (please specify): _____	1	2	3	4	5	

6. From these 10 factors above, which **three** are most important to you? (list their numbers below)

- | | | |
|---|-------|-----------------------|
| 1 | _____ | Most Important |
| 2 | _____ | Second Most Important |
| 3 | _____ | Third Most Important |

7. Do you think your **ranking** of the 3 most important factors, in Question 6 above, would **vary** depending on the specific **strategic modelling project** involved? (please circle one)

- | | |
|----------|---|
| Not sure | 1 |
| No | 2 |
| Yes | 3 |

If Yes, please explain _____

8. In the past two years have you tried any MS/OR tools for the **first time**? (please circle one)

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If Yes, please list them _____

Part C: Organisation Information

To assist in the categorization of responses, information is needed on the size and nature of your organisation.
Note: All of your responses will be confidential; only aggregate statistics will be reported.

1. What is the approximate annual **turnover** of your organisation?

- | | |
|--------------------------|---|
| Less than £5 million | 1 |
| Between £5m and £50m | 2 |
| Between £50m and £100m | 3 |
| Between £100m and £500m | 4 |
| Between £500m and £1000m | 5 |
| More than £1000 million | 6 |

2. How many people, full-time equivalents, are employed in your organisation? (please circle one)

Less than 100	1
100 - 499	2
500 - 999	3
1,000 - 4,999	4
5,000 - 9,999	5
10,000 - 49,999	6
50,000 or more	7

3. Does your organisation have a separate Management Science/Operational Research group or department?
(please circle one)

No	1
Yes	2

If yes, how many people are in this group? _____

4. Does your organisation have a separate corporate Strategic Planning/Management group or department?
(please circle one)

No	1
Yes	2

If yes, how many people are in this group? _____

5. Is there another Strategic Planning/Management group or department apart from any corporate group?
(please circle one)

No	1
Yes	2

If yes, how many people are in this group? _____

6. How many people are employed primarily to do Strategic Planning/Management? _____

7. What is the overall Strategic position of your organisation at present? (please circle one)

Growth phase	1
Stable	2
Retrenchment	3
Combination of the above	4
Don't know	5

8. What type of organisation are you employed in? (please circle one)

Listed company	1
Non-listed company	2
State owned enterprise/corporation	3
Central government department	4
Local government	5
Other (please specify):	_____

9. What is the main product or area of operation of your organisation? (please circle one)

Consultancy	1
Energy	2
Finance/banking/insurance	3
Information/computers/software	4
Health	5
Manufacturing/engineering	6
Retailing/wholesaling	7
Transportation	8
Other (please specify):	_____

Part D: Participant Information

To assist in the categorization of responses, information is needed on your position, training and involvement with MS/OR. *NB: All of your responses will be confidential; only aggregate statistics will be reported.*

1. What percentage of your work time was spent on MS/OR activities last year? _____ %
2. What percentage of your work time was spent on projects of a strategic nature last year? _____ %
3. How many years of work experience do you have in MS/OR? _____ years

4. What is the **main** area in which you are based in your organisation? *(please circle one)*
- | | |
|---------------------------------|-------|
| Senior Management | 1 |
| Strategic Planning group | 2 |
| Functional Department | 3 |
| Management Services, Consulting | 4 |
| Information Systems, Computing | 5 |
| MS/OR Department or Service | 6 |
| MS/OR Management | 7 |
| Research and Development group | 8 |
| Other <i>(please specify)</i> : | _____ |

5. What is the title of your present position? _____

6. How long have you held your current position? _____ years

7. What is the **main** role that you perform in your position? *(please circle one)*
- | | |
|---|-------|
| Performing analysis for other outside organisations | 1 |
| Performing analysis for management of your own organisation | 2 |
| Performing analysis yourself and making the decisions for your own organisation | 3 |
| Making decisions using the analysis/plans prepared by others | 4 |
| Analysing the plans and implementing them | 5 |
| Other <i>(please specify)</i> : | _____ |

8. How important is each of the following sources of training for your position? *(please circle one of the levels of importance for each source)*

	Not Important	Slightly	Moderately	Very	Extremely Important
(1) Experience accumulated from previous work	1	2	3	4	5
(2) Coaching by colleagues	1	2	3	4	5
(3) Courses run by your own organisation	1	2	3	4	5
(4) Seminars run by professional organisations	1	2	3	4	5
(5) Programmes run by a university or polytechnic	1	2	3	4	5
(6) Self initiated study	1	2	3	4	5
(7) Other <i>(please specify)</i> :	1	2	3	4	5

9. From these 7 training sources above, which three are most important to you? *(list their numbers below)*

1	_____	Most Important
2	_____	Second Most Important
3	_____	Third Most Important

10. What is your **main** source of information on new developments in MS/OR? *(please circle one)*

- | | |
|-----------------------|---|
| Newspapers | 1 |
| Business magazines | 2 |
| Society newsletters | 3 |
| Professional seminars | 4 |
| Tertiary programmes | 5 |
| Journals | 6 |
| Conferences | 7 |
| In-house courses | 8 |
| Colleagues | 9 |

Other *(please specify)*: _____

10. How do you rate the **performance** of your personal MS/OR strategic modelling efforts? *(please circle one)*

- | | |
|-------------------|---|
| Unsatisfactory | 1 |
| Satisfactory | 2 |
| Quite successful | 3 |
| Very successful | 4 |
| Highly successful | 5 |
| Not applicable | 6 |

11. What is your **highest** level of **educational qualification**? *(please circle one)*

- | | |
|-------------------------------|---|
| Diploma | 3 |
| First degree (BA, BSc, etc) | 4 |
| Masters degree (MA, MSc, etc) | 5 |
| MBA | 6 |
| Doctorate | 7 |

Other *(please specify)*: _____

12. In which areas do you have qualifications?

(circle as many as apply)

- | | Tertiary education | Professional |
|-----------------------------|---------------------------|---------------------|
| Accounting/Finance | 1 | 1 |
| Education | 2 | 2 |
| Engineering | 3 | 3 |
| Humanities/Arts/Languages | 4 | 4 |
| Management/Business Studies | 5 | 5 |
| Mathematics | 6 | 6 |
| Social Science | 7 | 7 |
| Science | 8 | 8 |

Other *(please specify)*: _____

13. What is your **age**?

(please circle one)

- | | |
|-------------------|---|
| Under 30 years | 1 |
| 30 - 39 | 2 |
| 40 - 49 | 3 |
| 50 - 59 | 4 |
| 60 years, or more | 5 |

14. What is your **sex**?

(please circle one)

- | | |
|--------|---|
| Female | 1 |
| Male | |

If you have any additional comments to make on this project, *or* on future developments that you would like to see in MS/OR research, please use this space:

Thank you very much for completing this questionnaire. Your contribution to this research project is very greatly appreciated.

*Please return your completed questionnaire in the **post-paid** envelope supplied.*

If you would be prepared to participate in an **interview** on your use of MS/OR tools for strategic projects, please provide your name and address below:

Name: _____

Address: _____

Telephone: _____

Fax: _____



The University of Waikato
Te Whare Wananga o Waikato
Private Bag 3105, Hamilton, New Zealand
Telephone 64 7 856-2889.

Department of Management Systems
Fax 64 7 838-4270

September 1992

Dear Operational Research Society Member

I am presently engaged in a research project which aims to identify current **Management Science/Operational Research (MS/OR)** tool usage within **Strategic Management** and to investigate the factors involved in tool selection. I am writing to invite you to participate in this project.

By completing the enclosed questionnaire on the **MS/OR techniques, tools and approaches** which you are using to support strategic decisions, you will be contributing to our understanding of the current state-of-the-art. It should take about 20-30 minutes to complete the questionnaire. Your participation is very important to the project.

The project involves a comparative survey of practitioner members of the **United Kingdom and New Zealand Operational Research Societies**. The outputs of the research will be used to develop guidelines for both management development courses and academic programmes. The project has approval from both Societies and funding from the University of Waikato Research Committee.

The questionnaire is in four parts: Part A collects information on **MS/OR tool usage**, Part B evaluates tool selection factors, Parts C and D collect background information on the organisations represented and the participants. The questions are easy to complete as most are multiple choice (simply circle the number of the option you select), or fill in the empty spaces.

If you do not use **MS/OR modelling tools and approaches** for any strategic level decision support, you will *only* need to complete the first 4 questions in Part A and the background information in Parts C and D. This will take *less than* 10 minutes of your time. I still need to receive your completed questionnaire!

All your responses will be completely confidential; only aggregate statistics will be reported. The questionnaire has an identification number for mailing purposes to enable targeted follow up, if necessary.

If you would like a summary of the aggregate results, please include your business card with your questionnaire, or mail it under separate cover. I expect to present the results at conferences in both New Zealand and the United Kingdom in 1993. A copy of the final results will also be sent to the President of each Society.

Thank you very much in anticipation for your assistance with this project.

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'Delwyn N Clark'.

Delwyn N Clark

Please return your completed questionnaire in the enclosed Post-Paid envelope as soon as possible.

Appendix VI NZSM Questionnaire



Strategic Management Tool Evaluation

in

the United Kingdom



and

New Zealand



Part A: Strategic Management Tool Usage

We are interested in the techniques, tools and approaches which **you** are using for the Strategic Management (SM) tasks which **you** perform in **your** current position; please respond giving your own views and experiences rather than attempting to represent your whole organisation. All of your responses will be confidential; only aggregate statistics will be reported.

Throughout this survey the term 'SM tools' will be used to represent any or all of the SM approaches and methods.

1. Have you ever used any SM tools (i.e. techniques, tools or approaches)? *(please circle one)*

Yes *please go to Question 4*

No *please go to Question 2*

2. If you have **not** used any SM tools, how does your organisation principally support their strategic decisions?
(please rank those that apply starting from 1 = most important)

Using intuitive **judgement** and reasoning only _____

By delegating the modelling to analysts **within** your organisation _____

By employing **outside** consultants to do the analysis _____

Other *(please specify)*: _____

3. What are your **main** reasons for **not** using any SM tools? *(circle as many as apply; then go to Part C)*

Tools are not necessary for my **position** 1

Tools do not provide the **information** needed 2

Management is not supportive 3

Money is not available 4

Data is not available 5

Not enough **time** to use tools 6

Not enough **training** on tool use 7

Lack of staff with **expertise** 8

Lack of **computer resources** 9

No **experience** with tools 10

No background **education** on tool use 11

Other *(please specify)*: _____

4. How important is each of the following functions of SM tools to you? *(please circle one of the levels of importance for each of the functions)*

	Not Important	Slightly	Moderately	Very	Extremely Important
(1) to generate information for decision making	1	2	3	4	5
(2) to provide a structure for analysis	1	2	3	4	5
(3) to encourage the communication of ideas	1	2	3	4	5
(4) to assist with coordination by establishing direction	1	2	3	4	5
(5) for symbolic purposes	1	2	3	4	5
(6) other <i>(please specify)</i> : _____	1	2	3	4	5

5. From these 6 functions above, which **three** are most important to you? *(list their numbers below)*

1 _____ Most Important
2 _____ Second Most Important
3 _____ Third Most Important

6. Evaluating the **current position** of an organisation is an important part of the Strategic Management process.

Do **you** use any SM tools to **evaluate the status** of the following **organisational resources and features**?

*If you use any SM tools, please circle Yes and write the name(s) of the tool(s) in the space provided;
if you do not use any SM tools, please circle No, or circle NA if the area is not applicable for you.*

	Do you use any tools?	Name(s) of any tool(s) used
Financial Resources	Yes / No / NA	_____
Human Resources	Yes / No / NA	_____
Marketing/Distribution	Yes / No / NA	_____
Production/Operations	Yes / No / NA	_____
Physical Resources	Yes / No / NA	_____
Information Systems	Yes / No / NA	_____
Administrative Systems	Yes / No / NA	_____
Research & Development	Yes / No / NA	_____
Intangible Resources	Yes / No / NA	_____
Culture	Yes / No / NA	_____
Top management	Yes / No / NA	_____
Structure	Yes / No / NA	_____
Mission	Yes / No / NA	_____
Objectives	Yes / No / NA	_____
Strategy	Yes / No / NA	_____
Other (please specify):		_____

7. Evaluating the external **environmental influences** on an organisation is another important part of Strategic Management. Do **you** use any SM tools or approaches to **evaluate** the following **environmental influences**?

*If you use any SM tools, please circle Yes and write the name(s) of the tool(s) in the space provided;
if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.*

	Do you use any tools?	Name(s) of any tool(s) used
Industry	Yes / No / NA	_____
Markets	Yes / No / NA	_____
Competitors	Yes / No / NA	_____
Customers	Yes / No / NA	_____
Suppliers	Yes / No / NA	_____

Stakeholders	Yes / No / NA	_____
Economic trends	Yes / No / NA	_____
Govt/Political factors	Yes / No / NA	_____
Social trends	Yes / No / NA	_____
Legal developments	Yes / No / NA	_____
Technological changes	Yes / No / NA	_____

8. **Strategic analysis** involves generating and evaluating alternative strategies to select the best strategy for the organisation to adopt. Do **you** use any SM tools for the following **strategic analysis** activities?

*If you use any SM tools, please circle Yes and write the name(s) of the tool(s) in the space provided;
if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.*

	Do you use any tools?	Name(s) of any tool(s) used
To generate alternative strategies	Yes / No / NA	_____ _____
To evaluate alternative strategies	Yes / No / NA	_____ _____
To select a specific strategy	Yes / No / NA	_____ _____
Other (please specify):		_____ _____

9. **Strategic implementation** involves developing plans to implement the chosen strategy, implementation of the strategy, monitoring the achievement of the strategy and reviewing the strategic performance. Do **you** use any SM tools to support these **strategic implementation** tasks? (i.e. to make the strategy happen)

*If you use any SM tools, please circle Yes and write the name(s) of the tool(s) in the space provided;
if you do not use any specific tool, please circle No, or circle NA if the area is not applicable for you.*

	Do you use any tools?	Name(s) of any tool(s) used
To develop plans to implement the chosen strategy	Yes / No / NA	_____ _____
To assist with implementation of the strategic plans	Yes / No / NA	_____ _____
To monitor/review the strategic performance	Yes / No / NA	_____ _____
Other (please specify):		_____ _____

10. For the sample of SM tools listed below, please indicate how **familiar** you are with each tool and how many times **you** use them per year. *Note: There is a brief description of this sample of SM tools on the coloured sheet for your reference.*

	Familiarity with tool? (circle one)				Number of times used per year?
	Don't know	Know about	Know well enough to apply	Have used	e.g. 0, 1, 2, 3, 4, 5, 6,... or monthly, weekly, daily.
Benchmarking	1	2	3	4	_____
Budgeting	1	2	3	4	_____
Core Competences	1	2	3	4	_____
Corporate Models	1	2	3	4	_____
Cost Benefit Analysis	1	2	3	4	_____
Critical Success Factors	1	2	3	4	_____
Delphi	1	2	3	4	_____
Driving Forces	1	2	3	4	_____
Financial Ratio Analysis	1	2	3	4	_____
Focus Groups	1	2	3	4	_____
Forecasting	1	2	3	4	_____
Management Profiles	1	2	3	4	_____
Market Opportunity Analysis	1	2	3	4	_____
Market Segmentation	1	2	3	4	_____
Market Signaling	1	2	3	4	_____
McKinsey 7-S	1	2	3	4	_____
Multiple Scenarios	1	2	3	4	_____
Porter's Five Forces	1	2	3	4	_____
Portfolio Models	1	2	3	4	_____
Process Mapping	1	2	3	4	_____
Product Life Cycle	1	2	3	4	_____
Reverse Engineering	1	2	3	4	_____
Simulation	1	2	3	4	_____
Spreadsheet Modelling	1	2	3	4	_____
Strategic Choice/AIDA	1	2	3	4	_____
Strategic Funds Programming	1	2	3	4	_____
Strategic Options Development and Analysis (SODA)	1	2	3	4	_____
Strategic Software	1	2	3	4	_____
SWOT Analysis	1	2	3	4	_____
Value Chain Analysis	1	2	3	4	_____

Part B: Strategic Management Tool Selection

In this section we are interested in the factors which influence your choice of tools. *Please circle the appropriate level of importance for each factor, or use NA if the factor is not relevant to you.*

1. **Organisational Factors:** How important is each of these **organisational** factors when you select a SM tool?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(1) the availability of funding	1	2	3	4	5	NA
(2) the time available to do the analysis	1	2	3	4	5	NA
(3) the staff available to do the analysis	1	2	3	4	5	NA
(4) the availability of computer resources	1	2	3	4	5	NA
(5) the availability of expertise	1	2	3	4	5	NA
(6) top management preferences	1	2	3	4	5	NA
(7) policy requirements for specific information	1	2	3	4	5	NA
(8) incentive and reward systems	1	2	3	4	5	NA
(9) the current strategic position	1	2	3	4	5	NA
(10) the attitude towards innovation and change	1	2	3	4	5	NA
(11) other (please specify): _____	1	2	3	4	5	

2. **External Factors:** How important is each of these **external** factors when you select a SM tool?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(12) the tools which others in our industry are using	1	2	3	4	5	NA
(13) the tools which our competitors are using	1	2	3	4	5	NA
(14) the tools used by the world-leading organisations	1	2	3	4	5	NA
(15) the tools used by SM consultants	1	2	3	4	5	NA
(16) the tools discussed at society seminars, conferences	1	2	3	4	5	NA
(17) the tools included in university/polytech courses	1	2	3	4	5	NA
(18) the development of new approaches	1	2	3	4	5	NA
(19) the availability of training on new approaches	1	2	3	4	5	NA
(20) the rate of change in the environment	1	2	3	4	5	NA
(21) other (please specify): _____	1	2	3	4	5	

3. **Personal Factors:** How important is each of these **personal** factors when you select a SM tool?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(22) my knowledge of the tool	1	2	3	4	5	NA
(23) my previous experience with the tool	1	2	3	4	5	NA
(24) my ability to do all the processing involved	1	2	3	4	5	NA
(25) my educational qualifications	1	2	3	4	5	NA
(26) the training courses I have attended	1	2	3	4	5	NA
(27) my skills and proficiencies	1	2	3	4	5	NA
(28) my preferences for certain types of analysis	1	2	3	4	5	NA
(29) my willingness to try new approaches	1	2	3	4	5	NA
(30) other (please specify): _____	1	2	3	4	5	

4. From these 30 factors above, which **three** are most important to you? (list their numbers below)

- 1 _____ Most Important
 2 _____ Second Most Important
 3 _____ Third Most Important

5. Tool Characteristics: How important is each of these tool characteristics or requirements when you select a SM tool?

	Not Important	Slightly	Moderately	Very	Extremely Important	Not Applicable
(1) the information produced	1	2	3	4	5	NA
(2) the method of analysis involved	1	2	3	4	5	NA
(3) the availability of data	1	2	3	4	5	NA
(4) the time it takes to do the analysis	1	2	3	4	5	NA
(5) the costs to complete the analysis	1	2	3	4	5	NA
(6) the skills required to do the analysis	1	2	3	4	5	NA
(7) the availability of computing requirements	1	2	3	4	5	NA
(8) the ease of understanding and use	1	2	3	4	5	NA
(9) the frequency of updating the data	1	2	3	4	5	NA
(10) other (<i>please specify</i>): _____	1	2	3	4	5	

6. From these 10 factors above, which **three** are most important to you? (*list their numbers below*)

- | | | |
|---|-------|-----------------------|
| 1 | _____ | Most Important |
| 2 | _____ | Second Most Important |
| 3 | _____ | Third Most Important |

7. Do you think your ranking of the 3 most important factors, in question 6 above, would **vary** depending on the specific **strategic task** involved? (*please circle one*)

- | | |
|----------|---|
| Not sure | 1 |
| No | 2 |
| Yes | 3 |

If Yes, please explain _____

8. In the past 2 years have you tried any SM tools for the **first** time? (*please circle one*)

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If Yes, please list _____

Part C: Organisation Information

To assist in the categorization of responses, information is requested on the size and nature of your employing organisation. *Note: All of your responses will be confidential; only aggregate statistics will be reported.*

1. What is the approximate annual **turnover** of your organisation? (*please circle one*)

- | | |
|-----------------------------|---|
| Less than \$6 million | 1 |
| Between \$6m and \$16m | 2 |
| Between \$16m and \$160m | 3 |
| Between \$160m and \$320m | 4 |
| Between \$320m and \$1600m | 5 |
| Between \$1600m and \$3200m | 6 |
| More than \$3200 million | 7 |

2. How many people, full-time equivalents, are employed in your organisation? (please circle one)

- | | |
|-----------------|---|
| Less than 100 | 1 |
| 100 - 499 | 2 |
| 500 - 999 | 3 |
| 1,000 - 4,999 | 4 |
| 5,000 - 9,999 | 5 |
| 10,000 - 49,999 | 6 |
| 50,000 or more | 7 |

3. Does your organisation have a separate **Management Science/Operational Research** group or department?
(please circle one)

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If yes, how many people are in this group? _____

4. Does your organisation have a separate **corporate Strategic Planning/Management** group or department?
(please circle one)

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If yes, how many people are in this group? _____

5. Is there another **Strategic Planning/Management** group or department apart from any corporate group?
(please circle one)

- | | |
|-----|---|
| No | 1 |
| Yes | 2 |

If yes, how many people are in this group? _____

6. How many people are employed primarily to do **Strategic Planning/Management**? _____

7. What is the overall **Strategic position** of your organisation at present? (please circle one)

- | | |
|--------------------------|---|
| Growth phase | 1 |
| Stable | 2 |
| Retrenchment | 3 |
| Combination of the above | 4 |
| Don't know | 5 |

8. What **type** of organisation are you employed in? (please circle one)

- | | |
|------------------------------------|-------|
| Listed company | 1 |
| Non-listed company | 2 |
| State owned enterprise/corporation | 3 |
| Central government department | 4 |
| Local government | 5 |
| Other (please specify): | _____ |

9. What is the **main product** or **area of operation** of your organisation? (please circle one)

- | | |
|--------------------------------|-------|
| Consultancy | 1 |
| Energy | 2 |
| Finance/banking/insurance | 3 |
| Health | 4 |
| Information/computers/software | 5 |
| Manufacturing/engineering | 6 |
| Retailing/wholesaling | 7 |
| Transportation | 8 |
| Other (please specify): | _____ |

Part D: Participant Information

To assist in the categorization of responses, information is requested on your position, training and involvement with SM. *Note: All of your responses will be confidential; only aggregate statistics will be reported.*

1. What percentage of your work time was spent on Strategic Management activities last year? _____ %

2. For how many years have you been working in Strategic Management? _____ years

3. What is the **main** area in which you are based in your organisation? *(please circle one)*

Senior Management	1
Strategic Planning group	2
Functional Department	3
Management Services, Consulting	4
Information Systems, Computing	5
MS/OR Department or Service	6
MS/OR Management	7
Research and Development group	8
Other <i>(please specify)</i> :	_____

4. What is the title of your present position? _____

5. How long have you held your current position? _____ years

6. What is the **main** role that you perform in your position? *(please circle one)*

Performing analysis for other outside organisations	1
Performing analysis for management of your own organisation	2
Performing analysis yourself and making the decisions for your own organisation	3
Making decisions using the analysis/plans prepared by others	4
Analysing the plans and implementing them	5
Other <i>(please specify)</i> :	_____

7. How **important** is each of the following sources of training for your position? *(please circle one of the levels of importance for each source)*

	Not Important	Slightly	Moderately	Very	Extremely Important
(1) Experience accumulated from previous work	1	2	3	4	5
(2) Coaching by colleagues	1	2	3	4	5
(3) Courses run by your own organisation	1	2	3	4	5
(4) Seminars run by professional organisations	1	2	3	4	5
(5) Programmes run by a university or polytechnic	1	2	3	4	5
(6) Self initiated study	1	2	3	4	5
(7) Other <i>(please specify)</i> : _____	1	2	3	4	5

8. From these 7 training sources above, which **three** are most important to you? *(list their numbers below)*

1	_____	Most Important
2	_____	Second Most Important
3	_____	Third Most Important

9. What is your **main** source of information on new developments in Strategic Management? *(please circle one)*

- | | |
|-----------------------|---|
| Newspapers | 1 |
| Business magazines | 2 |
| Society newsletters | 3 |
| Professional seminars | 4 |
| Tertiary programmes | 5 |
| Journals | 6 |
| Conferences | 7 |
| In-house courses | 8 |
| Colleagues | 9 |

Other *(please specify)*: _____

10. How do you rate the **performance** of your personal Strategic Management efforts? *(please circle one)*

- | | |
|-------------------|---|
| Unsatisfactory | 1 |
| Satisfactory | 2 |
| Quite successful | 3 |
| Very successful | 4 |
| Highly successful | 5 |
| Not applicable | 6 |

11. What is your **highest** level of educational qualification? *(please circle one)*

- | | |
|-------------------------------|---|
| Diploma | 1 |
| First degree (BA, BSc, etc) | 2 |
| Masters degree (MA, MSc, etc) | 3 |
| MBA | 4 |
| Doctorate | 5 |

Other *(please specify)*: _____

12. In which areas do you have qualifications? *(circle as many as apply)*

- | | Tertiary education | Professional |
|-----------------------------|--------------------|--------------|
| Accounting/Finance | 1 | 1 |
| Education | 2 | 2 |
| Engineering | 3 | 3 |
| Humanities/Arts/Languages | 4 | 4 |
| Management/Business Studies | 5 | 5 |
| Mathematics | 6 | 6 |
| Social Science | 7 | 7 |

Other *(please specify)*: _____

13. What is your age? *(please circle one)*

- | | |
|-------------------|---|
| Under 30 years | 1 |
| 30 - 39 | 2 |
| 40 - 49 | 3 |
| 50 - 59 | 4 |
| 60 years, or more | 5 |

14. What is your sex? *(please circle one)*

- | | |
|--------|---|
| Female | 1 |
| Male | 2 |

If you have any additional comments to make on this project, *or* on future developments that you would like to see in Strategic Management research, please use this space:

Thank you very much for completing this questionnaire. Your contribution to this research project is very greatly appreciated.

Please return your completed questionnaire in the freepost envelope supplied.

Questionnaire No: _____

Appendix: Strategic Management Tools

This is the sample of SM tools which is used in Question 10 of Part A. It is not a definitive list of SM tools- there are many many more!

Benchmarking-	involves comparative analysis of the products, processes, and practices of competitors, industry leaders, and world-class companies to find best practices as a guide for making improvements.
Budgeting-	involves the use of projected statements of financial position and anticipated operating results as guidelines for monitoring/measuring performance.
Core Competences-	involves identifying and building core competences rather than end products. These often involve a mixture of individual technologies and production skills which are difficult to imitate, and have potential access to a wide variety of markets.
Corporate Models-	are computer models of the organisation developed for planning purposes, which may include linked financial, marketing, and production modules.
Cost Benefit Analysis-	compares alternatives by identifying and evaluating both the tangible and intangible costs and benefits.
Critical Success Factors-	involves identification of the few key areas which are critical to ensure success, as a focus for planning/action.
Delphi-	a sequential written process for developing, evaluating, and synthesising individual viewpoints until a consensus is reached or sufficient information is obtained.
Driving Forces-	involves identification of one driving force for the organisation which serves as the focus for all planning efforts including the scope of future products and markets.
Financial Ratio Analysis-	involves calculation of a series of ratios to assess the financial status of the organisation; for comparison with objectives, trends over time, and with industry figures.
Focus Groups-	involves bringing together recognised experts and qualified individuals to develop, evaluate, and synthesize individual points of view on a particular topic in an organised setting.
Forecasting-	involves estimating the future value of a variable; the quantitative methods are either extrapolative or causal, qualitative methods are judgemental.
Management Profiles-	examines the goals, backgrounds, and personalities of the individuals making strategic decisions in a competing firm or institution.
Market Opportunity Analysis-	involves identification of markets and market factors in the economy and industry that will affect the demand for and the marketing of the product or service.
Market Segmentation-	identifies discrete pockets of competition based on product variety, buyer characteristics, channels of distribution, or geography.
Market Signaling-	involves interpretation of actions by competitors which provide direct or indirect indications of intentions, motives, goals or the internal situation.

McKinsey 7-S Framework-	guidelines for successful strategy implementation which assume a match of the 7-S elements: strategy, structure, systems, style, shared values, staff and skills.
Multiple Scenarios-	development of a set of detailed descriptions of possible alternative future situations such as industry structures.
Porter's Five Forces-	analyses the five basic forces driving industry competition: threats of substitute products and new entrants, bargaining power of suppliers and customers, and rivalry of existing firms.
Portfolio Models-	involves classification and matrix display of present businesses and products according to the attractiveness of the market and the ability to compete within that market.
Process Mapping-	involves developing maps of key processes to identify and improve the value-added time, thereby improving performance.
Product Life Cycle-	involves analysis of sales over time to identify phases of development and compare with competitors to identify and evaluate market entry strategies.
Reverse Engineering-	involves purchasing and dismantling a competitor's product to identify how it was designed and constructed so that costs and quality can be estimated.
Simulation-	is a computer-based modelling tool for exploring alternative future situations and estimating the performance of these systems.
Spreadsheet Models-	involves the use of spreadsheets for modelling systems and investigating different alternative scenarios.
Strategic Choice-	is a group process for examining complex situations using 4 modes of decision making: shape, design, compare and choose.
Strategic Funds Programming-	a process for determining the costs and controlling the funding of strategic programs
Strategic Options Development and Analysis-	a facilitated process for developing and evaluating options which uses individual interviews followed by a group workshop.
Strategic Software-	computer software which is designed specifically to support strategic decision making.
SWOT analysis-	a systematic approach for identifying the internal Strengths and Weaknesses of the organisation, and the external Opportunities and Threats.
Value Chain Analysis-	involves identifying and analysing the primary and support activities that add value of the product or service.



The University of Waikato

Te Whare Wananga o Waikato
Private Bag 3105, Hamilton, New Zealand
Telephone 64 7 856-2889.

Department of Management Systems
Fax 64 7 838-4270

4 November 1992

Dear Strategic Management Society Member

I am presently engaged in a research project which aims to identify current **Strategic Management (SM)** tool usage patterns and to investigate the factors involved in SM tool selection. I am writing to invite you to participate in this project.

By completing the enclosed questionnaire on the techniques, tools and approaches which you are using to assist with your **Strategic Management** tasks, you will be contributing to our understanding of the current state-of-the-art. It should take about 20-30 minutes to complete the questionnaire. Your participation is very important to the project.

The project involves a comparative survey of practitioner members of the United Kingdom Strategic Planning Society and the New Zealand Strategic Management Society. The outputs of the research will be used to develop guidelines for both management development courses and academic programmes. The project has approval from both Societies and funding from the University of Waikato Research Committee.

The questionnaire is in four parts: Part A collects information on SM tool usage, Part B evaluates SM tool selection factors, Parts C and D collect background information on the organisations represented and the participants. The questions are easy to complete as most are multiple choice (simply circle the number of the option you select), or fill in the empty spaces.

If you do **not** use SM techniques, tools and approaches, you will *only* need to complete the first 3 questions in Part A **and** the background information in Parts C and D. This will take *less than* 10 minutes of your time. I still need to receive your completed questionnaire!

All your responses will be completely confidential; only aggregate statistics will be reported. The questionnaire has an identification number for mailing purposes to enable targeted follow up, if necessary.

If you would like a summary of the aggregate results, please include your business card with your questionnaire, or mail it under separate cover. I expect to present the results at conferences in both New Zealand and the United Kingdom in 1993. A copy of the final results will also be sent to the Executive Administrator of each Society.

Thank you very much in anticipation for your assistance with this project.

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'D Clark'.

Delwyn N Clark

Please return your completed questionnaire in the enclosed FreePost envelope as soon as possible.

Appendix VII Chi Square Test Results

This appendix contains the Chi square results for the SM process phase tasks for the respondents in the first and last waves from all four surveys.

Phase 1: Situation Analysis

A. Organisational Analysis

Organisational Area	UKSM	NZSM	UKOR	NZOR
Mission	.5028	.1398	.1980	.1797
Objectives	.4625	.7683	.1187	.0995
Strategy	.3425	.7593	.5501	.3961
Organisation structure	.2438	.0617	.6557	.3961
Top management style	.2168	.8354	.4674	-
Culture	.6736	.8248	.5781	-
Resources:				
Financial resources	.4596	.5427	.2304	.5271
Human resources	.4927	.4195	.7936	.3961
Marketing/distribution	.8616	.3621	.1631	.8140
Production/operations	.9510	.1505	.7378	1.000
Physical resources	.4697	.9353	.6985	.0897
Information systems	.2689	.3683	.7629	.6591
Administrative systems	.1124	.0368	.8963	.6454
Intangible resources	.4392	.5500	.3398	.3961
Research and development	.1916	.2014	.6791	.4037

B. Environmental Analysis

Environmental Area	UKSM	NZSM	UKOR	NZOR
Operating Environment				
Industry	.0952	.0597	.1950	.6333
Markets	.0601	.7916	.1361	.8140
Competitors	.0425	.3304	.0878	.4858
Customers	.4756	1.000	.1027	.8288
Suppliers	.5319	.5875	.0121	.8695
Stakeholders	.2797	.4549	.7722	.6333
Remote Environment				
Economic trends	.2011	.6821	.8473	.3961
Govt/political factors	.1454	.1794	.4097	.3961
Legal developments	.9772	.4993	.9096	-
Social trends	.2447	.8984	.0660	.6591
Technological changes	.8365	.4215	.0236	.4323

Phase 2: Strategic Analysis

Task	UKSM	NZSM	UKOR	NZOR
Generate alternative strategies	.8858	.5770	.5505	.6885
Evaluate alternative strategies	.4527	.1875	.4334	.2260
Select a specific strategy	.0786	.0593	.4909	.7189

Phase 3: Strategic Implementation

Task	UKSM	NZSM	UKOR	NZOR
To develop plans to implement the strategy	.5755	.2237	.6360	.3105
To assist with implementation of the strategy	.8407	.4702	.4225	.8247
To monitor/review the strategic performance	.3367	.5589	.7242	.8247

Appendix VIII UKOR Interview Outline

This appendix contains the outline for the UKOR interviews.

Strategic Evaluation of MS/OR Tools

Name: _____

Organisation: _____

Address: _____

Phone: _____

Fax: _____

Interview Date: _____

Interview Time: _____

Directions: _____

Strategic Evaluation of MS/OR Tools

Interview Outline

1. Introduction:

- myself
- the research project
- confirm the time available for interview
- confidentiality of responses
- summary report provided to all participants
- ask permission to tape record the interview
- outline of the interview

2. Collect background information using a checklist:

- personal (position, etc)
- organisation (size, etc)

3. Strategic Tool Usage and Selection:

- your involvement with MS/OR techniques, tools and approaches for strategic decision support, strategic planning or strategic management
- the types of MS/OR tools that you use
- the types of strategic decisions/tasks that you use the tools for
- names of tools which you use the most for strategic projects
- discussion of 1 or 2 specific favourite tools (reasons, strengths/advantages, weaknesses/limitations)
- new tools needed?
- any other contribution of MS/OR to strategic decisions, strategic planning/management?
- tool selection criteria- what is important to you when you select a tool for a strategic project?

4. Finale:

- other comments
- thanks!

I would like to spend most of the interview time on part 3.

Organisation Information

1. What is the approximate annual **turnover** of your organisation?

Less than £5 million	_____	Between £100m and £500m	_____
Between £5m and £50m	_____	Between £500m and £1000m	_____
Between £50m and £100m	_____	More than £1000 million	_____

2. How **many people**, full-time equivalents, are employed in your organisation?

Less than 100	_____	5,000 - 9,999	_____
100 - 499	_____	10,000 - 49,999	_____
500 - 999	_____	50,000 or more	_____
1,000 - 4,999	_____		

3. Does your organisation have a **separate Management Science/Operational Research group or department**?

No	_____	
Yes	_____	If yes, how many people are in this group? _____

4. Does your organisation have a **separate corporate Strategic Planning/Management group or department**?

No	_____	
Yes	_____	If yes, how many people are in this group? _____

5. Is there another **Strategic Planning/Management group or department** apart from any corporate group?

No	_____	
Yes	_____	If yes, how many people are in this group? _____

6. How **many** people are employed **primarily** to do **Strategic Planning/Management**? _____

7. What is the overall **strategic position** of your organisation at present?

Growth phase	_____	Combination of the above	_____
Stable	_____	Don't know	_____
Retrenchment	_____		

8. What **type** of organisation are you employed in?

Listed company	_____	Central government department	_____
Non-listed company	_____	Local government	_____
State owned enterprise/corp'n	_____	Other (please specify):	_____

9. What is the **main product** or **area of operation** of your organisation?

Consultancy	_____	Manufacturing/engineering	_____
Energy	_____	Retailing/wholesaling	_____
Finance/banking/insurance	_____	Health	_____
Information/computers/software	_____	Other (please specify):	_____

Participant Information

1. What percentage of your work **time** was spent on MS/OR activities last year? _____ %

2. What percentage of your work **time** was spent on projects of a strategic nature last year? _____ %

3. For how many **years** have you been working in MS/OR? _____ years
4. What is the **main area** in which you are based in your organisation?
- | | | | |
|---------------------------------|-------|----------------------------------|-------|
| Senior Management | _____ | MS/OR Department or Service | _____ |
| Strategic Planning group | _____ | MS/OR Management | _____ |
| Functional Department | _____ | Research and Development group | _____ |
| Management Services, Consulting | _____ | Other (<i>please specify</i>): | _____ |
| Information Systems, Computing | _____ | | |
5. What is the **title** of your present position? _____
6. How **long** have you held your current position? _____ years
7. What is the **main role** that you perform in your position?
- | | |
|---|-------|
| Performing analysis for other outside organisations | _____ |
| Performing analysis for management of your own organisation | _____ |
| Performing analysis yourself and making the decisions for your own organisation | _____ |
| Making decisions using the analysis/plans prepared by others | _____ |
| Analysing the plans and implementing them | _____ |
| Other (<i>please specify</i>): | _____ |
8. What is your **main source** of information on **new developments** in MS/OR?
- | | | | |
|-----------------------|-------|----------------------------------|-------|
| Newspapers | _____ | Journals | _____ |
| Business magazines | _____ | Conferences | _____ |
| Society newsletters | _____ | In-house courses | _____ |
| Professional seminars | _____ | Colleagues | _____ |
| Tertiary programmes | _____ | Other (<i>please specify</i>): | _____ |
9. How do you rate the **performance** of your personal MS/OR strategic modelling efforts?
- | | | | |
|------------------|-------|-------------------|-------|
| Unsatisfactory | _____ | Very successful | _____ |
| Satisfactory | _____ | Highly successful | _____ |
| Quite successful | _____ | Not applicable | _____ |
10. What is your **highest** level of **educational qualification**?
- | | | | |
|------------------------------|-------|----------------------------------|-------|
| Diploma | _____ | MBA | _____ |
| First degree (BA, BSc, ..) | _____ | Doctorate | _____ |
| Masters degree (MA, MSc, ..) | _____ | Other (<i>please specify</i>): | _____ |
11. In which areas do you have **qualifications**?
- | | Tertiary education | Professional |
|----------------------------------|---------------------------|---------------------|
| Accounting/Finance | _____ | _____ |
| Education | _____ | _____ |
| Engineering | _____ | _____ |
| Humanities/Arts/Languages | _____ | _____ |
| Management/Business Studies | _____ | _____ |
| Mathematics | _____ | _____ |
| Social Science | _____ | _____ |
| Other (<i>please specify</i>): | _____ | |
12. What is your **age**?
- | | |
|-------------------|-------|
| Under 30 years | _____ |
| 30 - 39 | _____ |
| 40 - 49 | _____ |
| 50 - 59 | _____ |
| 60 years, or more | _____ |
13. What is your **sex**?
- | | |
|--------|-------|
| Female | _____ |
| Male | _____ |

Strategic Evaluation of MS/OR Tools

1. Are you involved with any **MS/OR** modelling for supporting **strategic decision making, strategic planning** or **strategic management**?

2. Which **MS/OR techniques, tools or approaches** do you use?

3. What types of **strategic decisions** are you preparing models for?

4. What are the MS/OR tools that you use the **most for strategic projects**?

Select one of these to discuss in detail:

(a) **why** do you use this tool more than the others?

(b) what are the **advantages** of using this tool? ie its strengths

(c) what are the **disadvantages/limitations** of this tool?

Repeat Q 4 if time permits.

5. Do you think there is a need for any **new tools**? of specific types? for specific tasks?

6. Can you think of any other ways that **MS/OR** can contribute to **strategic decision support, strategic planning** or **strategic management**?

7. **Tool Selection:** how do you decide which tools to use?

Appendix IX NZSM Interview Outline

This appendix contains the outline for the NZSM interviews.

Strategic Management Tool Evaluation

Name: _____

Organisation: _____

Address: _____

Phone: _____

Fax: _____

Interview Date: _____

Interview Time: _____

Directions: _____

Evaluation of Strategic Management Tools

Interview Outline

1. Introduction:

- myself
- the research project
- confirm the time available for interview
- confidentiality of responses
- summary report provided to all participants
- ask permission to tape record the interview
- outline of the interview

2. Collect background information using a checklist:

- personal (position, etc)
- organisation (size, etc)

3. SM Tool Usage and Selection:

- your involvement with SM techniques, tools and approaches
- the types of SM tools that you use
- what tasks do you use the tools for?
- names of tools which you use which are (i) strong favourites, and (ii) strongly disliked (with reasons)
- discussion of 1 or 2 specific favourite tools (reasons, strengths/advantages, weaknesses/limitations)
- discussion of 1 or 2 of the 'strongly disliked' tools (reasons, strengths/advantages, weaknesses/limitations)
- new tools needed?
- tool selection criteria- what is important to you when you select a SM tool?

4. Finale:

- other comments
- thanks!

I would like to spend most of the interview time on part 3.

Organisation Information

1. What is the approximate annual **turnover** of your organisation?

Less than £5 million	_____	Between £100m and £500m	_____
Between £5m and £50m	_____	Between £500m and £1000m	_____
Between £50m and £100m	_____	More than £1000 million	_____

2. **How many people**, full-time equivalents, are employed in your organisation?

Less than 100	_____	5,000 - 9,999	_____
100 - 499	_____	10,000 - 49,999	_____
500 - 999	_____	50,000 or more	_____
1,000 - 4,999	_____		

3. Does your organisation have a **separate Management Science/Operational Research group or department**? No _____

Yes _____ If yes, how many people are in this group? _____

4. Does your organisation have a **separate corporate Strategic Planning/Management group or department**?

No _____

Yes _____ If yes, how many people are in this group? _____

5. Is there another **Strategic Planning/Management group or department** apart from any corporate group?

No _____

Yes _____ If yes, how many people are in this group? _____

6. **How many** people are employed **primarily** to do **Strategic Planning/Management**? _____

7. What is the overall **strategic position** of your organisation at present?

Growth phase	_____	Combination of the above	_____
Stable	_____	Don't know	_____
Retrenchment	_____		

8. What **type** of organisation are you employed in?

Listed company	_____	Central government department	_____
Non-listed company	_____	Local government	_____
State owned enterprise/corp'n	_____	Other (please specify):	_____

9. What is the **main product** or **area of operation** of your organisation?

Consultancy	_____	Manufacturing/engineering	_____
Energy	_____	Retailing/wholesaling	_____
Finance/banking/insurance	_____	Health	_____
Information/computers/software	_____	Other (please specify):	_____

Participant Information

1. What percentage of your work **time** was spent on Strategic Management activities last year? _____ %

2. For how many **years** have you been working in Strategic Management? _____ years

3. What is the **main area** in which you are based in your organisation?

Senior Management	_____	MS/OR Department or Service	_____
Strategic Planning group	_____	MS/OR Management	_____
Functional Department	_____	Research and Development group	_____
Management Services, Consulting	_____	Other (please specify):	_____
Information Systems, Computing	_____		

4. What is the **title** of your present position? _____

5. How **long** have you held your current position? _____ years

6. What is the **main role** that you perform in your position?

Performing analysis for other outside organisations	_____
Performing analysis for management of your own organisation	_____
Performing analysis yourself and making the decisions for your own organisation	_____
Making decisions using the analysis/plans prepared by others	_____
Analysing the plans and implementing them	_____
Other (please specify):	_____

7. What is your **main source** of information on **new developments** in Strategic Management?

Newspapers	_____	Journals	_____
Business magazines	_____	Conferences	_____
Society newsletters	_____	In-house courses	_____
Professional seminars	_____	Colleagues	_____
Tertiary programmes	_____	Other (please specify):	_____

8. How do you rate the **performance** of your personal Strategic Management efforts?

Unsatisfactory	_____	Very successful	_____
Satisfactory	_____	Highly successful	_____
Quite successful	_____	Not applicable	_____

9. What is your **highest** level of **educational qualification**?

Diploma	_____	MBA	_____
First degree (BA, BSc, ..)	_____	Doctorate	_____
Masters degree (MA, MSc, ..)	_____	Other (please specify):	_____

10. In which areas do you have **qualifications**?

	Tertiary education	Professional
Accounting/Finance	_____	_____
Education	_____	_____
Engineering	_____	_____
Humanities/Arts/Languages	_____	_____
Management/Business Studies	_____	_____
Mathematics	_____	_____
Social Science	_____	_____
Other (please specify):	_____	

11. What is your **age**?

Under 30 years	_____
30 - 39	_____
40 - 49	_____
50 - 59	_____
60 years, or more	_____

12. What is your **sex**?

Female	_____
Male	_____

Strategic Management Tool Evaluation

1. In your current position, what is your **involvement** with SM techniques, tools and approaches?
2. Which **SM tools** do you use?
3. Which **SM tasks** do you use tools for?
4. Which are your **favourite tools**? Why do you like them?
5. Do you **strongly dislike** any of the tools that you are using? why?
6. Select a **specific favourite tool** and discuss it in detail:
 - (a) why do you **like** to use it?
 - (b) what are its **strengths**?
 - (c) what are its **weaknesses/limitations**?

7. Select a specific tool from your 'strongly dislike' category:

(a) why do you **not like** using it?

(b) what are its **strengths**, if any?

(c) what are its **weaknesses**?

Repeat Q 5 and 6 if time permits.

8. Do you think there is a need for any **new tools**? of specific types? for specific tasks?

9. How do you decide which tools to use? ie what factors do you consider when you **select** a tool?

(a) Task requirements?

(b) Tool characteristics?

(c) Organisational factors?

(d) Environmental factors?

(e) Personal factors?

Appendix X Interview Participants

This appendix contains a list of the MS/OR and SM interviewees.

MS/OR Interviews

A. United Kingdom MS/OR

Personal interviews were conducted in September/October 1992 with the following people:

- | | | |
|-----|------------------|----------------------|
| 1. | John Hough | Rolls Royce |
| 2. | James Gibb | Shell |
| 3. | Ted Gregory | British Telecom |
| 4. | David Rutherford | British Airways |
| 5. | Ann Taket | College of Mary |
| 6. | Keith Backwell | PA Consulting |
| 7. | Brian Fine | Consulting |
| 8. | Vince Hopkinson | British Gas |
| 9. | Andre Hare | Dept of Health |
| 10. | David Patching | Essex County Council |
| 11. | Trevett Steggles | Royal Mail |

B. New Zealand MS/OR

Personal interviews were conducted in November/December 1992 or February 1993 with the following people:

- | | | |
|-----|-------------------|-----------------------------------|
| 1. | Laura Donovan | ASB |
| 2. | Hugh Barr | Industrial Research Limited |
| 3. | Frances Sutton | Economic Services |
| 4. | Don Johnston | Johnston Inventory Services Ltd |
| 5. | Jonathan Lermitt | Electricity Corporation of NZ |
| 6. | Alison Levingston | NZ Rail (with Scott Murray) |
| 7. | Hamish Fraser | Ernst & Young Management Sciences |
| 8. | Bob Cavana | Victoria University |
| 9. | Conrad Edwards | Ministry of Defense |
| 10. | Damien Mather | Telecom NZ Ltd |
| 11. | John Hayes | Databank Systems |
| 12. | Alan Gaskin | Air New Zealand |
| 13. | Phil Yates | Consultant |
| 14. | Patrick Harnett | TransPower |

continued

SM Interviews

A. United Kingdom SM

Personal interviews were conducted in September/October 1992 with the following people:

1.	David Barthorpe	East Midlands Electricity
2.	David Greenwood	Royal Bank of Scotland
3.	Steve Walkin	British Telecom
4.	Philippa Sondheimer	European Passenger Services
5.	Ian Wigston	Barclays de Zoete Wedd
6.	Geoff Bothamley	British Gas
7.	Keith Roberts	PIMS
8.	Oliver Sparrow	Shell UK
9.	Andrew Clarke	British Airways
10.	Sanaya Bhote	Abbey National
11.	Gerard Nosowski	Post Office
12.	Nick Duggan	Rockware
13.	Steve Tedbury	Tate & Lyle
14.	John Webb	IPC Magazines
15.	Christine Tindell	Ernst & Young
16.	Stephen Cockell	National Westminster Bank PLC

B. New Zealand SM

Personal interviews were conducted in November/December 1992 or February 1993 with the following people:

1.	Harry Tollinar	Fletcher Challenge
2.	Rob Sweet	TVNZ
3.	Arnold Young	National Bank
4.	Ifor Ffowcs Williams	TRADENZ
5.	Lee Wilson	Electricity Corporation of NZ
6.	Susan Paterson	WireMakers
7.	Rick Boven	Boston Consulting Group
8.	Ted Gibson	PA Consulting
9.	Ching Yeo	ASB
10.	Sean Howe	Clear Communications
11.	Roy Carroll	Manukau City Council
12.	Colin Hall	Telecom
13.	Kathryn Ennis	Environment Waikato
14.	David Stubbs	Auckland City Council
15.	John Blyth	John Blyth & Associates
16.	Gordon Smith	Shell NZ (with Trevor Johnson)
17.	Glenys Coughlan	Air New Zealand
18.	John Vandersyp	Resource Facilitation
19.	Srian Abeysuriya	WEL Energy Group
20.	Lawrence Griffiths	Dominion Breweries

Appendix XI SM Process Models

This appendix contains a list of the Strategic Management process models which were studied and compared prior to the development of the SM framework.

1. Andrews (1980)
2. Ansoff (1986)
3. Below, Morrissey, and Acomb (1987)
4. Boseman and Phatak (1989)
5. Greenley (1989)
6. Hatten and Hatten (1988)
7. Hofer and Schendel (1978)
8. Hax and Majluf (1984)
9. Johnson (1987)
10. Johnson and Scholes (1989)
11. King and Cleland (1987)
12. Naylor (1980)
13. Pearce and Robinson (1991)
14. Porter (1980, 1985)
15. Quinn (1980)
16. Quinn, Mintzberg, and James (1988)
17. Rowe, Mason, Dickel, and Snyder (1989)
18. Rue and Holland (1986)
19. Wheelen and Hunger (1986)

Appendix XII Basic Elements of Strategic Management

This appendix contains a summary of the basic elements of Strategic Management; these are included in the Situation Assessment Phase of the SM framework.

ORGANISATION - includes both the tangible and intangible features of the organisation (the people, their knowledge, expertise and values, the administrative systems, the plans, the resources etc):

MISSION expression of the overall purpose of the organisation; includes the current and future business scope in terms of products, markets and geographical coverage; and a statement of competitive position.

OBJECTIVES desired future achievements

STRATEGY the coherent set of actions which are designed to achieve the objectives

STRUCTURE summarised as an organisation chart which shows the roles and relationships of the people; and shows the patterns of communication channels, authority and work flow, designated tasks and responsibilities.

STYLE the leadership approach adopted by top management

CULTURE includes the values, beliefs and expectations shared by the members of the organisation; produces norms that shape the behaviour of the individuals

RESOURCES includes the systems, processes, procedures; skills/capabilities and the financial, physical and human elements involved)

Administrative Systems procedures for planning and controlling the organisational activities (including quality control, performance measurement and reward systems)

Financial Resources sources, uses and control of funds (W&H,117)

Human Resources people and their skills/capabilities

Information Systems collection, storage and synthesis of information (W&H,130-133)

Intangible Resources 'goodwill' from brand names, good contacts, company image (J&S,89)

Marketing/Distribution market position, marketing mix (product, place promotion and price) (W&H,116/117)

Production/Operations transform inputs into final product or service (J&S,87)

Physical Resources buildings, materials, products (J&S,95)

R & D responsible for technological development in product, process, or raw materials (J,88)

SOURCES:

JOHNSON and SCHOLLES, 1989, ch 4, 83-112.

WATERMAN (1982)

WHEELEN and HUNGER, 1986, ch 5, 109-136

continued....

ENVIRONMENT - includes the external factors which influence the operations of the organisation directly or indirectly, in the present and the future.

OPERATING ENVIRONMENT - includes those elements or groups that directly affect and are affected by an organisation's major operations (W&H, 1986:10):

INDUSTRY comprises the groups of firms producing similar products (goods or services)

MARKETS within an industry there will be smaller groups which produce for the same potential customers

COMPETITORS those firms operating within the same markets producing close substitute products

CUSTOMERS the individuals or firms who buy the products or use the services

SUPPLIERS those who provide the inputs for the firm to operate

STAKEHOLDERS those who have an interest in the firms operation because they affect or are affected by the achievement of the firm's objectives e.g. shareholders, creditors, employees, unions, communities, customers, distributors, local bodies, trade and lobby groups.

REMOTE ENVIRONMENT - includes the more general forces which have an impact on the organisation:

ECONOMIC forces that regulate the exchange of material, money, energy and information.
(business cycles, GNP trends, interest rates, inflation, money supply, unemployment, disposable income, energy availability and cost)

POLITICAL government stability and policies as enacted through regulations, controls, and incentives
(trade agreements, protectionism, incentives for local/foreign firms)

LEGAL laws which may influence (constrain/protect/regulate) the operations of the firm
(monopolies legislation, environmental protection, employment contracts act)

SOCIAL forces that regulate values and customs
(population demographics, lifestyle changes, attitudes to work and leisure, consumerism, levels of education, social mobility)

TECHNOLOGICAL forces that generate problem solving inventions
(government spending on R&D, government and industry focus of technological effort, new discoveries/developments, speed of technology transfer, rates of obsolescence, productivity improvements through automation)

SOURCES:

JOHNSON and SCHOLLES, 1989, ch 3, 53-82.

WHEELEN and HUNGER, 1986, ch 4, 76-108

Appendix XIII SM Non Tool User Information

This appendix contains a summary of the information which was provided by the respondents who were not involved in SM tool use.

In both the SM surveys there were some respondents who indicated that they are not involved in SM tool usage; 8.7% of the UKSM sample and 6.5% of the NZSM sample were thus classified as non-users of SM tools. These respondents were asked to indicate how strategic decisions were principally supported in their organisations. The majority of both sample ranked using judgement and reasoning as the most important surrogate for tools; 71% of the UKSM sample and 55.5% of the NZ sample. Some of the respondents are not personally involved with SM Tools as they are able to delegate the work to others within their organisations or employ outside consultants. Combinations of these options are also used. The three options were ranked in the same order by both samples, however the delegation and consultant options were proportionately higher in the NZSM sample.

The main reasons for not using tools were further explored using a sample of options. Table 1 summarises the proportions of the non-users who indicated that each of these options are applicable to them.

Table 1 Reasons for Not Using SM Tools

Reasons	UKSM	NZSM
Tools are not necessary for my position	42.9	55.6
No background education on tool use	35.7	22.2
Lack of staff with expertise	28.6	22.2
Tools do not provide the information needed	28.6	11.1
Not enough time to use tools	28.6	11.1
Not enough training on tool use	28.6	11.1
Lack of computer resources	28.6	0
Management is not supportive	21.4	11.1
Data is not available	21.4	0
No experience with tools	14.3	33.3
Money is not available	14.3	0

The predominant reason for not using tools in both samples is 'Tools are not necessary for my position'. As the Society contains some individuals with symbolic-type memberships such as those who are nominated representatives of affiliated organisations, or Board level executives with more esoteric interests in the discipline, this result is not surprising. The next cluster of reasons are all personal factors; they include lack of education, staff expertise, and experience in the NZSM sample. Physical resources including computers, data and money were not rated as important by the NZSM sample, and they are also at the low end of the UK ratings.

Appendix XIV SM Process Results: SM Surveys

This appendix contains a summary of the tool user proportions and the Chi square results for the UKSM and NZSM samples for all of the strategic tasks in the three SM process phases.

SM Tool Use in Phase 1: Situation Analysis

A. Organisational Analysis

Organisational Area	UKSM	NZSM	Prob	Signif
Mission	59.8	69.7	.1048	
Objectives	75.6	84.3	.0805	
Strategy	88.1	89.6	.7102	
Organisation structure	51.6	57.8	.3317	
Top management style	39.8	46.9	.2695	
Culture	43.8	50.4	.3024	
Resources:				
Financial resources	82.4	80.2	.6533	
Human resources	53.8	62.7	.1576	
Marketing/distribution	68.1	65	.5920	
Production/operations	48.5	57.5	.1527	
Physical resources	27.8	38.9	.0671	
Information systems	49.6	59.1	.1364	
Administrative systems	34.9	47.3	.0540	
Intangible resources	16.4	15.7	.8859	
Research and development	35.2	37.4	.7174	

Significance level:

.001	***
.010	**
.050	*

B. Environmental Analysis

Environmental Area	UKSM	NZSM	Prob	Signif
Operating Environment				
Industry	67.2	64.8	.6492	**
Markets	75.2	69.4	.3012	
Competitors	78.3	61.0	.0023	
Customers	71.1	69.9	.8338	
Suppliers	35.6	38.7	.6174	
Stakeholders	30.0	39.1	.1330	
Remote Environment				
Economic trends	61.9	62.7	.8996	
Govt/political factors	46.6	55.6	.1574	
Legal developments	33.1	38.1	.4467	
Social trends	47.7	49.1	.8262	
Technological changes	52.3	58.8	.3153	

SM Tool Use in Phase 2: Strategic Analysis

Task	UKSM	NZSM	Prob	Signif
Generate alternative strategies	70.0	72.0	.7203	
Evaluate alternative strategies	74.6	76.9	.6710	
Select a specific strategy	62.5	71.7	.1260	

SM Tool Use in Phase 3: Strategic Implementation

Task	UKSM	NZSM	Prob	Signif
To develop plans to implement the strategy	52.5	68.8	.0091	**
To assist with implementation of the strategy	50.4	56.5	.3389	
To monitor/review the strategic performance	67.9	70.7	.6253	

Appendix XV SM Interviews: Job Titles

This appendix contains a list of the job titles of the SM interviewees.

Acting Director of Planning
Business Environment Manager
Competitor Strategy Manager
Corporate Development Manager (*2)
Director
Director of Strategic Planning
Director of Systems Development
Director Planning and Development
General Manager
General Manager of Strategic Development Unit
Group Strategic Planner (*2)
Manager, Group Strategy
Manager, Health Sector Consulting
Manager Strategic Planning (*3)
Manager Strategic Projects
Managing Director
Managing Partner
Marketing Analyst
Market Strategist
Planning Director
Planning Manager (*2)
Planning and Research Manager
Senior Business Analyst
Senior Economic Analyst
Senior Group Planning Analyst
Senior Manager Corporate Planning
Senior Planning Manager
Strategic Planning Manager (*2)
Strategy Manager
Vice President

Note: There are 31 different job titles for these 36 SM interviewees.

Appendix XVI MS/OR Non Strategic Tool Users

This appendix contains a summary of the information collected from the MS/OR respondents who are not involved with tool use at the strategic level.

In both the MS/OR surveys there were some respondents who indicated that they are not involved in strategic usage of MS/OR tools: 21.5% of the UKOR sample and 33.3% of the NZOR sample. These respondents were asked to indicate how Strategic Decisions were principally supported in their organisations. The majority of both samples ranked using judgement and reasoning as the most important surrogate for tools; 63.6% of the UKOR sample and 50% of the NZ sample. Some of the respondents are not personally involved with tools as they are able to Delegate the work to others within their organisations or employ outside Consultants. Combinations of these options are also used. In the NZOR sample using Consultants was ranked second, with Delegation in third place. This ranking was reversed in the UK sample, however the margin was very small between the proportions.

The main reasons for not using tools were further explored using a sample of options. Table 1 summarises the proportions of the non-users who indicated that each of these options are applicable to them (multiple responses were allowed).

Table 1 Reasons for Not Using MS/OR Tools

Reasons	UKOR	NZOR
Tools are not necessary for my position	38.9	33.3
Management is not supportive	27.8	0
Lack of staff with expertise	22.2	8.3
No experience with tools	16.7	33.3
Not enough time to use tools	13.9	8.3
Data is not available	13.9	0
Tools do not provide the information needed	8.3	33.3
Money is not available	8.3	8.3
Not enough training on tool use	5.6	0
No background education on tool use	5.6	8.3
Lack of computer resources	0	8.3

The main reasons for not using tools are quite different in the two samples. In the NZOR sample, three of the options were important for one third of the non-users: 'Tools are not necessary for my position', 'Tools do not provide the information needed' and 'No experience with tools'. In the UKOR sample the most frequent reason for not using tools was one of the NZ top three, 'Tools are not necessary for my position'; lack of management support and staff expertise were the other top reasons in the UK. In general, physical resources were not important; human resource factors are important, yet training and education of staff are not rated as important.

Appendix XVII Comparisons with Carter's UKOR Survey

This appendix contains a comparison of the management areas of the UK respondents from Carter's 1985 survey and the UKOR results from this project.

This question on the main area of management in which the respondents are based was adapted from the Carter survey of the UK OR Society members for comparative purposes. As 18% of Carter's sample were from the Education sector, which has been excluded from this research, the proportions in his UKOR sample percentages have been recalculated (as a proportion out of 82). Also, in this survey the Management Services and Consulting areas were combined into one category. Finally, two new categories were added: Research and Development and a Functional department category.

Table 1 Management Area

Area	UKOR % Carter, 1987	UKOR % whole sample 1992	UKOR % users only 1992
MS/OR Department or Service	23.2	23.0	24.3
Management Services, Consulting	20.72	18.4	22.1
Information Systems, Computing	21.95	15.5	13.2
Senior Management	9.75	10.9	12.5
MS/OR Management	6.09	5.7	7.4
Strategic Planning Group	8.54	5.7	7.4
Research and Development Group		5.7	7.1
Functional Department		9.8	4.4
Other	10.98	5.2	3.7

The results for the whole sample and also for the strategic tool users are shown in Table 1 along with the equivalent UK proportions from Carter's survey. The proportions are very close for all but one category: the Information Systems/Computing area is lower than in the Carter's survey. This may reflect changes in the proportions of Society members from this area over the seven year time interval between these surveys; alternatively fewer people from this area may be involved with strategic level MS/OR work.

Appendix XVIII SM Process Results: MS/OR Surveys

This appendix contains the tool user proportions and the Chi square results for the UKOR and NZOR samples for all of the strategic tasks in the three SM process phases.

MS/OR Tool Use in Phase 1: Situation Analysis

A. Organisational Analysis

Organisational Area	UKOR	NZOR	Prob	Signif
Mission	16.1	12.0	.6022	
Objectives	25.0	24.0	.9159	
Strategy	44.2	32.0	.2588	
Organisation structure	16.7	12.0	.5599	
Top management style	8.1	0	.1415	
Culture	7.3	0	.1646	
Resources:				
Financial resources	47.7	48.0	.9775	
Human resources	34.8	12.0	.0238	*
Marketing/distribution	46.6	24.0	.0367	*
Production/operations	57.7	68.0	.3366	
Physical resources	38.3	36.0	.8297	
Information systems	32.8	25.0	.4499	
Administrative systems	16.8	8.0	.2649	
Intangible resources	2.5	12.0	.0300	*
Research and development	19.2	29.2	.2706	

Significance level:

.001	***
.010	**
.050	*

B. Environmental Analysis

Environmental Area	UKOR	NZOR	Prob	Signif
Operating Environment				
Industry	19.1	12.5	.4409	
Markets	32.6	29.2	.7404	
Competitors	29.6	16.7	.1909	
Customers	37.3	36.0	.9007	
Suppliers	16.2	20.8	.5739	
Stakeholders	8.7	4.2	.4501	
Remote Environment				
Economic trends	29.2	24.0	.5953	
Govt/political factors	15.5	12.0	.6528	
Legal developments	8.7	0	.1165	
Social trends	19.2	16.7	.7678	
Technological changes	19.2	16.7	.7678	

MS/OR Tool Use in Phase 2: Strategic Analysis

Task	UKOR	NZOR	Prob	Signif
Generate alternative strategies	40.9	40.0	.9299	
Evaluate alternative strategies	68.4	73.1	.6349	
Select a specific strategy	45.7	57.7	.2805	

MS/OR Tool Use in Phase 3: Strategic Implementation

Task	UKOR	NZOR	Prob	Signif
To develop plans to implement the strategy	24.6	20.0	.6201	
To assist with implementation of the strategy	21.2	29.2	.3902	
To monitor/review the strategic performance	35.1	30.4	.6631	

Appendix XIX MS/OR Interviews: Job Titles

This appendix contains a list of the job titles of the MS/OR interviewees.

Assistant Group Management Services Officer
Business Director
Chairman
Consultant (*2)
Corporate Demand Analyst
Corporate Economist
Corporate Operational Research Manager
Engineering Consultant
Governing Director
Head of Management Science and Organisation
Head of Management Services
Head of Operational Research
Head of OR Services
Manager, Business Systems
Manager Capability Analysis
Manager OR Department
OR Analyst
Pricing Analyst
Principal
Principal Consultant
Research Analyst
Senior Business Analyst
Senior Scientist
Systems Manager

Note: There are 24 different job titles from this sample of 25 MS/OR practitioners.

Appendix XX Strategic Tool Selection Factors

This appendix contains a summary of the Strategic Tool Selection factors which were identified prior to the empirical research.

Organisational Factors

- | | |
|--------------------------|--|
| 1. SM Maturity | the stage of development of SM (financial, forecast-based, externally-oriented, SM) |
| 2. Strategic Position | the current position of the organisation (growth, stable, declining) |
| 3. Top Management | the preferred style of decision making of top management |
| 4. Organisational Policy | policy requirements for specific outputs and reports |
| 5. Culture | the accepted 'norm' (specific approaches, attitude to innovation/change) |
| 6. Reward Systems | the system of incentives and rewards encourages certain actions |
| 7. Human Resources | the people involved in the analysis |
| 8. Financial Resources | funding for the data collection and analysis, use of consultants, and salaries/opportunity costs |
| 9. Computer Resources | the hardware and software required |
| 10. Time | the amount of time available to produce the output |
| 11. Managerial Skills | the expertise or capabilities needed |

External Factors

- | | |
|----------------------------|---|
| 1. Industry | the tools which others in the industry are using |
| 2. Competitors | the tools which competitors are using |
| 3. Best Practices | the approaches used by world leaders in analogous operations |
| 4. Consultants | the development and dissemination of information on approaches |
| 5. Societies | professional development seminars, courses and conferences |
| 6. Universities | tertiary courses, conferences and research publications |
| 7. Environmental stability | the level of stability/rate of change in the remote environment |
| 8. New Developments | the development of new approaches |
| 9. Training | the availability of training on new approaches |

Personal Factors

- | | |
|---------------|---|
| 1. Knowledge | the understanding of information which has been accumulated/learnt |
| 2. Skills | the skills and proficiencies of the individual |
| 3. Education | qualifications- the products of formal education |
| 4. Training | the instruction to develop proficiency |
| 5. Experience | things discovered or learned by personal participation |
| 6. Abilities | the ability to do the processing of different types of information |
| 7. Attitudes | predispositions to act or respond (Baker, 1991)
e.g. willingness to try new approaches
preferred type of analysis |

Tool Characteristics

- | | |
|---------------------------|--|
| 1. Output produced | the nature and content of the information produced |
| 2. Method of analysis | the type of processing involved |
| 3. Data availability | the nature, sources and time horizon of the data which is required |
| 4. Time to develop | the time required for preparations |
| 5. Cost to develop | the financial costs involved in using the tool |
| 6. Computer requirements | the hardware and software required |
| 7. Time to execute | the time involved in data collection, analysis and dissemination of findings |
| 8. Frequency of updating | how often the tool is updated (continuously, periodically, or on demand) |
| 9. Difficulty of updating | the extent and nature of skills that may be required during an update |
| 10. Effectiveness | the effectiveness of the tool in performing the tasks |
| 11. Ease of use | the ease/difficulty of understanding and using the tool |
| 12. Skills required | the managerial capabilities involved |

Appendix XXI Tool Selection Factor Mean Values

This appendix contains the mean importance values for each of the tool selection factors and the probabilities determined in the statistical testing.

A. Organisational Factors

Organisational Factors	UKSM	NZSM	UKOR	NZOR	Prob
Time available	3.86	3.86	4.02	4.20	.3836
Expertise	3.61	3.69	3.64	3.72	.9669
Staff available	3.54	3.61	3.44	3.48	.8316
Attitude to change	3.10	3.26	2.78	3.08	.0629
Top management preferences	3.34	3.25	2.56	2.68	.0000***
Strategic position	2.95	3.29	2.17	2.13	.0000***
Availability of funding	2.64	2.81	2.69	3.20	.3385
Policy requirements	2.79	2.85	2.44	2.21	.0538
Computer resources	2.50	2.52	2.81	2.96	.1106
Incentives/rewards	1.49	1.75	1.17	1.28	.0001***

Significance Level:

.001	***
.010	**
.050	*

B. External Factors

External Factors	UKSM	NZSM	UKOR	NZOR	Prob
Rate of change	3.03	3.15	2.36	2.52	.0000***
New approaches	2.76	3.15	2.56	2.72	.0022**
Availability of training	2.72	2.90	2.71	2.60	.5470
World-leading organisations	2.52	2.91	1.90	2.12	.0000***
Society seminars/conferences	2.42	2.47	2.18	2.28	.1584
Consultants	2.22	2.47	2.05	2.04	.0460*
University/polytech courses	2.15	2.26	1.89	2.28	.0944
Others in industry	2.03	2.02	2.19	2.28	.5003
Competitors	2.04	1.79	1.79	1.88	.3121

C. Personal Factors

Personal Factors	UKSM	NZSM	UKOR	NZOR	Prob
My knowledge	3.90	3.80	3.79	3.68	.7155
Skills and proficiencies	3.57	3.68	3.58	3.52	.8295
My previous experience	3.63	3.47	3.50	3.48	.7067
Willingness to try new tools	3.63	3.58	3.34	3.20	.0904
Analytical preferences	3.51	3.45	3.39	2.92	.1175
Processing ability	3.24	2.86	3.20	3.04	.0631
Training courses attended	2.62	2.54	2.11	2.44	.0020**
Educational qualifications	2.00	2.10	1.78	2.40	.0389*

D. Tool Characteristics

Tool Characteristics	UKSM	NZSM	UKOR	NZOR	Prob
Information produced	4.28	4.38	4.11	4.28	.1470
Availability of data	3.81	3.91	3.90	4.15	.4716
Ease of understanding/use	3.96	3.95	3.61	3.56	.0115*
Time to do the analysis	3.76	3.63	3.69	3.54	.6778
Skills required	3.62	3.83	3.61	3.73	.2920
Costs to do the analysis	3.31	3.21	3.12	3.46	.4077
Method of analysis	3.24	3.23	3.07	3.27	.5042
Updating frequency	3.13	3.06	2.83	2.96	.1688
Computing requirements	2.58	2.68	2.76	3.19	.0896

Appendix XXII Tool Selection Factor Frequencies

This appendix contains the sample proportions and the factor type proportions for each of the tool selection factors (identified by content analysis of the interviews) grouped into the four general factor types: Organisational, External, Personal and Tool Characteristics.

A. Organisational Factors

Organisational Factors	Abbrev.	UKOR		UKSM	
		Sample %	Factor %	Sample %	Factor %
Nature of business/area	Nature	0	0	36.0	7.83
Strategic position	StrPos	0	0	14.0	2.61
Life Cycle	LifeC	0	0	14.0	1.74
Parent organisation	Parent	0	0	7.0	2.61
Internal policies	Policy	45 ¹⁼	9.43	50.0 ²⁼	6.96
External regulatory rq	Reg	0	0	21.0	6.96
Incentive/reward systems	Incent	0	0	0	0
Level of management involved	Level	18.0	3.77	36.0	5.22
Communication	Commu	0	0	14.0	3.48
Participation/involvement	Part	0	0	14.0	1.74
Learning	Learn	9.0	1.89	21.0	3.48
Culture	Cult	27.0	9.43	29.0	4.35
Attitude to change	Change	45.0 ¹⁼	11.32	43.0 ⁴	6.96
Attitude to innovation	Innov	9.0	3.77	36.0	6.09
Preferences	Pref	36.0 ³⁼	11.32	57.0 ¹	6.96
Top Management preferences	TMPref	9.0	3.77	14.0	3.48
Top Management understanding	TMUnd	36.0 ³⁼	9.43	29.0	6.96
Expertise/skills available	Expert	45.0 ¹⁼	16.98	50.0 ²⁼	11.30
Staff available	Staff	0	0	21.0	2.61
Training staff available	TStaff	18	5.66	7.0	0.87
Computer resources	CompAv	36.0 ³⁼	9.43	7.0	0.87
Systems	Sys	0	0	7.0	0.87
Funding available	Fund	9	1.89	7.0	1.74
Time available	Time	9	1.89	21.0	4.35

B. External Factors

External Factors		UKOR		UKSM	
	Abbrev.	Sample %	Factor %	Sample %	Factor %
Others in our industry	Others	27.0 ⁴	11.1	29.0 ²⁼	8.16
Competitors	Compet	0	0	21.0	8.16
World leaders	World	0	0	0	0
Experts	Experts	36.0 ²⁼	14.81	14.0	8.16
Consultants	Conslt	36.0 ²⁼	14.81	57.0 ¹	32.65
Society seminars/conferences	SocSem	0	0	14.0	6.12
Univ/polytech courses	Univ	9.0	3.70	14.0	6.12
Journals/books	Journals	0	0	29.0 ²⁼	8.16
Training courses available	Traing	9.0	3.7	7.0	2.04
Info on new developments	NewDev	73.0 ¹	40.74	21.0	14.29
New computing developments	NewCo	18.0	11.11	0	0
External databases	Database	0	0	7.0	2.04
Rate of change in environment	RateOC	0	0	14.0	4.08

C. Personal Factors

Personal Factors		UKOR		UKSM	
	Abbrev.	Sample %	Factor %	Sample %	Factor %
Knowledge	Knowlg	27.0 ³⁼	7.69	14.0	6.82
Educational qualifications	EdQual	18.0	7.69	36.0 ¹⁼	20.45
Training courses attended	TCours	0	0	7.0	2.27
Continuous learning	ContL	18.0	5.13	14.0	4.55
Understanding	Under	9.0	2.56	0	0
Processing ability	Process	0	0	0	0
Skills and proficiencies	SkProf	27.0 ³⁼	7.69	7.0	2.27
Experience	Exper	55.0 ²	17.95	36.0 ¹⁼	13.64
Analytical preferences	Anal	0	0	14.0	4.55
Preferences	Pref	64.0 ¹	33.33	36.0 ¹⁼	15.91
Willingness to try new tools	Willing	9.0	2.56	7.0	2.27
Expectations	Expect	9.0	2.56	14.0	9.09
Viewpoint	View	18.0	7.69	7.0	4.55

D. Tool Characteristics

Tool Characteristics		UKOR		UKSM	
	Abbrev.	Sample %	Factor %	Sample %	Factor %
Process:					
Purpose	Purpose	27.0	0.70	21.0	1.21
Assumptions	Assumpt	18.0	0.35	7.0	0.60
Key factors	KeyF	45.0	1.40	14.0	0.91
Input required	Input	18.0	0.70	29.0	1.51
Analysis	Analysis	27.0	0.53	29.0	2.42
Method	Method	27.0	0.53	43.0	1.81
Approach	Approac	18.0	0.35	14.0	1.51
Process involved	Process	73.0	4.56	43.0	3.32
Output produced	Output	82.0	4.21	57.0	6.65
Provides structure	Struct	73.0	3.68	36.0	2.42
Helps focus attention	Focus	45.0	1.75	29.0	1.21
Stimulates thought	Thought	27.0	1.05	0	0
Builds picture	Picture	27.0	0.53	14.0	0.91
Identifies issues	Issues	27.0	0.88	21.0	1.21
Provides insight	Insight	27.0	0.53	7.0	0.30
Stores ideas	Storage	9.0	0.35	0	0
Enables 'what if' analysis	What if	36.0	0.70	0	0
Generates consensus	Consen	9.0	0.18	0	0
Generates commitment	Commit	18.0	0.53	0	0
Provides summary	Summar	0	0	7.0	0.30
Translates into action	Action	9.0	0.18	0	0
Delivery mechanism	DelM	9.0	1.05	0	0
Present information	Present	27.0	0.53	0	0
Resources:					
AV equipment	AV	18.0	0.35	7.0	0.30
Computer requirements	CompR	55.0	2.11	7.0	0.30
Data availability	Data	27.0	0.88	36.0	4.23
Cost	Cost	27.0	1.05	14.0	1.21
Staff required	Staff	36.0	0.88	14.0	0.60
Time required	Time	55.0	3.16	29.0	3.02
Skills/expertise required	Skills	73.0	2.11	14.0	1.21
Facilitator required	Facil	9.0	0.35	0	0

D. Tool Characteristics *continued*

Tool Characteristics	Abbrev.	UKOR		UKSM	
		Sample %	Factor %	Sample %	Factor %
Use:					
Ease of use	Use	45.0	0.88	36.0	1.81
Easy to develop	Develop	9.0	0.35	0	0
Frequency of use	Freq	64.0	2.98	43.0	3.93
Demand for use	Demand	18.0	0.35	7.0	0.30
Personal use only	PerUse	9.0	0.35	0	0
Motivation for use	Motiv	9.0	0.18	0	0
Participation	Part	9.0	0.70	14.0	0.60
Updating frequency	Up-freq	0	0	0	0
Updating ease	Up-ease	9.0	0.18	7.0	0.30
Documentation	Docume	9.0	0.18	0	0
Combination with others	Combin	55.0	1.93	29.0	1.51
Complementary	Compl	9.0	0.18	0	0
Adaptation	Adapted	45.0	2.11	21.0	1.21
Customised	Custom	36.0	1.75	14.0	0.91
Available for use	Avail	27.0	1.23	0	0
Accessible for use	Access	9.0	0.70	0	0
Users:					
Experience	Exper	45.0	1.93	36.0	3.02
Confidence	Confid	18.0	0.35	0	0
Sophistication	Soph	27.0	0.70	21.0	0.91
Credibility	Cred	18.0	0.53	7.0	0.30
Marketability:					
Known/familiarity	Known	73.0	2.28	50.0	2.72
Acceptance	Accept	45.0	1.75	29.0	2.11
Ease of understanding	EaseU	91.0	4.04	29.0	2.42
Easy to explain	Explain	45.0	1.58	21.0	2.42
Easy to sell	ESell	36.0	1.05	7.0	1.21
Able to communicate the results	Commu	45.0	0.88	21.0	0.91
Easy to relate to	Relate	18.0	0.53	7.0	0.30
Able to win confidence	Confid	18.0	0.70	0	0

D. Tool Characteristics *continued*

Tool Characteristics	Abbrev.	UKOR		UKSM	
		Sample %	Factor %	Sample %	Factor %
Content:					
Applicability	Applic	45.0	0.88	29.0	1.51
Capability	Capab	9.0	0.18	7.0	0.30
Simplicity	Simple	55.0	1.58	36.0	3.93
Complexity	Complex	55.0	2.81	43.0	2.42
Technicality	Tech	36.0	1.23	0	0
Generality	General	0	0	7.0	0.30
Dynamism	Dynamic	36.0	0.70	21.0	1.51
Integrative	Integ	9.0	0.18	0	0
Interactive	Inter	36.0	1.58	14.0	0.60
Visual	Visual	27.0	1.40	7.0	0.30
Transparent	Transp	18.0	0.53	0	0
Black Box	BBox	36.0	0.70	7.0	0.60
Flexibility	Flex	27.0	0.88	29.0	1.21
Modifiable	Modif	27.0	1.05	0	0
Transferability	Transfer	9.0	0.53	0	0
Interpretive	Interp	0	0	7.0	0.91
Subjectivity	Subject	0	0	21.0	0.91
Objectivity	Object	9.0	0.18	7.0	0.60
Systematic	System	9.0	0.18	0	0
Validity	Valid	45.0	1.58	7.0	0.91
Auditability	Audit	9.0	0.35	0	0
Deterministic	Deter	9.0	0.35	0	0
Probabilistic	Probab	18.0	0.35	0	0
Quantitative	Quant	9.0	0.53	29.0	1.51
Qualitative	Qual	27.0	0.53	0	0
Theoretical	Theory	18.0	0.88	0	0
Pragmatic	Prag	18.0	0.35	0	0
Scope	Scope	18.0	1.40	7.0	0.30
Size	Size	36.0	0.53	7.0	0.30
Sampling	Sampl	9.0	0.35	0	0
Aggregation level	Aggreg	27.0	0.70	21.0	0.91

D. Tool Characteristics *continued*

Tool Characteristics		UKOR		UKSM	
	Abbrev.	Sample %	Factor %	Sample %	Factor %
Perceived Attributes:					
Comfortable	Comfort	9.0	0.35	14.0	0.60
Fashionable	Fashion	0	0	7.0	0.60
Helpful	Helpful	0	0	7.0	0.60
Practical	Practical	9.0	0.70	0	0
Useful	Useful	55.0	2.46	36.0	4.83
Value added	ValueA	18.0	0.35	29.0	1.81
Workable	Work	36.0	0.88	14.0	1.21
Effective	Effect	9.0	0.18	0	0
Powerful	Power	18.0	1.05	7.0	0.30
Successful	Success	36.0	1.23	7.0	0.30
Relevant	Relevant	9.0	0.18	21.0	0.91
Fun/enjoyment	Fun	9.0	0.53	7.0	0.30
Learning:					
Learning curve	LCurve	9.0	0.35	7.0	0.30
Learning time	LTime	27.0	0.88	21.0	2.72
Ease of learning	EaseL	9.0	0.18	14.0	0.91
Learning approach	LAppr	18.0	0.53	0	0
Knowledge gained	Knowl	27.0	1.23	21.0	1.51

Appendix XXIII SM Process Phase Comparisons

This appendix contains the Chi square results for the tool user proportions from all all four surveys for all of the strategic tasks in the three SM process phases.

Tool Use in Phase 1: Situation Analysis

A. Organisational Analysis

Organisational Area	UKSM	NZSM	UKOR	NZOR	Prob.
Mission	59.8	69.7	16.1	12.0	.0000
Objectives	75.6	84.3	25.0	24.0	.0000
Strategy	88.1	89.6	44.2	32.0	.0000
Organisation structure	51.6	57.8	16.7	12.0	.0000
Top management style	39.8	46.9	8.1	0	.0000
Culture	43.8	50.4	7.3	0	.0000
Resources:					
Financial resources	82.4	80.2	47.7	48.0	.0000
Human resources	53.8	62.7	34.8	12.0	.0000
Marketing/distribution	68.1	65	46.6	24.0	.0000
Production/operations	48.5	57.5	57.7	68.0	.2013
Physical resources	27.8	38.9	38.3	36.0	.2329
Information systems	49.6	59.1	32.8	25.0	.0001
Administrative systems	34.9	47.3	16.8	8.0	.0000
Intangible resources	16.4	15.7	2.5	12.0	.0025
Research & develop	35.2	37.4	19.2	29.2	.0095

Significance level:

.001	***
.010	**
.050	*

B. Environmental Analysis

Environmental	UKSM	NZSM	UKOR	NZOR	Prob.
Operating Environment					
Industry	67.2	64.8	19.1	12.5	.0000
Markets	75.2	69.4	32.6	29.2	.0000
Competitors	78.3	61.0	28.9	16.7	.0000
Customers	71.1	69.9	37.3	36.0	.0000
Suppliers	35.6	38.7	16.2	20.8	.0003
Stakeholders	30.0	39.1	8.7	4.2	.0000
Remote Environment					
Economic trends	61.9	62.7	29.2	24.0	.0000
Govt/political factors	46.6	55.6	15.5	12.0	.0000
Legal developments	33.1	38.1	8.7	0	.0000
Social trends	47.7	49.1	19.2	16.7	.0000
Technological change	52.3	58.8	19.2	16.7	.0000

Tool Use in Phase 2: Strategic Analysis

Task	UKSM	NZSM	UKOR	NZOR	Prob.
Generate alternative strategies	70.0	72.0	40.9	40.0	.0000
Evaluate alternative strategies	74.6	76.9	68.4	73.1	.4602
Select a specific strategy	62.5	71.7	45.7	57.7	.0007

Tool Use in Phase 3: Strategic Implementation

Task	UKSM	NZSM	UKOR	NZOR	Prob.
To develop plans to implement the strategy	52.5	68.8	24.6	20.0	.0000
To assist with implementation of the strategy	50.4	56.5	21.2	29.2	.0000
To monitor/review the strategic performance	67.9	70.7	35.1	30.4	.0000