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# Mental models, cognitive style, and organisational learning : the development of shared understanding in organisations

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# **Mental Models, Cognitive Style, and Organisational Learning: The Development of Shared Understanding in Organisations**

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**This Thesis is submitted to the  
University of Plymouth in partial  
fulfilment for the degree of**

**Doctor of Philosophy**

**Human Resources Study Group,  
Group for Organisational Learning & Development,  
& Department of Business, Economics and Management  
University of Plymouth Business School**

**February 2000**

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**ABSTRACT:**  
**Mental Models, Cognitive Style, and Organisational Learning:**  
**The Development of Shared Understanding in Organisations**  
**David Philip Spicer**

Organisational learning is seen by many to be a key determinant of organisational performance. This is demonstrated by the growth of the 'learning company' concept (Pedler *et al.* 1991), and by the suggestion that the ability to learn faster than one's competitors is the only sustainable competitive advantage (DeGeus 1988). Consequently, organisations need to integrate and maximise the knowledge and learning of their individuals, and central to the learning process in firms is an effective means of transferring knowledge and learning between individuals and their organisation as a whole. Mental models (individual and shared) have been postulated as a mechanism through which this occurs (Senge 1990a; Kim 1993; Hayes and Allinson 1998). An individual mental model can be characterised as a simplification or representation of understanding of an idea, notion, process or system which provides the cognitive framework in which that individual's knowledge in respect of that issue is stored, whilst shared (group or organisational) mental models can be characterised as the common elements that exist between individual mental models. Both of these have been theoretically linked with individual and organisational learning.

Literature in respect of individual and organisational learning, mental models and a third issue cognitive style is reviewed. Cognitive style represents the way individuals obtain, store and operationalise knowledge, and is included here as it is recognised as potentially affecting how learning and mental models interact (Hayes and Allinson 1998). A research model is posited which integrates key theory in respect of these three concepts, and research undertaken in two phases is presented. Phase One focused upon the representation of individual and shared mental models through semi-structured causal interviews with senior managers in participant organisations, whilst Phase Two involved organisation wide surveys of these models, aspects of learning and cognitive style. Results obtained suggest that the complexities of an organisation, its environment, learning and mental models all mitigate against the identification of a simple relationship between these constructs. However some of the sources of these complexities are identified and suggested, and it is posited that the progression of work addressing organisational learning would best be served through a case study approach addressing the sources of complexity and effectiveness of learning in relation to specific mental models and within organisations.



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## AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

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A programme of advanced study was undertaken. This included modules from the University of Plymouth's M.Sc. in Social Research, and Staff Development Programme. Specialist training in the use and application of cognitive mapping was also undertaken.

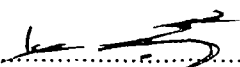
The research contributed to seminar programmes in the Business School and the Group for Organisational Learning Development at the University of Plymouth. Papers have been prepared for publication throughout the research and a number of these were presented by the author whilst attending conferences in the research's fields.

### PUBLICATIONS:

- Linking Mental Models and Cognitive Maps as an Aid to Organisational Learning
- Characterising Mental Models in Organisations: A Cognitive Mapping Approach
- Cognitive Style and Levels of Learning (with E. Sadler-Smith)
- Shared Mental Models and Levels of Learning (with E. Sadler-Smith)
- The *Cognitive Style Index*: A Replication & Extension (with E. Sadler-Smith & F. Tsang)

### CONFERENCES ATTENDED:

- Maintaining Organisational Effectiveness Conference, Edge Hill University College, Ormskirk, Lancashire, June 18<sup>th</sup> 1997
- Second Maintaining Organisational Effectiveness Conference, Edge Hill University College, Ormskirk, Lancashire, June 17<sup>th</sup> 1998
- Third Annual Learning Styles Conference, Sunderland Business School, June 29-30<sup>th</sup> 1998
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# CHAPTER ONE

## Introduction

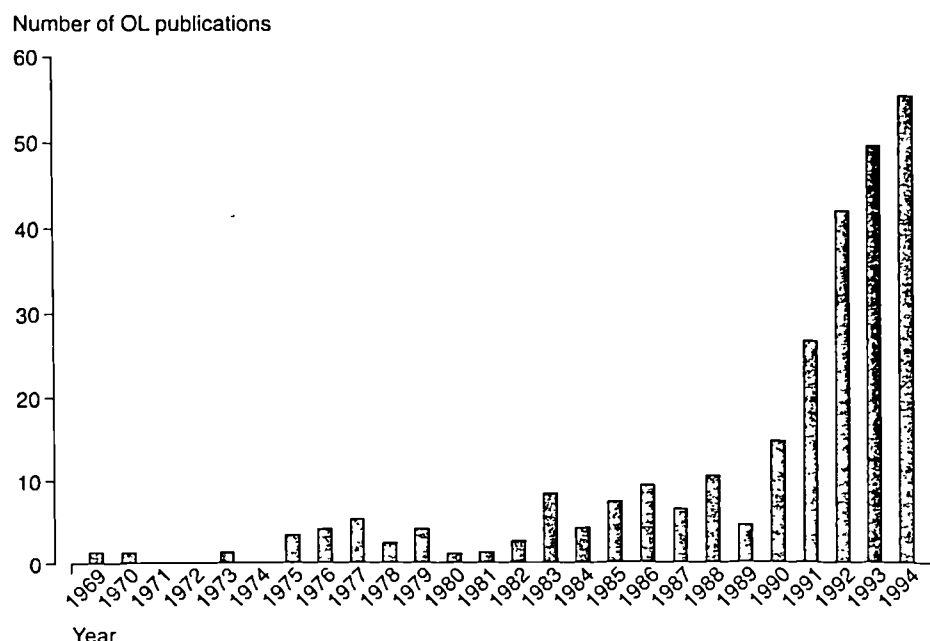
### 1.1 OUTLINE

Learning is of critical importance. It is through learning that entities, be they individuals or organisations, adapt and develop, and without the ability to learn, those entities are unlikely to survive. In studies of organisation, the need for and importance of learning has gained growing recognition as a result of the increased competitive pressures placed upon organisations acting in a rapidly changing global environment (DeGeus 1988), and whilst the concept of organisational learning has been recognised explicitly since the 1960s (Cangelosi and Dill 1965), it has reach new heights of pre-eminence in the last decade. Nevertheless, there is a paucity of effective investigation into organisational learning (Rahim 1995; 1997), which this research seeks to address. More fundamentally, the research looks at individual and shared mental models in organisations and the roles and relationships these have with learning at both the individual and organisational levels. In this interaction, the impact of one other key variable is considered: cognitive style.

#### 1.1.1 Learning

The importance of learning for survival that extends from the Darwinian model of evolution has already been stated above, as has its importance in studies of organisation. Indeed, organisational learning has elements that can be traced back to F.W. Taylor's scientific management and the ideas of Henry Ford (Dodgson 1993), and its origins can even be tracked back to Copernicus in the 16<sup>th</sup> century (Mirvis 1996). It is a concept which is widely argued as critical to the survival and success of organisations (de Geus 1988; Stata 1989; Senge 1990a; Dodgson 1993; Garvin 1993), and can be described as "the development of new organisational capabilities" (Kim and Senge 1994: 277).





**Figure 1.1: Organisational Learning Publications** (*Source: Crossan & Guatto 1996: 108*)

The growth in the pre-eminence of organisational learning is widely seen as resulting from organisations' desires to be better able to perform in highly competitive environments (see for example, Easterby-Smith 1990; Prahalad and Hamel 1990; Iles 1994; Kim 1993a; Leitch, Harrison, Burgoyne & Blanter 1996; Mayo 1993). It has also been suggested that the adoption of Japanese styles of management in the USA and Europe has also contributed to the growth and popularity of the concept. The increase in the currency of organisational learning has been effectively demonstrated by Crossan and Guatto (1996) who undertook a search of the Social Science Citations Index, ABI/Inform and Psychlit databases using the keywords 'organisational learning' and 'learning organisation.' Their research profile, in terms of numbers of organisational learning publications by year is shown in Figure 1.1. This demonstrates a growth in organisational learning publications which vastly outstrips the general growth in management publications (Table 1.1).

	<i>Percentage growth in general publications</i>	<i>Percentage growth in organisational learning publications</i>
1960-69	53	153
1970-79	66	163
1980-89	37	636

**Table 1.1: Growth in Average Yearly Publications** (*Source: Crossan & Gualto 1996: 108*)

Despite the growth of interest in and writing about organisational learning, there has been a long standing and consistent failure in the literature to report empirical research identifying and describing the process of learning in organisations (Rahim 1995; 1997; Tsang 1997). Reasons for this failure centre around the complexity of the environment in which learning operates (Crossan, Lane, White and Djurfeldt 1995; Miner and Mezias 1996; Easterby-Smith 1997), and further confusion is engendered by researchers failing to adequately differentiate between concepts, such as ‘organisational learning’ and the ‘learning organisation.’ These are discussed in Chapter Five. This research identifies with organisational learning and not the learning organisation in developing its understanding of learning. This means that this research chooses to explore the learning process in organisations, rather than the characteristics of organisations open to learning. Process is important because it is only through understanding the mechanism of learning that effective learning can be created and maintained. In developing this understanding, learning is seen as a process of ‘transformation through experience’ (Kolb 1984).

The understanding of the learning process developed identifies learning in organisations as occurring at two levels: the individual; and the organisation. Whilst organisational learning is the primary focus of this research, individual learning is considered in detail in recognition of its espoused importance to the learning process in organisations (Shrivastava 1983; Huber 1991; Kim and Senge 1994; Easterby-Smith 1996; Kleindl 1997; Spicer 1998a). In considering organisational learning, this is taken to refer to any learning that collectively occurs within an organisation, including group and team learning. The implications of this are considered below.

Ultimately this research seeks to explore the relationship between the levels of learning identified (individual and organisation) and the uptake of shared understanding across organisations, and identifies mental models as critical to this process.

### 1.1.2 Mental Models

Mental models represent a concept whose origins be traced back to the 1940s Identified by Craik (1943), as ‘working models’ of particular phenomena in individuals’ minds, they are a concept which has been widely discussed in the psychology literature. Mental models can be characterised, after Johnson-Laird (1983) as simplifications or representations of understanding, which can vary from simple images or pictures in the mind to more complex abstract archetypes built through more detailed understanding. These images can be constructed and held as verbal and visual representations, with the ‘image or picture’ produced through writing and/ or drawing, either alone or in combination.

Whilst mental models have been identified as tools for improving individual learning (see for example: Young 1983; Payne 1991; Hong and O’Neil 1992), and are also recognised implicitly as a central element of the organisational learning process by Argyris and Schon (1978), and Senge (1990a). There is also a considerable body of literature which sees them as an essential mechanism for the transfer and storage of knowledge and understanding between individuals and within organisations (see for example, Stata 1989; Senge; 1990; Simon 1991; Kim 1993b; Hayes and Allinson 1998). Their centrality to this research comes from Kim’s (1993a; 1993b) recognition of an explicit role for mental models in the development of shared understanding in organisations. Individual mental models are personal constructs which that instigate understanding, affect behaviour, and drive action. Kim describes a shared construct (shared mental models) which represents the common understandings that exist in organisations, and link and allow for interaction between individual mental models. Conceptualised thus, shared mental models have been hypothesised both as mechanisms for facilitating the process of learning in organisations and as constructs developed and maintained through that selfsame learning process (Senge 1990a; Kim 1993a). This research therefore seeks to explore how individual and organisational learning interact with shared mental models. In doing so, one further key variable is identified: cognitive style.

### 1.1.3 Cognitive Style

Cognitive style is a fundamental personal construct which defines the way individuals obtain, store and operationalise knowledge (Hayes and Allinson 1998). It represents “consistent individual differences in preferred ways of organising and processing

information and experience” (Messick 1976: 5). As a construct it is widely described as a bi-polar dimension, the extremes of which identify dominant styles in terms broadly ‘wholist/ intuitive’ and ‘analytical’ descriptors (Riding 1991; Allinson and Hayes 1996; Riding and Rayner 1998).

Cognitive style is recognised as affecting individuals’ workplace behaviour, and their ability to perform in a range of tasks and scenarios (Driver 1987; Struefert and Nogami 1989). Cognitive style can thereby influence the ways in which individuals engage in learning (Chaharabaghi and Newman 1996; Hayes and Allinson 1998), interact when learning together (Kiron and DeCiantis 1989; Riding 1991; 1994; Sadler-Smith 1998a) and affect the uptake and inclusion of knowledge into mental models (Kim 1993b; Hayes and Allinson 1998). Consequently it can have significant influences upon the learning process.

#### **1.1.4 The Research Need**

A major reason given for the lack of empirical research identified above is the complexity of learning in an organisational environment (Crossan, Lane, White and Djurfeldt 1995; Miner and Mezias 1996; Easterby-Smith 1997), which makes the establishment of any single integrating theory of organisational learning a major barrier to empirical research. Nevertheless, both Easterby-Smith (1997) and Huber (1991) call for research which integrates ideas from differing disciplines and perspectives and works cumulatively, building upon past and existing research, and Miner and Mezias (1996) also posit that the net must be cast wider for ideas and theories to contribute to a model of learning. There is also a question of ‘where to start?’, given variety of gaps in learning research identified (e.g. Rahim 1997; Lahteenmaki, Mattila and Toivonen 1998).

The starting point for this research came from Kim’s (1993a; 1993b) call for research into the relationships between shared mental models and individual and organisational learning. This has been extended to incorporate consideration of cognitive style which is recognised as influencing both mental models and learning at the individual and organisational levels (Hayes and Allinson 1998; Sadler-Smith 1998a). Relationships between the key issues identified (mental models, individual and organisational learning, and cognitive style) will be explored below.

## 1.2 THESIS STRUCTURE

This report falls into four broad sections. The first of these (Chapters Two to Five) reviews literature relating to the concepts identified above. The second (Chapters Six to Eight) details the research model, hypotheses and research questions, the philosophy driving the research, and the approaches adopted to undertake this research. The third section (Chapters Nine through Fourteen) reports results of this research in four organisations, and this report ends with a fourth section and final chapter which identifies the strengths and weaknesses of the research and those conclusions which can be drawn from it. The contents of these succeeding chapters are described briefly below.

Individual learning is taken as the starting point (Chapter Two), and a definition of learning appropriate to the current study is outlined. This sees learning as a process in which knowledge is created through experience so that individuals may be better able to take effective action. This definition clearly links this research with the notion of learning as an experiential process (Kolb 1994), and the experiential model is consequently described. The notions of simple and complex levels of learning are also introduced.

Cognitive style is considered in Chapter Three. Its relationship with learning style is described, and cognitive style and the allied concepts of cognitive strategy and cognitive ability are considered. Three key models of cognitive style prevalent in the literature and the tools for assessing cognitive style linked with them are discussed: Intuition-Analysis (Allinson and Hayes 1996); Adaption-Innovation (Kirton 1989); and Wholist-Analytical/Verbaliser-Imager (Riding 1991). The chapter concludes by outlining the role of cognitive style in this research.

Chapter Four discusses mental models. This concept is defined and the theory supporting it is discussed. The notions of individual mental models consisting of 'frameworks' and 'routines', and shared mental models of '*weltanschauung*' and 'organisational routines' are introduced (Kim 1993a; 1993b), and the relationships between learning, mental models and cognitive style are discussed. Techniques available for the study of mental models in organisations are also considered. The chapter concludes by looking at a number of examples of research into mental models.

Organisational learning is discussed in Chapter Five, which begins by reviewing the definition of learning arrived at in Chapter One against the wealth of definitions of organisational learning evident in the literature. Relationships between the concepts of

organisational learning and the learning organisation are also described. Subsequently, typologies of learning are considered, and the two-level models of learning identified at the individual level are discussed in an organisational context. From these a single typology appropriate to the study of organisational learning as a developmental and experiential process is outlined. Following this, two key models of the organisational learning process are identified and explored alongside the range of alternative models available in the literature. Kim's (1993b) *OADI-SMM* Cycle of Organisational Learning is identified here as the most complete and complex model currently available. The complexity of the learning process in organisations is discussed, as are the importance of unlearning and incomplete learning. The chapter then considers the assessment of and research into organisational learning, and concludes by presenting an integrating perspective on organisational and individual learning, mental models and cognitive style.

Chapter Six summarises the literature reviewed, and describes a model upon which the subsequent operational research is focused. This represents a development of Kim's (1993b) *OADI-SMM* Cycle, but is described and constructed here from first principles, and seeks to integrate the theory and concepts identified as significant from the literature. In doing so, the research model aims to address the criticisms made of earlier models.

The design and methods of the research are described in Chapters Seven and Eight. In Chapter Seven, the research need is reviewed, and the philosophical approach informing the methodology is presented. Aims and objectives for the research are outlined, and specific research questions and hypotheses are developed from these. Two phases of research are identified. The first focused on the elicitation and representation of individual and shared mental models of specific issues at the management level in organisations. The second phase builds upon this, consisting of questionnaire surveys assessing the uptake of the shared mental models, the extent and nature of individual and organisational learning, and cognitive styles across these organisations. The reasons for the approaches adopted in realising both these phases are also discussed in Chapter Seven, as is the nature and recruitment of the organisations who participated in the research. Details of the methods adopted for realising both phases of this research are discussed in depth in Chapter Eight.

Results are presented in Chapters Nine through Fourteen. Results from the four organisations which participated in Phase One of the research are presented in Chapters Nine to Twelve. Results and analyses from the two organisations which participated in Phase Two are presented in Chapters Thirteen and Fourteen.

The final chapter (Fifteen) draws conclusions from this research, and begins by reviewing the results obtained. The extent of the evidence for or against the research questions and hypotheses is also identified, and the outcomes and overall conclusions from the research are described. Implications for the research model described in Chapter Six are also considered. This final chapter itself concludes by reviewing the problems and limitations of the research and the directions in which future research may progress.

### **1.3 SUMMARY**

This research looks at the development of shared understanding in organisations. This has been characterised above as occurring through shared mental models. Through the investigation of the relationships between individual and shared mental models, cognitive style, and individual and organisational learning undertaken below, it is hoped that some insight may be gained into the development of shared understanding in organisations and the process of learning in organisations which drive it. This chapter has introduced the research. Key concepts identified as important have been outlined and the need for this research has been detailed. The content and structure of this thesis was also described.

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## CHAPTER TWO

# Individual Learning

### 2.1 INTRODUCTION

Webster's dictionary (1996: 726) defines learning as "the act of acquiring knowledge or skill." Learning has been widely studied yet, we know relatively little about the mechanics of the learning process (Kim 1993a). In particular, many researchers fail to recognise the role of individuals in organisational learning (Hedberg 1981; Huber 1991; Kim 1993b; Torres 1994; West 1994a). Consequently, two key levels of learning have been identified in this research, the individual and the organisation. Organisational learning is considered in Chapter Five, individual learning is discussed below. However, this chapter does not intend to provide a comprehensive review of individual learning theory and research, but rather to develop an understanding of individual learning appropriate to the model and arguments developed in subsequent chapters. As a first step, a definition of the term 'learning', appropriate to the current study is outlined. The chapter then identifies the schools of thought which are used to explain and understand learning. The notion of learning existing at two key levels, which could be described in the most general terms as 'simple' or 'complex', is then introduced, and subsequent to this a number of key models of learning process are described. The chapter concludes by looking at individual learning in an integrated way and identifies individual learning's role in organisational learning.

### 2.2 DEFINING LEARNING

The dictionary definition of learning used above hides the complexity behind this common and widely used term (Aitchinson 1987; Johnson-Laird 1983). According to Catania (1984) the word's root '*leis*' is Indo-European, and means a track or furrow. This links with the idea that the process of learning is a path or journey (Burdett 1993; West 1994b). However, an actual definition of learning is much harder to come by, with many of the definitions of the term being highly context specific (Estes 1982).



Attempts to provide an all encompassing definition of learning still exist. Daudelin (1996: 1) for example, sees “learning as the creation of meaning from past or current events that serves as a guide for future behaviour.” Catania (1984: 3), defines learning as a “relatively permanent change in behaviour resulting from experience.” It is however unclear what is meant by ‘meaning,’ ‘behaviour,’ ‘experience,’ or ‘relatively permanent,’ but these and other examples do suggest that a central tenet of learning is some form of change. Yet, the form this change takes is also unclear (Bateson 1973), and it is possible to recognise that learning can occur without obvious or noticeable behavioural change. A potentially more appropriate definition might be Kolb’s (1984: 38) in which learning is seen as “the process whereby knowledge is created through the transformation of experience.” This definition represents an improvement, as it has moved away from defining learning in terms of outcomes towards the idea that learning is a process driven by experience. This notion is widely recognised in the literature on learning in organisations, and is important in that it offers a “holistic integrative perspective on learning that combines experience, perception, cognition and behaviour” (Kolb 1984: 21).

One limitation of Kolb’s definition is that it does not identify whether learning is effective nor what benefit the learning is likely to be. It can be argued that learning which does not increase effectiveness could be, at least in an organisational context, pointless (Freidlander 1983; Hawkins 1994). When no benefits are accrued, the time (and hence cost to an organisation) spent learning by an individual is wasted. Learning can also be dysfunctional, leading to the loss of benefits. Estes (1982: 170) provides a definition which recognises this need for increased effectiveness: “learning... refers to the way organisms profit by experience so as, on the average at least, to increase adaptability to their environment.” As does Kim (1993b: 38) who sees learning “as *increasing one’s capacity to take effective action*,” (*sic*). This need for developmental change as part of the learning process has also been recognised by Piaget (1970), Catania (1984) and Senge (1990a).

This study identifies with Kolb’s (1984) model of learning as a process driven by experience, but also recognises that learning is only of benefit if it ultimately leads to improvements in the ways individuals, groups and organisations work (Estes 1982; Kim 1993b). Consequently, the definition which will be used in this study is developed from both the work of Kolb (1984) and Kim (1993b):

*Learning is the process whereby entities create knowledge through the transformation of experience in order that they may increase their capacity to take effective action.*

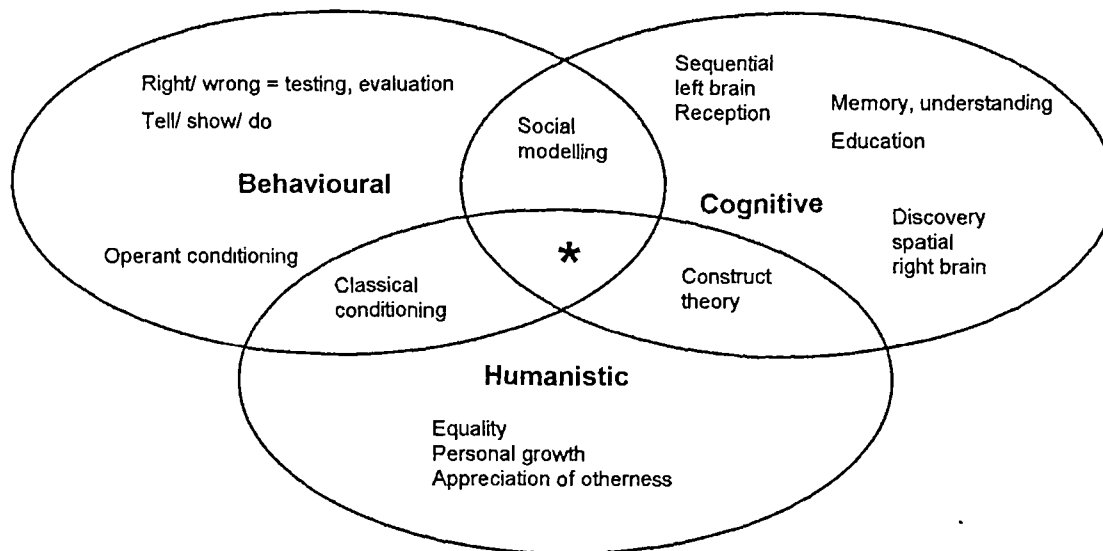
This new definition recognises that learning is a process of change through experience, but accepts that to be truly effective it has to be directional, leading to improvement. The value of the definition stems from the fact that it recognises learning to be a positive and constructive process which is of benefit to an individual or organisation. Additionally, it is a definition which can be applied to both organisations and individuals (the term entity can be taken to mean either), and it will be returned to when looking at organisational learning (Chapter Five). However, this definition does not, explain how learning occurs and the mechanics of the learning process are looked at below.

### **2.3 LEARNING THEORY: A TYPOLOGY**

A wide variety of theories on learning, exist, and whilst it is not the intention of this research to review all of these, it is possible to identify common elements which link them. Greeno (1980) identifies the historical development of learning theory from models focused on 'change in behaviour' through work on the 'organisation of knowledge' to theories based on the 'acquisition of knowledge,' and learning theory can be represented as three schools of thought which characterise these stages. These three philosophies are behavioural, cognitive and humanist in approach and are summarised in Figure 2.1.

Behavioural theories link learning directly to behavioural outcomes, seeing learning as a process where individuals develop and reinforce particular responses to environmental conditions through a system of rewards (both intrinsic and extrinsic), supposedly without a conscious mind intervening (Hendry 1996).

Cognitive theory covers learning where individuals form plans and images based on their needs, motives, values and beliefs about themselves (Hendry 1996). These guide behaviour, and are modified through feedback obtained from their operationalisation. Under cognitive theory, learners might not necessarily be consciously aware of their knowledge (Lee 1996). Cognitivists also recognise individuals ability to transfer learning from one situation to another, so that learning appears to be cumulative (Howe 1980).



**Figure 2.1: Aspects of Learning: A Typology** (Source: Lee 1996: 241)

The humanistic dimension is not always recognised by researchers seeking to describe schools of thought in learning theory, with some writers seeing learning as consisting of the behavioural and cognitive dimensions only (Hendry 1996; Huczynski and Buchanan 1985). Lee (1996) however, sees humanists as representing a significant development, as they argue that individuals create their own versions of ‘reality’ based upon the ways in which they structure their perceptions and memories of their own unique set of experiences and beliefs about the future (following personal construct theory, Kelly 1955; Daft and Weick 1984). Here learning is seen as “gaining a deeper insight into our view of ourselves as located within our perception of the world” (Lee 1996: 242).

Whilst characterising the scope of learning theory, the aspects of learning identified above, still do not explain the process of learning. Figure 2.1 is best seen as an overview of learning at the individual level. It can also be criticised as being static, whereas, learning, following the definition provided above, is a dynamic and developmental process. Another important limitation of this typology is that it identifies three distinct forms for the learning process. It would be inappropriate to view these as separate entities. Learning in the real world will combine elements from all three schools of thought, and it is likely that truly effective learning will completely integrate all three schools of thought, and as such could be characterised as sitting on the star at the diagram’s centre (Figure 2.1).

## 2.4 LEARNING LEVELS

Moving beyond the aspects of learning described above, amongst researchers there exists a hierarchy of levels of learning, which identify the different forms learning takes. Within these, it is the categorisation of learning as consisting of two levels which is most common, and as a result is considered here. However, it should be recognised that other more complex models exist (e.g. Gagne 1965; Sahakian 1976).

<i>Author(s)</i>	<i>Types of Learning</i>
Argyris & Schon (1978)	single-loop - double-loop
Bateson (1973)	Learning I - Learning II
Corsini (1987)	know-how - know-what
Dodgson (1991)	tactical - strategic
Fiol & Lyles (1985)	lower - higher
Kim (1993a; 1993b)	operational - conceptual
Kim (1993a; 1993b)	know-how - know-why
Miner & Mezas (1996)	incremental - radical
Senge (1990b)	adaptive - generative
Snell & Chak (1996)	adaptation - development
Stein and Vandenbosch (1996)	lower-order - higher-order
Virany, Tushman & Romanelli (1992)	first-order - second-order

**Table 2.1: Types of Learning**

Corsini (1987) provides an example of a two-fold typology, seeing the process of learning at the individual level as one of building knowledge, through the development of 'know-what' and 'know-how,' concepts which equate with Kim's (1993a; 1993b) conceptualisation of the knowledge created by learning consisting of two categories; 'know-why' and 'know-how'. Know-how is the physical ability to produce some action, in essence what people learn, whilst know-why is the ability to explain a conceptual understanding of an experience, in other words, how individuals understand and apply learning. Kim (1993b) links these ideas with the work of others including Argyris and Schon (1978), Piaget (1970) and Kolb (1984). It should be recognised that the development of know-how and know-why are independent and it is possible to create one without the other. For example, it is possible to have excellent 'know-why' (the

knowledge) about football, and become a premier league manager, without ever developing the ‘know-how’ (the skills) to become a premier league footballer. Equally, not all footballers, who have ‘know-how,’ are capable of developing the ‘know-why’ needed to become managers. Kim (1993b) also extends on the ideas of know-how and know-why to incorporate the idea that learning can be both operational and conceptual. Operational learning equates with know-how and “represents learning at the procedural levels, where one learns the steps in order to complete a particular task” (Kim 1993b: 40). Conceptual learning, which equates with know-why, moves beyond operational learning and “has to do with the thinking about why things are done in the first place” (Kim 1993b: 40). Ultimately this could lead to the learner “challenging the very nature or existence of prevailing conditions, procedures, or conceptions” (Kim 1993b: 40). Operational and conceptual learning are concepts that will be returned to in subsequent chapters when looking at the relationships between organisational learning and mental models.

Corsini and Kim are not alone in dividing learning into two types, there exists an array of studies that distinguish different types of learning. Table 2.1, summarises some of these, and this is not an exhaustive list, other alternatives do exist. All of the alternatives presented in Table 2.1 can be matched with Kim’s (1993b) description of learning as operational or conceptual, with each pair describing a split between simple and complex levels of learning. For example, Fiol and Lyles’ (1985) description of ‘lower’ and ‘higher’ levels of learning, Dodgson’s (1991) ‘tactical’ and ‘strategic’ learning types, Senge’s (1990b) adaptive and generative learning and Argyris and Schon’s (1974; 1978) single-loop learning and double-loop learning all equate with operational and conceptual learning in similar ways.

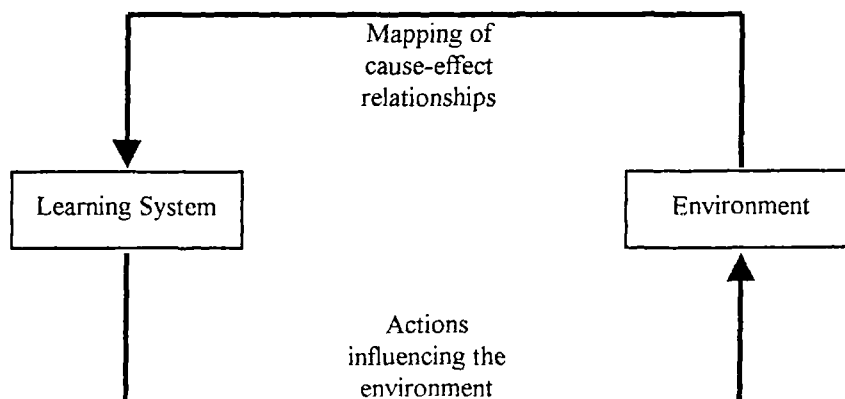
The importance of the types of learning identified is that they help characterise the ways in which individuals learn and whether an individual learns at all. The knowledge that individuals create through learning is both operational and conceptual, and consists of both know-how and know-why. The effectiveness of learning, in part at least, is dependant upon the extent of higher versus lower, or double-loop versus single-loop learning which the individual undertakes. However, as these models are in fact rooted in studies of learning in organisations, they will be returned to in the chapter on organisational learning (Section 5.4).

## 2.5 MODELS OF INDIVIDUAL LEARNING

Moving beyond attempts to describe 'what is meant by learning, there exist a number of models which attempt to describe and define the way in which learning operates at the individual level. Given that the individual has been identified as key to learning in organisations, the starting point for any model of organisational learning must be a model of individual learning. The examples below focus on experiential learning theories, as learning through experience has already been identified as central to the understanding of the learning process in organisations.

### 2.5.1 The Adaptive-Manipulative Learning System

Hedberg (1981: 5) provides one of the simplest models (Figure 2.2), which sees learning as “the processes whereby learners iteratively map their environments and use their maps to alter their environments”. In other words, individuals adapt to their environment, and in turn use their adapted image of that environment to manipulate it. For learning to occur in this way, feedback from the environment is required. The adaptive-manipulative cycle implies that learning requires both change and stability, and whilst this may seem contradictory, it is important to recognise that learning requires a balance. For example, in a highly unstable environment, change can be too rapid, preventing individuals from mapping their environment, and as a result they are unable to adapt.



**Figure 2.2: Learning as an Adaptive-Manipulative Relationship Between a System and its Environment** (Source: Hedberg 1981: 5)

Whilst Hedberg's (1981) model is process-based, and could apply equally well to learning at both the individual and organisational levels, it can be criticised for being overly simplistic, representing at best, a 'black-box' model which does not identify any detail in the learning process. The importance of Hedberg's (1981) model is that it recognises that learning is something that does not occur in isolation, but exists in relationship to the environment in which an individual (or organisation) acts. It also introduces the idea that learning occurs as individuals "map their environment" (Hedberg 1981: 5). The importance of this idea will become evident when mental models are looked at in Chapter Four.

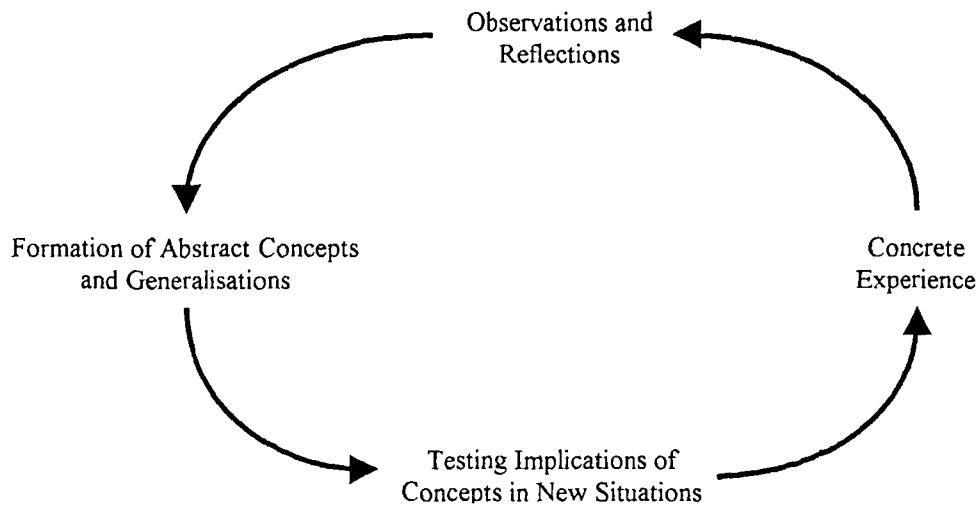
### 2.5.2 Experiential Learning Theories

Arguably the most widely cited models of the learning process in management and organisational behaviour are the experiential learning theories (Burnard 1991; Daudelin 1996). These follow the work of Dewey (1926), Lewin (1951) and Piaget (1970) as developed and used by Kolb (1984). The theory is described, according to Kolb (1984) as 'experiential' for two reasons: (i) to tie it to its intellectual origins in the work of Dewey, Lewin and Piaget; (ii) in recognition of the important role experience plays in the process of learning. This "differentiates experiential learning theory from rationalist and other cognitive theories of learning that tend to give primary emphasis to acquisition, manipulation, and recall of abstract symbols, and from behavioural learning theories that deny any role for consciousness and subjective experience in the learning process" (Kolb 1984: 20). Experiential learning theory is essentially humanistic (see Figure 2.1).

Kolb (1984) identifies three models of the experiential learning process, which can be seen simply, as a continuous process of learning driven by the experiences of an individual:

- The *Lewinian Experiential Model* (Lewin 1951), which is linked to action research theory, and sees learning as an integrated, continuous and cyclic process;
- *Dewey's Model of Experiential Learning* (Dewey 1926), which is similar to the Lewinian model, and describes how learning transforms the impulses, feelings, and desires of experience into purposeful action;

- *Piaget's Model of Learning and Cognitive Development* (Piaget 1970), which identifies four major stages of cognitive growth which develop from birth until adolescence, these link closely to the primary nature of the experiences at each stage and identifies the development of the basic learning processes of adults.



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**Figure 2.3: The Lewinian Experiential Learning Model** (Source: Kolb 1984: 21)

Of these three models the one which has had the greatest uptake in the management and organisational learning literature is that of Lewin (Figure 2.3), and it is this cycle which Kolb is most frequently identified. Following the Lewinian model, an individual is immersed in a continuous cycle where, having had a concrete experience and having made observations about and reflected upon that experience, they are in a position to form or develop abstract concepts or generalisation based upon their observations and reflections, which can then be tested in a new situation or a changed environment, which will in turn, lead to new concrete experiences. This represents a significant development over the two stage model described by Hedberg (1981). Kim (1993a) demonstrates the importance of the Lewinian model, linking it to the work of Deming and Shewhart in the Total Quality Management literature, Schien's (1987) work from Organisational Development and Argyris and Schon's (1978) work under the heading of Action Science. According to Kolb (1984) Lewin's model is noteworthy because it emphasises concrete experience to test and validate abstract concepts, and is based upon theories which see feedback as a central aspect of the process of learning and development.



It should be recognised that the development of Kolb's theory on experiential learning also drew in part on Jungian psychological types in its construction (Sadler-Smith 1998b), with the experiential model described above (Figure 2.3) being linked to Jung's (1923) perceptual and judgement dimensions of personality. Kolb's theory and the experiential learning cycle can be seen as being derived from two fundamental dimensions: 'concrete experience-abstract conceptualisation' and 'reflective observation-active experimentation' which link to Jung's orthogonal dimensions of 'prehension' (taking hold of experience) and 'transformation' (manipulating experience) respectively. This interpretation links with DeCiantis and Kirton's (1996) criticism of the experiential learning model, as they suggest that Kolb's theory, which identifies a four stage process of learning, is only one of three possible patterns, summarising DeCiantis and Kirton (1996) these are:

1. all four constructs ordered rationally but unrelated (i.e. correlated insignificantly), indicating four discrete constructs in accord with the four-stage 'process' interpretation (as shown above; Figure 2.3);
2. each construct highly negatively correlated with one other and zero correlated with the remaining two, suggesting a two-bipolar orthogonal 'style' interpretation;
3. all four constructs moderately correlated with one another suggesting each as facets of the same underlying construct(s) or a single 'level' concept of learning ability.

According to DeCiantis and Kirton (1996), these correspond to differing levels of interpretation, which in turn correspond to a theory of learning in terms of process, style or level respectively, and their research using the *Learning Styles Questionnaire* (Honey and Mumford 1986) suggests that of the alternatives they suggest, the second is most likely, in that Kolb's construct best represents a bipolar orthogonal style interpretation. This conclusion, however is not necessarily at odds with the description of the experiential learning in Jungian terms. Furthermore, it does not lead DeCiantis and Kirton (1996) to totally reject the concept of a process model, rather it leads them to posit "that process is unrelated to both style and level, for it does not directly measure anything as such but instead provides a "map" (information) on where one is in relation to a start and a finish" (DeCiantis and Kirton 1996: 817-818). They suggest that the limitations and problems of the experiential learning model stem from the fact that it does not adequately differentiate between the style, level and process when considering learning.

DeCiantis and Kirton's (1996) research could itself be criticised, as it uses a measure of 'style' to test the relationships within Kolb's model, and produces results which lead them to suggest that a 'style' interpretation is most appropriate. It would have been more surprising if the style measure used had failed to confirm the strength of this element within the theory. Research on the relationships between style and experiential learning has been ongoing. There is a recognition that an individual's cognitive style (their preferred ways of perceiving and processing knowledge and information) will influence the ways that individual engages in and perceives the experiential learning process (Allinson and Hayes 1996; Chaharbaghi and Newman 1996). This illustrates the complexities of this issue, and the relationships between the experiential learning model, Jungian types and learning and cognitive style will be explored in the next chapter.

It should also be recognised that failing to differentiate between the three interrelated aspects identified by DeCiantis and Kirton (1996) does not necessarily invalidate those models which see learning as a cyclic process of change. Differentiation does, however provide the opportunity to improve our understanding and assessment of learning, by recognising the individual contribution of these three key elements.

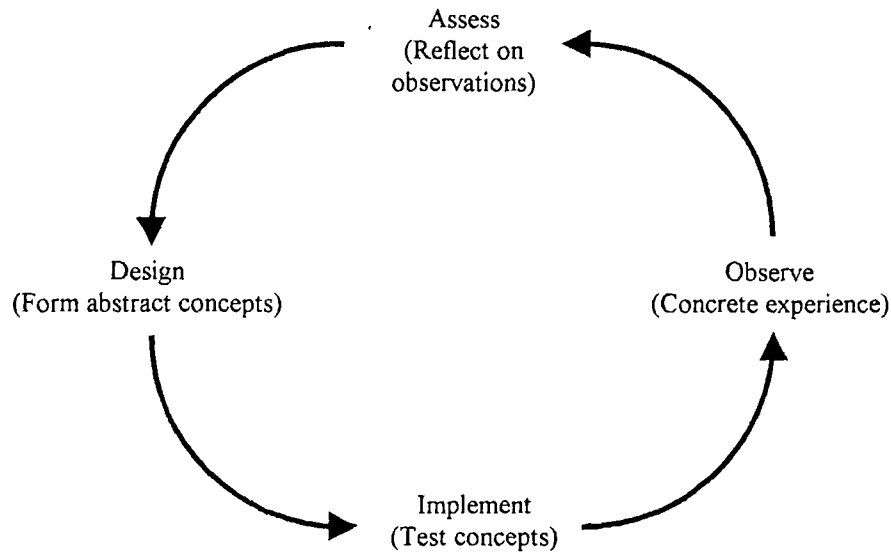
The experiential learning model could also be criticised for not making explicit the relationship between learning and the environment in which that learning occurs. For experiential learning to occur the learner must have something to experience, and exist within an environment that supports and requires learning (Feldman 1986). Also the experiential learning model does not explicitly address how the knowledge developed through the learning process is retained and maintained by the learner. The Lewinian model could also be criticised for implying that the learning process consist of a single, unbroken cycle. This is unrealistic as learning in the real world would best be represented as a complex, ongoing process. Individuals are likely to switch (consciously and sub-consciously) between cycles and experiences operating a number of simultaneous learning cycles, all of which will have reached different stages. Mumford (1991) in part recognises this, suggesting that upon completion of a particular learning cycle, an individual is presented with a number of options, including engaging in a new experience or activity, undertaking to repeat an experience in light of their learning and revised plans, or returning to a previous experience to attempt to learn more from it. These are issues addressed in Section 5.6 below.

Despite its limitations, it should be recognised that the experiential learning model has high face validity (Sadler-Smith and Riding 1998), and that it is widely recognised as being a valuable framework for designing, developing and delivering learning experiences for adults (Honey and Mumford 1992; Kolb 1984; Mumford 1991, 1993; Rowntree 1992; Tennant 1998). Additionally, the popularity and strength of the experiential learning model and the theory espoused by Kolb for describing the learning process is further demonstrated by the number of researchers who align their own models and concepts with those of Kolb and Lewin. Whilst some of these models could be criticised for re-inventing the wheel, others do produce ideas which add to our understanding of learning. Mumford's (1991) Progressive Learning Cycle is one such example.

### 2.5.3 The Observe-Assess-Design-Implement (*OADI*) Cycle

The final model considered here is the Observe-Assess-Design-Implement (*OADI*) Cycle, (Kofman 1992). According to Kim (1993a) the stages within the *OADI* can be directly linked to the stages of the Lewinian cycle and the work of Kolb (1984), to the extent that they have been described as synonymous. Within the *OADI* individuals 'observe' their experiences before 'assessing' that experience (a process that may be conscious or subconscious), and then using that assessment to 'design' an appropriate response to the experience. Finally individuals 'implement' their response to the experience which creates a new experience and begin a new cycle. (Figure 2.4).

Whilst its similarity means the *OADI* can be criticised in the same ways that the Lewinian model can, it does have two key advantages. Firstly, the *OADI* has been linked to the concepts of operational and conceptual learning. According to Kim (1993a; 1993b) 'design' and 'assess' represent the conceptual half of the cycle, whilst 'implement' and 'observe' are its operational aspects. This distinction explicitly links the experiential cycle of learning with the dichotomous levels of learning described above, and will be returned to when considering organisational learning. Additionally, the *OADI*'s terminology is better, in terms of its clarity and simplicity than that of Lewin's model. Consequently, Kim (1993a: 49) uses the *OADI* model because he believes "the choice of terms have clearer connections to activities conducted in an organisational context." This is a point of view with which this current study concurs and it is the *OADI* cycle that will be used below.



**Figure 2.4: The Observe-Assess-Design-Implement (OADI) Cycle** (Source: Kim 1993a: 50)

## 2.6 INDIVIDUAL LEARNING: AN INTEGRATED VIEW

This chapter began by identifying a working definition of learning. It was recognised that within the organisational environment, learning is best seen as a process of transformation through experience, the key purpose of which in the context of the present study is developmental change. The definition chosen is therefore concerned with the effectiveness of experiential learning and only recognises that learning has occurred when it results in an enhanced capability or performance. Within this, it is important to recognise that learning may be effective without being explicit or conscious.

In developing an understanding of individual learning driven by this definition and appropriate to the models and discussion below, this research identifies with the experiential models of the learning process developed from Lewin but frequently referenced as Kolb's. Within these, three key issues need to be highlighted.

Firstly, central to all the models presented is the notion that learning is cyclic. This can be seen as recognising that learning is an ongoing and developmental process.

Secondly, the models defined are incomplete as they do not recognise the role of memory (Kim 1993a). If the learning process identified is to be effective, the individual must have a way of retaining and maintaining the new knowledge and information created

through the learning process (as well as a means of discarding the unwanted portion of knowledge which is superseded by the new knowledge). This requires memory (Kepner and Tregoe 1965), and will be returned to when mental models are considered below. Linked to this is intelligence. Intelligence is implicit in theories of learning as without intelligence an individual cannot learn, remember or process information effectively (Glynn 1996). However given the difficulty in defining intelligence (see for example Spearman 1927; Eysenck 1973; 1979; Vygotsky 1978; Lave 1988; Gardner 1993) and the recognition of the difficulties inherent in the study of intelligence (Sternberg 1985), it is best seen as a factor whose influence can be recognised but not quantified. Consequently, no consideration of intelligence is included here.

Firstly, the emphasis on experiential learning maintained here echoes that taken by writers and researchers in the management and organisation fields, and an argument for taking an experiential viewpoint (following Kolb 1984) has been expressed above. More specifically, the *OADI* cycle has been identified as the chosen descriptor of the learning process (Figure 2.5), and can be linked to the humanistic dimension of learning (Figure 2.1). Essentially, this model is taken here to describe the way in which individuals learn. It should be reiterated that experiential learning, and the models espoused by its proponents are representative of only one of a range of theories describing how people learn, and other models and theories exist. Experiential learning is adopted here as the 'route-map' for the understanding of learning developed below and has been chosen in recognition of its importance in studies of organisation, and in order that this research fulfils the recognised need to be integrative by building on previous studies and theories in organisational learning. Specifically, the *OADI* cycle was selected over the other models because of the clarity of its terminology, because it can be linked to the dichotomous levels of learning identified above, and because, it is integrated within existing models linking mental models and learning (discussed below: Section 5.6).

Nevertheless, the *OADI*, and experiential learning can be criticised on a number of levels, and that in developing a more complete understanding of individual and organisational learning below, elements of the other models described here will be linked to the *OADI*. For example, in its action, the *OADI* will be affected by the simple and complex levels of learning identified. These are issues which cannot be considered in isolation. Furthermore, DeCiantis and Kirton's (1996) recognition that process, style and

level are linked means that the interaction of these issues will impact upon the effectiveness of learning. Within such an integrated model, it is necessary to keep in mind that learning is still an individual activity, with individuals preferring different forms, styles and levels of learning, and identifying with particular elements of the learning cycle. This are issues returned to in the discussion of experiential learning at the organisational level (Section 5.6 below).

## 2.7 SUMMARY

This chapter has looked at individual learning. A new definition, drawn from the work of Kolb (1984) and Kim (1993b) was presented:

*Learning is the process whereby entities create knowledge through the transformation of experience in order that they increase their capacity to take effective action.*

This recognises that learning ultimately occurs through experience and recognises the need for learning to be effective, i.e. developmental, as non-developmental learning ultimately provides no benefit for the individual or the organisation they inhabit.

Three schools of thought pertaining to the learning literature were identified (Figure 2.1) which define the scope of learning theory at the individual level, but do not allow for the dynamic and developmental nature of learning. This is better represented by the idea that learning exists at simple and complex levels (Table 2.1). The chapter concluded by describing a range of models of the learning process, focusing on experiential learning models (Lewin 1951; Kolb 1984). The Observe-Assess-Design-Implement (*OADI*) cycle of learning (Figure 2.4, after Kofman 1992) was identified as most appropriate for this research.

Having looked at individual learning, the concepts of learning style and cognitive style are considered next. Learning style and experiential learning are linked theories (Kolb 1985; Honey and Mumford 1986), and as experiential learning has been chosen as a focus for this research, learning style also needs to be considered. Furthermore, both learning style and cognitive style were identified above as potentially impacting upon the effectiveness of an individual's learning.

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## CHAPTER THREE

# Cognitive and Learning Styles

### 3.1 INTRODUCTION

Cognition defines the way individuals obtain, store and operationalise knowledge (Hayes and Allinson 1998), and cognitive style can be defined as “consistent individual differences in preferred ways of organising and processing information and experience” (Messick 1976: 5). It was suggested in the previous chapter that there exists a relationship between Kolb’s experiential learning model, and cognitive style, in that individuals will engage in the learning cycle in different ways dependent upon their dominant style. The possibility also exists for a relationship between an individual’s cognitive style and their mental models; the form, nature and adaptability of an individual’s mental model may be affected by their cognitive style. These issues apply equally well within organisations.

This chapter begins by considering learning style, a concept allied to cognitive style. Whilst there is some discussion over the relationship between cognitive style and learning style (Riding and Rayner 1998); learning style is seen here, as a subset of cognitive style (Hayes and Allinson 1998) and refers to the way individuals absorb or retain information (DeBello 1989). Following this cognitive style and a number of key constructs related to it are defined and outlined. Three key models of cognitive style are also described: Intuition-Analysis (Allinson and Hayes 1996); Adaption-Innovation (Kirton 1989); and Wholist-Analytical/ Verbaliser-Imager (Riding 1991), and the methodologies and instruments available for assessing cognitive style, linked to these models are also reviewed. The chapter concludes by describing cognitive style’s role in this research.

### 3.2 LEARNING STYLE

Brundage and Mackeracher (1980) see learning styles as consistent differences in the way individuals change the information they hold in response to changes in their environment, and cognitive style as a descriptor of consistent differences between individuals in the way

they organise information in response to experience. This is not a distinction that is widely shared (Hayes and Allinson 1998). Indeed, in common with many of the concepts included in this research, learning style has been used in a variety of ways to mean a variety of things (Sadler-Smith 1996a). In order to clarify the concept, learning style will be seen here as “a distinctive and habitual manner of acquiring knowledge, skills or attitudes through study or experience” (Sadler-Smith 1996b: 186). This is a definition of learning styles which makes the concept distinctly different to cognitive style as defined below.

Kolb's (1984) work on experiential learning, links into theory on learning style. Kolb (1985) has also developed a measure of individuals' learning styles, the *Learning Styles Inventory (LSI)*, which assesses learning style in terms of 'concrete experience-abstract conceptualisation' and 'reflective observation-active experimentation' dimensions. Honey and Mumford (1986, 1992) have built upon and modified Kolb's work, identifying four types of learning (learning styles) which can also be linked to the four stages of the Lewinian experiential learning model in terms of their suitability for each stage of the cycle; 'activist,' 'reflector,' 'theorist,' and 'pragmatist'. The expectation is that a truly effective learner would be strong at all four stages of the experiential learning cycle, and would have abilities indicative of all four of the learning types identified by Honey and Mumford (Sadler-Smith 1996b). Such an individual is unlikely to exist, and individuals are likely to favour one or more of these types of learning over the others. This was a major imperative in Honey and Mumford's development of their own measure of learning style, the *Learning Styles Questionnaire (LSQ)*, which identifies individuals preferences in respect of the four learning types identified above. Unfortunately, whilst the *LSQ* is recognised as being superior to the *LSI* in a number of respects (Allinson and Hayes 1988), both have been criticised for low reliability and stability (Sadler-Smith 1992; 1997b; 1998b; Sims, Veres, Watson and Buckner 1986). Furthermore, empirical work has failed to confirm the *LSQ*'s structure (Allinson and Hayes 1990; Sadler-Smith and Riding 1998; Swailes and Senior 1999).

Despite the face validity of learning style, the lack of an adequate definition, and the paucity of empirical support for and criticism of Kolb's and Honey and Mumford's models suggests that, a consideration of learning style in relation to organisational learning and mental models must be deferred until a satisfactory theoretical elaboration of the concept is achieved. Instead this research concentrates on cognitive style.



### 3.3 DEFINING COGNITIVE STYLE

The importance of cognitive style comes from the fact that it impacts upon a range of behaviours at the individual level (Driver 1987; Struefert and Nogami 1989; Riding and Rayner 1998), and that this ultimately leads to differences in performance in a range of tasks and situations. This potentially includes learning and mental models.

Cognitive style was defined in the introduction as “consistent individual differences in preferred ways of organising and processing information and experience” (Messick 1976: 5). Witkin, Moore, Goodenough and Cox (1977) posit a similar definition describing cognitive style as individual differences in the way people perceive, think, solve problems, learn and relate to others, and Riding and Rayner (1998: 7) see cognitive style as “an in-built and automatic way of responding to information and situations”. Whilst Brundage and Mackeracher (1980) see cognitive style as a descriptor of consistent differences between individuals in the way they organise information in response to experience. All of these definitions are broadly similar, but the one that will be adopted here is Sadler-Smith’s (1996b: 186), which sees following Messick (1976; 1984), cognitive style as “a distinctive and habitual manner of organising and processing information”. Critically this definition places cognitive style at a point in our understanding which is distinctly different from learning style.

It should be recognised that as defined, cognitive style can be seen as representing a fundamental aspect of an individual’s personality (Curry 1983), and as such represents a key ‘trait’ (an enduring descriptive characteristic of a person) (Eysenck 1995), with the behaviour that it creates representing a broadly consistent expression of stable personality dimensions that appear early in an individual’s life (Kirton 1989; Riding 1997; Riding and Rayner 1998). This is an assertion supported by research undertaken by Allinson and Hayes (1996), Kirton (1989), Kirton and DeCiantis (1989) and Riding and Dyer (1980) all of which found significant relationships between cognitive style and differing personality measures. Although others would disagree with this idea that cognitive style represents an inherent personality variable, but this does not necessarily negate the idea that individuals have preferred modes of understanding, working and thinking which may affect their behaviour and potentially their learning.

As a concept, cognitive style is also widely recognised as having a number of additional key characteristics (Witkin *et al.* 1977; Messick 1984; Kirton 1989; Allinson

and Hayes 1996; Riding 1991; 1997). These are: (1) that cognitive style is concerned with the form rather than the content of information processing; (2) that it is pervasive and can be assessed using psychometric techniques; (3) that it is stable over time; (4) that it is bipolar; (5) that it may be value differentiated (in other words style represents a measure of 'difference' rather than alternatives that which may or may not be 'better' than each other (Sadler-Smith 1997a; Sadler-Smith & Badger 1998). In order to ensure a complete understanding of cognitive style, it is important to consider a number of these key characteristics in greater depth. In particular two additional concepts need to be considered, these are: cognitive strategy, and cognitive ability.

### **3.3.1 Cognitive Strategy**

In the description of cognitive style furnished above cognitive style was seen as being a permanent and stable aspect of an individuals behaviour (Garger and Guild 1984), yet it is possible for individuals to act in ways which contradict their underlying style (Streufert and Nogami 1989; Hayes and Allinson 1994). Cognitive strategy (or 'coping behaviours; Kirton 1989) is used to describe this phenomenon. These are, unlike cognitive styles, adaptable and relatively short-lived phenomena, which are brought into being by individuals in response to significant changes in the environment or in response to a specific task. According to Sadler-Smith (1997a: 8) style is "largely a function of the individual (and more specifically her or his personality), whereas a strategy is a function of the interaction of the individual and the situation." Sadler-Smith (1997a: 9) goes on to assert that this may be the key to versatile behaviour; "the coupling of behaviours derived from one's style (which may or may not be appropriate for a particular situation) with strategies which are appropriate to the situation is one way in which versatile behaviour may be achieved." As a result, whilst an individual's cognitive style may not be easily modified, their cognitive strategies should be susceptible to modification through training or experience (Hayes and Allinson 1994).

### **3.3.2 Cognitive Ability**

It was suggested above that cognitive style is bi-polar and value differentiated, measuring difference rather than individual capability. Cognitive ability however is uni-polar and value directional (Messick 1984) and allows for the recognition that peoples capabilities

may differ. With style, individuals can be characterised as having either one dominant style or another but not both, whilst it is possible for individuals to have more or less cognitive ability (Nickerson, Perkins and Smith 1985). It is also possible for an individual to demonstrate cognitive ability which contradicts their over-riding style. This distinction is supported by Sternberg (1995) who sees cognitive style as representing an individual's preferred way of using the ability given to them by their intelligence, and sustained by empirical research which supports the idea that cognitive style describes different as opposed to better ways of thinking (Kirton 1989; Riding and Pearson 1994; Sadler-Smith 1997b). Nevertheless, it is important that we recognise that ability like style potentially affects behaviour. Whilst it is possible to identify appropriate cognitive styles to deal with particular tasks and environments, and even to form strategies which allow us to overcome some of the limitations of our styles, ultimately the effectiveness of our behaviour depends upon the extent of our ability. Consequently as Miller (1987) suggests behaviour is made up of both an individual's style which will control the way they act and their ability which is reflected in the success (or failure) of their action.

The importance of the concepts of cognitive strategy and cognitive ability is that they allow us to extend our understanding of how individuals' behaviour relates to their cognitive style without negating the key characteristics of cognitive style espoused above. These criteria represent an idealised view of cognitive style (Messick 1984; Martinsen 1997) which is not always evident in individuals' behaviour, and has not been met by some of the existing models of cognitive style (Tiedemann 1989).

### **3.4 MODELS OF COGNITIVE STYLE**

Beyond the definition of cognitive style presented above there exists theories of cognitive style which attempt to describe the nature of the styles exhibited by individuals. Lewis (1976) even suggests that researchers are all pursuing their own dimensions and theories, without reference to each other. However, within these Sadler-Smith (1998a) identifies three allied models of cognitive style which fulfil the criteria described above (Section 3.3), which are widely accepted as viable and have been used in organisational studies. These are the, 'Intuition-Analysis' dimension of Allinson and Hayes (1996), Kirton's (1989) distinction of 'Adaptor-Innovator' styles, and the 'Wholist-Analytical' and 'Verbaliser-Imager' dimensions described by Riding (1991).

### **3.4.1 Intuition - Analysis (Allinson and Hayes 1996)**

Allinson and Hayes (1996) describe two contrasting styles: (a) analysts are 'left-brain' dominant, they focus on detail and make decisions or solve problems on the basis of mental reasoning; (b) intuitives are 'right-brain' dominant and they make decisions and tackle issues on the basis of feeling. This distinction of cognitive style through hemispheric differences follows the work of Nebes and Sperry (1971), Taggart, Robey and Kroeck (1985), Allinson and Hayes (1996), and Leonard & Strauss (1997). However, as there is, as yet no firm neurophysiological evidence for this phenomena, it is perhaps best treated as a metaphor (Sadler-Smith and Badger 1998). Allinson and Hayes (1996) make the point that their description of style as existing on an intuitive-analytical dimension can be linked to Honey and Mumford, to Kolb, and to models of experiential learning.

### **3.4.2 Adaption - Innovation (Kirton 1989)**

Kirton (1989) describes the adaptor-innovator dimension as representing the ways in which individuals differ in their preferred ways of dealing with change, creativity, problem-solving and decision-making. Individuals on the adaptor side of the dimension are characterised by precision, reliability, efficiency, discipline and conformity, and as a consequence tend to seek solutions within their existing knowledge and understanding. Alternatively, innovators are typified by undisciplined thinking and tangential approaches to tasks and problem solving which cut across accepted paradigms.

### **3.4.3 Wholist - Analytical / Verbaliser - Imager (Riding 1991)**

Riding (1991) differs from Kirton (1989) and Allinson and Hayes (1996) in positing two independent dimensions of cognitive style which represent super-ordinate categories subsuming many of the pre-existing dimensions of style identified in the literature (Riding and Cheema 1991). These are the wholist-analytical and verbaliser-imager dimensions.

The wholist-analytical dimension describes the habitual ways in which individuals process information (Riding 1991). Wholists will adopt a global or overall perspective with information, and as a consequence they may blur the distinctions between parts of a problem, situation, issue or topic. Analytics will process information into its component

parts, and prefer to break down a problem in order to deal with it, sometimes to the extent that they may become focused on a particular aspect at the expense of the rest.

The verbaliser-imager dimension describes individuals habitual means for the representation of information in their memory whilst thinking. Verbalisers “consider the information they read see or listen to, in words or verbal associations,” whilst imagers experience information as “fluent spontaneous and frequent pictorial mental pictures (Riding 1994: 48). Riding (1994) goes on to suggest that these dimensions influence the type of activity an individual prefers. Imagers are passive, will tend to focus inwards and upon themselves, and will be content with a static environment. Verbalisers, will tend to focus outwards towards others, be more active and prefer a stimulating environment.

The models described above all represent alternative ways of describing the differences in individuals’ preferred procedures for processing knowledge and information. Their significance stems from the fact that they ultimately effect the way individuals interact with, utilise and operationalise that knowledge and information. Three instruments, which are linked to the three models are described below.

### 3.5 ASSESSING COGNITIVE STYLE

Commensurate with their respective theories, each of the authors cited above have developed measures of style.

#### 3.5.1 The *Cognitive Style Index* (Allinson and Hayes 1996)

Allinson and Hayes’ (1996) *Cognitive Style Index (CSI)* uses a self-report questionnaire to assess the extent to which individuals exhibit either an intuitive or analytical style. The *CSI* is constructed to measure differentiation on a uni-dimensional (bi-polar scale), it contains 38 items scored on a trichotomous scale and has a theoretical maximum score of 76, and a minimum of 0. The higher the score, the more analytical a respondent’s style. The lower the score the more intuitive they are. This does not suggest however, that an analyst style is better than an intuitive. According to Allinson and Hayes (1996: 132) the *CSI* is a psychometrically sound instrument for identification of individual differences in cognitive style that is appropriate for organisationally based studies. Studies using the *CSI* have also demonstrated acceptable levels of internal consistency and temporal stability

(see for example Allinson and Hayes 1996; Armstrong Allinson and Hayes 1997; Spicer and Sadler-Smith 1998a; Sadler-Smith, Spicer and Tsang 1999).

### **3.5.2 The *Kirton Adaption-Innovation Inventory* (Kirton 1976)**

The *Kirton Adaption-Innovation Inventory* (*KAI*) (Kirton 1976) is a 32 item self-reported inventory. It is scored on a on a five point scale and is supposed to identify an individuals position on the adaption-innovation dimension of style identified by Kirton (1976). Whilst the *KAI* has demonstrated appropriate levels of internal reliability (Kirton 1976) and temporal stability (Kirton 1978), its uni-dimensional structure, confirmed by Kirton's own work (1989) has been questioned by other researchers (Taylor 1989; Bagozzi and Foxall 1995; Rickards and Gaston 1995). Critics of the *KAI* allege that it is not homogeneous, it confounds level and style as descriptors and its factor structure leaves too much unexplained variance (Foxall and Hackett 1992).

### **3.5.3 The *Cognitive Styles Analysis* (Riding 1991)**

The *Cognitive Styles Analysis* (*CSA*) consists of two sub-tests which assesses an individual's position on the dimensions identified by Riding (1991; 1994). The *CSA* differs from the *CSI* and *KAI* in that it is computer rather than paper based. In the test for the wholist-analytical dimension, individuals are required to dis-embed a simple shape from a complex shape, and to judge whether two complex shapes are the same. The test for the verbaliser-imager dimension requires individuals to answer true or false to a set of visual appearance and semantic conceptual questions by pressing the appropriate key, assessment of this dimension is based upon an individual's relative speed of response to the two types of question. *CSA* scores are produced in the form of ratios for the two dimensions of style. The *CSA* is a "simple, quick and convenient means of assessing an individual's position on the two fundamental cognitive style dimensions" (Riding 1997: 32).

Of the alternative measures identified, it is Allinson and Hayes' (1996) *Cognitive Style Index* (*CSI*) which will be used in this research. The *CSA* has been unfortunately discounted, as this is not a self-report measure, and consequently is unsuitable for inclusion in a questionnaire survey, which is how cognitive style will be assessed as part of

this research. The *CSI* has been chosen over the *KAI* for a number of reasons. Firstly, the *KAI* has received more criticism in terms of its construction (Taylor 1989; Foxall and Hackett 1992; Bagozzi and Foxall 1995; Rickards and Gaston 1995). Whilst this might be expected given that the *KAI* is an older instrument, results to date appear to suggest that the *CSI* is more robust (Allinson and Hayes 1996; Armstrong Allinson and Hayes 1997; Spicer and Sadler-Smith 1998a; Sadler-Smith, Spicer and Tsang 1999). Secondly, and potentially more importantly, despite the fact that the *KAI*'s terminology (Adaption-Innovation) has perhaps a more perspicacious link with adaptive and generative learning (as described below; Section 5.4), the *CSI* and the model of cognitive style this represents (Analytical-Intuitive) and have been linked with both learning and mental models. These relationships are discussed below (Section 3.6), alongside exploration of the reasons for including a measure of cognitive style in this research. However, put simply, both Sadler-Smith and Badger (1998) and Allinson and Hayes (1998) suggest explicit relationships between learning, mental models and cognitive style using the *CSI* as their model of cognitive style, with the former pair of researchers using the adaptive/ generative model as their descriptor of learning (Figure 3.1). As both pairs of researchers call for research into these relationships, recognising the need for work which is integrative and cumulative, this research has chosen to use the *CSI* as a measure. Finally, there is the question of access, with the *CSI* being more openly and readily available to researchers than the *KAI*.

### 3.6 THE ROLE OF COGNITIVE STYLE IN INDIVIDUAL AND ORGANISATIONAL LEARNING

Three models of cognitive style, and their assessment instruments have been outlined above, and whilst these have been dealt with separately, it has been conjectured that the models identified are linked and exhibit some overlap in their explanation, in that they all represent the same fundamental style dimension, described as 'analytic-holist' (Sadler-Smith & Badger 1998). The suggestion is that the analytic dimension incorporates the analyst (Allinson and Hayes 1996), analytical (Riding 1991) and adaptor (Kirton 1989) styles. The holist aspect includes the intuitive (Allinson and Hayes 1996), wholist (Riding 1991), and innovator (Kirton 1989) styles.

The relevance of cognitive style to this research is that, as has already been mentioned, cognitive style is presupposed to affect individuals' workplace behaviour, (and ultimately their ability to perform in a range of tasks and scenarios) (Driver 1987; Struefert

and Nogami 1989). Consequently, it is not unreasonable to suppose a link exists between both learning and mental models, with cognitive style as an intervening variable between learning and mental models, acting as a perceptual filter on the ways in which an individual interacts with their environment. There is also a recognition in the literature that individuals' learning performance may be enhanced by accommodating cognitive style in the means of teaching and modes of presenting and summarising information (Riding and Sadler-Smith 1992; Hayes and Allinson 1996; Sadler-Smith 1996b; Vermunt 1996).

In terms of the experiential learning, it is also likely that individuals will engage in the cycle in different ways and at different places dependent upon their cognitive style (Chaharabaghi and Newman 1996). Analysts will treat and perceive 'concrete experiences' in a different way to intuitives (Hayes and Allinson 1998). This relationship can be linked to DeCiantis and Kirton's (1996) criticism of Kolb's model for confusing process and style. However, Rayner and Riding's (1997) assertion (supported by Sadler-Smith 1999) that there is a fundamental distinction between the cognition-centred models of style, such as Allinson and Hayes' (1996) intuition-analysis dimension and process-based models, including Kolb's (1984) experiential learning cycle, strengthens both the importance and the significance of the description of Kolb's model in process terms.

More fundamentally, it is possible to see a direct link back from the *CSI* and intuition-analysis dimension of cognitive style (Allinson and Hayes 1996) through Kolb's (1985) *LSI* and Honey and Mumford's (1986) *LSQ* to the experiential learning model, and the notion of Jungian psychological types introduced in the last chapter. The development of the *CSI* by Allinson and Hayes (1996), relies at least in part on their earlier research with Honey and Mumford's (1986) *LSQ* in which they identified two super-ordinate factors labelled 'action' and 'analysis' (which link to intuitive and analytical styles respectively). Honey and Mumford's (1986) model itself counts Kolb's (1984) *LSI* as its prime antecedent, and the links between the dimensions of the *LSI*, the experiential learning model and Jung's (1923) psychological type dimensions (prehension and transformation) have already been espoused. This 'family-tree' provides support for the assertion that cognitive style represents a fundamental aspect of an individual's personality, an assertion that is further supported for the *CSI* by the statistically significant relationships identified by Allinson and Hayes (1996) between *CSI* scores and a number of personality inventories (including the *Myers-Briggs Type Indicator (MBTI)* which like the

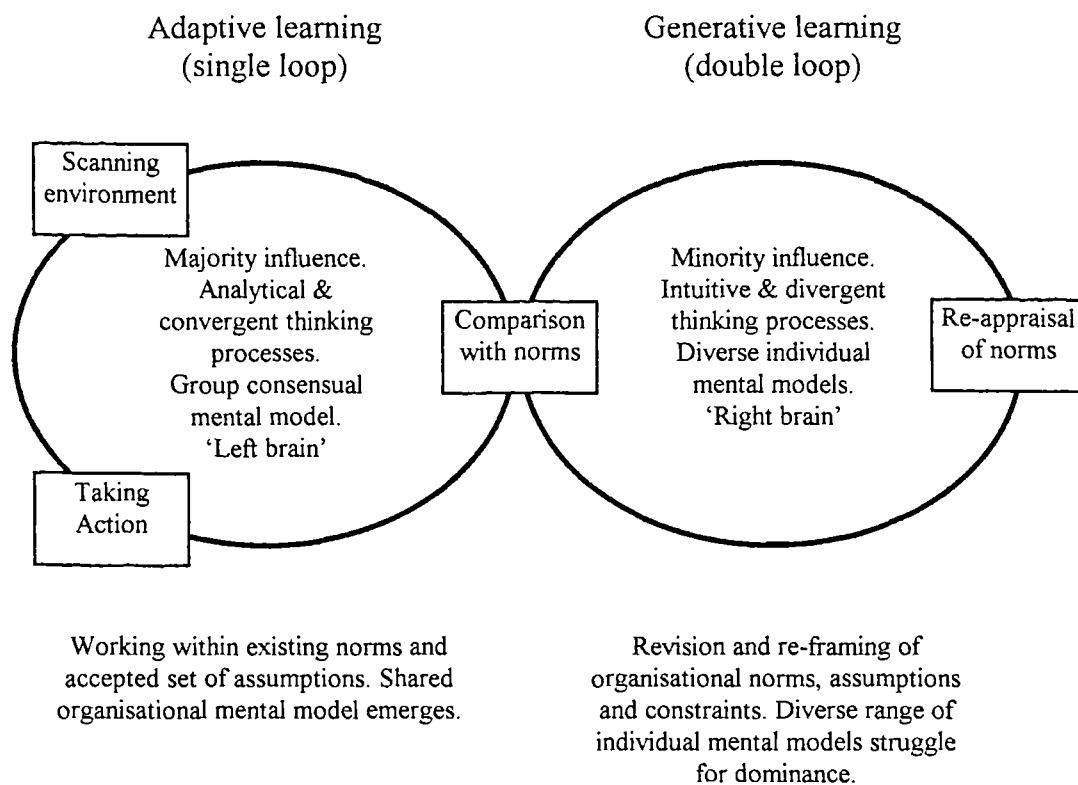


*CSI* counts Jungian types amongst its antecedents). It should be recognised however that these results are at odds with the opinions of Riding and Rayner (1998: 112) who state that “cognitive style and personality sources are not the same since the correlations among them approximate to zero”. Instead they suggest that style and personality combine to affect behaviour and conclude that the “psychological source” is the major contributor to personality related behaviour with a lesser effect on style. This is logical when it is remembered that Jung’s (1923) psychological types are a more direct antecedent for the *MBTI* than for the *CSI*.

Links between cognitive style and group form, behaviour and function are well documented. Sadler-Smith (1998a) identifies cognitive style as having important implications for group interaction, and Riding (1991; 1994) argues that the *CSA* could be used for selecting and building teams, with an effective team having a balance of styles. This is an attitude mirrored by Schroder (1989) who investigated the differing behaviour of teams composed of the adapter and innovator styles. Kirton and DeCiantis (1989) and Ribbens (1997) extend this idea, suggesting that not only is cognitive (learning) style a key variable influencing group climate, it also can have influence at the organisational level. Such a viewpoint, however does not allow for the limitations of the learning style concept and overly anthropomorphises the organisation. More appropriate links can be identified between cognitive style and learning at the organisational level.

Cognitive style represents differences in individuals’ preferred modes of processing information which ultimately effects the way those individuals’ utilise and operationalise knowledge, as a result a person’s behaviour may ultimately be affected by their cognitive style (Woodman, Sawyer and Griffin 1993). Following this, it would not be unreasonable to suppose that an individual’s conception of ‘know-how’ and ‘know-why,’ Kim (1993b) may be style dependent. Equally a link can be hypothesised between Argyris and Schon’s (1978) single-loop and double-loop learning, and Senge’s (1990a) adaptive and generative learning and cognitive style. It can be argued that the individual is the fundamental unit of learning in organisations (Hedberg 1981) and the cognitive styles of the individuals in an organisation could ultimately affect that organisation’s propensity for adaptive and generative learning. Adaptive learning is about coping, and dealing with the current environment in new and better ways and equates with an analytical style of thought, whilst generative learning requires individuals and organisations to think globally and develop

new ways of looking at the world, and as such it can be seen as being characterised by intuitive thought (Sadler-Smith 1998a). Tullett's (1995) research using the *KAI* in which he found a link between an individual's cognitive style and the role they perform in an organisation provides some evidence in support of this assertion. Furthermore, Sadler-Smith and Badger (1998) have expanded on this linking the ideas of analytical and intuitive style and adaptive and generative learning with the mental models which result from learning under different conditions (adaptive versus generative) and dominant cognitive styles (Figure 3.1). This model hypothesises that the extent to which mental models are shared depends upon both the nature of the learning evident, as well as the cognitive styles of the learners, and links adaptive learning with an analytical style, and generative learning to an intuitive approach.



**Figure 3.1: Cognitive Style, Adaptive and Generative Learning, and Mental Models**  
(Source: Sadler-Smith and Badger 1998: 256)

Others have supposed similar relationships between mental models and cognitive style. Mental models can be characterised as the repositories of the knowledge and information held by individuals and organisations (Chapter Four). The surfacing and

sharing of individual mental models to develop shared mental models is recognised as fundamental to organisational learning (Kim 1993b), and Hayes and Allinson (1998) have suggested that cognitive style could potentially affect the development of individuals' mental models, as the way an individual processes and stores information is likely to be dependant upon their style. Indeed Kim (1993b) sees mental models as being composed of two elements: frameworks which link to the ideas of 'know-why' and conceptual learning; and routines which link to 'know-how' and operational learning. As a consequence, it is possible to extend the link supposed above between learning, mental models, and cognitive style to link the aspects of the individual mental model (routines and frameworks) to adaptive and generative learning and analytical and intuitive styles respectively. Extending this concept to the organisational level, shared mental models are seen as consisting of organisational frameworks (*weltanschauung*) and routines that can be linked to learning and cognitive style in the same way. These are issues that will be considered further when mental models and organisational learning are discussed in subsequent chapters.

It should therefore be evident that cognitive style has the potential to influence the effectiveness of learning, and the development of individual and shared mental models. It is for these reasons that cognitive style will be included in this research.

### 3.7 SUMMARY

This chapter has outlined the theories underlying cognitive and learning styles. Learning style was considered first and discounted due to the confusion of what this concept means and the low reliability and stability of the instruments used to identify it (Sadler-Smith 1992; Sims et al. 1986). The chapter then continued by defining cognitive style and elaborating on the key characteristics of this concept. Three key models of cognitive style were then identified and described (Allinson and Hayes 1996; Kirton 1989; Riding 1991), and from these it was suggested that Allinson and Hayes' (1996) model of cognitive style as 'intuitive' or 'analytical' was most appropriate to this research. The relationships between these models and between cognitive style, learning and mental models were also discussed and it was suggested that cognitive style was of relevance to this research as it affects the way individuals utilise information and perceive and solve problems or issues. In effect an individual's cognitive style affects how they prefer to learn and how they form and operate their mental models.

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## **CHAPTER FOUR**

# **Mental Models**

### **4.1 INTRODUCTION**

Mental models have been identified as potentially critical to the learning system within an organisation (Argyris and Schon 1978; Senge 1990a; Kim 1993b), and can be defined as simplifications or representations of understanding through which “human beings understand the world by constructing working models of it in their minds” (Johnson-Laird 1983: 10). They represent the way an individual perceives their environment, and are personal, affecting the way that individual receives, retains, stores and utilises information. It was suggested in Chapter Two that, in order for learning to be effective, individuals must have a way of retaining and maintaining the new knowledge created through the learning process. This was seen as requiring memory, and mental models can be seen as characterising an operational form of memory as it is through the operation and utilisation of their mental models that individuals retain, modify and utilise the information they learn. This research aims to explore the relationships between mental models and individual and organisational learning which influence the development of shared understanding in organisations.

The aim of this chapter is to provide an understanding of the mental model concept appropriate to this research. Initially, a working definition of the term mental model is outlined. The theory driving this concept and the relationships between learning, individual mental models and cognitive style are discussed. The concept of shared mental models is then considered, as is the relationship between shared mental models and organisational learning. Subsequently, the methodology available for mental model elicitation and representation will be described, and cognitive mapping techniques will be introduced. The chapter concludes by looking at a number of examples of mental model research.

## 4.2 DEFINING MENTAL MODELS

The idea of a mental model is not new: Craik (1943) recognised that knowledge and understanding operate through the application of ‘working models’ of particular phenomenon in an individual’s mind, and Johnson-Laird (1983) who developed this concept, saw a mental model as a small-scale model of reality, which whilst, not necessarily wholly accurate nor a complete match for what it models, is still useful as an aid to understanding. Unfortunately, this definition of a mental model is not all encompassing and it is one of the concept’s misfortunes that it means different things to different people. A problem confounded by the fact that writers and researchers use a range of terms interchangeably with mental models. Kitchin (1994: 5) identifies a number of examples of this nature; “abstract maps, cognitive configurations, cognitive images, cognitive maps, cognitive representations, cognitive schemata, cognitive space, cognitive systems, conceptual representations, configurational representation, environmental images, mental images, mental maps, mental representations, orientating schemata, place schemata, topological representations, topological schemata, and world graphs.” To this can be added, ‘signed diagraphs’ (Roberts 1976a), ‘archetypes’ (Mitroff 1983), ‘frames of reference’ (Shrivastava and Mitroff 1982; Shrivastava and Schneider 1984) ‘image theory’ (Mitchell, Rediker and Beach 1986), ‘hypermapping’ (Bryant 1990), ‘cognitive taxonomies’ (Hodgkinson and Johnson 1994) ‘memes’ (Price 1994; 1995), ‘hyper-mental-maps’ (Lokuge, Gilbert and Richards 1996), ‘cognitive complexity’ (Goodwin and Ziegler 1998), and even ‘myths and stories’ (Mitroff and Klimann 1976). It can be argued that, all of these can be seen as being broadly equivalent with or sharing some of the features of mental models. In order to preserve clarity, the term mental model will be retained below, irrespective of writers’ own choices of terminology.

Definitions other than Johnson-Laird’s (1983) exist. Senge (1990a: 8) describes mental models as “deeply ingrained assumptions, generalisations or even pictures or images that influence how we understand the world.” He goes on to assert that, in this way an individual’s understanding of their environment (or any part of it) is made up of their knowledge, beliefs, experiences and perceptions, and as such is affected by that person’s political, economic, social and cultural backgrounds. Doyle and Ford (1998: 15) propose a definition of a mental model as an: “enduring and accessible, but limited, internal conceptual representation of an external system”. Gentner and Stevens (1983: 1) see mental models research as being characterised by “careful examination of the way people

understand some domain of knowledge.” According to Vaudreuil (1995) mental models turn data into information which an individual can act on; information which in turn, is processed according to that individual’s mental model. Others take a prescriptive approach, defining the concept purely in relation to a particular field or study: Aitchison (1987) looked at the way in which individuals use and understand language and chose to define a mental model as a diagram of the connections in the mental lexicon.

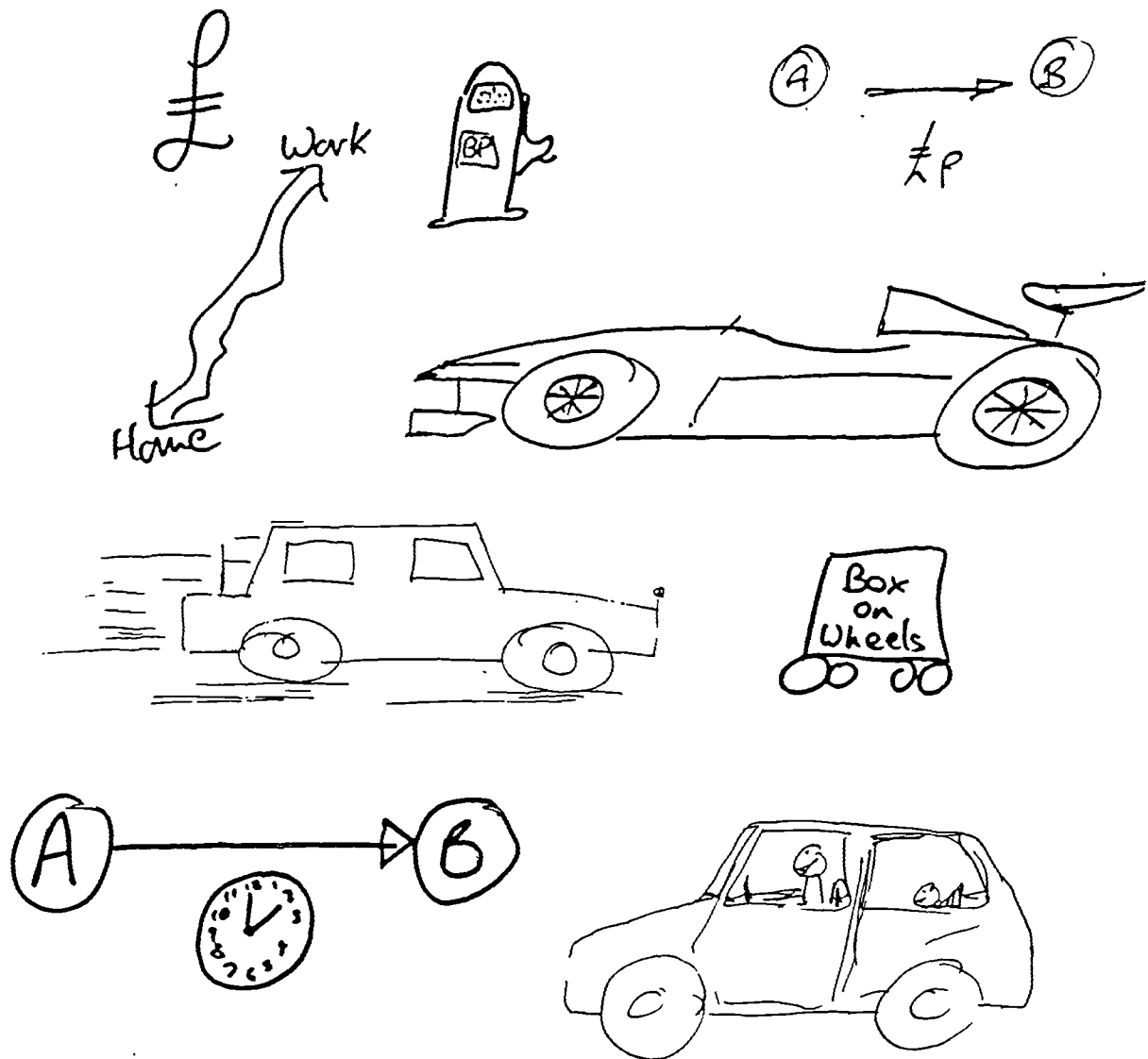
In order to proceed, a working definition of a mental model is suggested (after Johnson-Laird 1983):

*A mental model is a simplification or representation of understanding, which can vary from a simple image or picture in the mind to a more complex abstract or conceptual archetype built through more detailed understanding.*

This definition is broad but incorporates the fundamental meaning of the word ‘model’ (“an approximate copy or image,” Webster’s dictionary 1996: 818), and builds upon this, placing the concept at a conceptual level in our understanding. It also allows for both verbal and visual representations of understanding (the ‘image or picture’ can be constructed through writing or drawing alone or in combination). For example, consider the forms individuals’ mental models of a car can take. Given a blank sheet paper and asked to depict what they understand by the term ‘car,’ individuals will provide a vast variety of images. Some of these will be written, some drawn. Some images will identify with particular makes or types of car (such as Mercedes, hatchbacks, or Formula One racing cars), others will show the implications and consequences arising from cars, (e.g. transport, pollution, congestion and cost). Examples of the outcomes of an exercise of this type, undertaken with masters students at the University of Plymouth Business School are shown in Figure 4.1, which illustrate the range of understanding evident in these individuals. If the same exercise were undertaken with motor industry professionals (e.g. car designers, mechanics or salesmen), other more complex models may result.

The definition identified, sees a mental model as providing a framework which directs an individual’s decision making. Our mental models affect the way we view the world, influence the way we think and perceive problems or issues, and ultimately affect the way we act. Defining a mental model in such a broad way corresponds closely with Johnson-Laird’s (1983) idea of a mental model and builds upon psychologists’ use of mental model theory to “explain the nature of deduction and to characterise its underlying

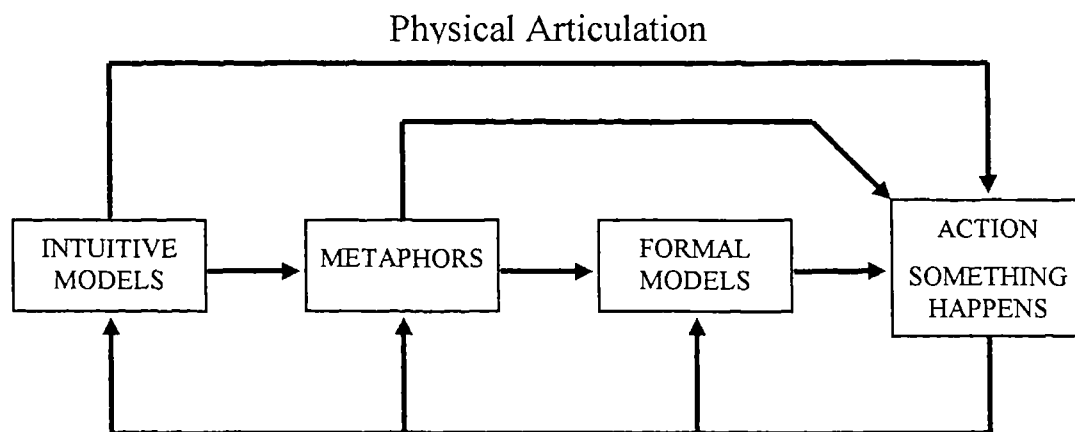
mental processes” (Johnson-Laird and Byrne 1993: 377). Mental models are, however context specific, and each individual mental model is only one of a number of possible models which could be (and are) used in that context (Johnson-Laird 1985; Mantovani 1996). This means that the model’s function cannot be ignored, and that “two people with different mental models can observe the same event and describe it differently because they’ve noticed different details” (Senge 1992: 5).



**Figure 4.1: Individuals' Depictions of their Understanding of the Concept 'Car'**

Beyond the definition presented, it is important to recognise that mental models are more complex in their operation. The definition chosen is deliberately open, placing mental models at a conceptual level in our understanding. From this, more comprehensive

understandings of the concept can be developed. Johnson-Laird (1983) describes a typology of mental models which identifies six types of physical models. Richardson, Andersen, Maxwell and Stewart (1994) posit that mental models are multifaceted made up of sub-models focused upon ends, means and the connections between them. Hill and Levenhagen (1995), identify a development process for mental models which identifies functional forms of mental model and the links between them (Figure 4.2). This describes how increasingly complex and rational models are generated through 'physical articulation' and observation of and response to resultant action in the environment.



**Figure 4.2: The Mental Model Development Process** (Source Hill and Levenhagen 1995: 1060)

Mental models are considered in more detailed below. The roles played by domains of knowledge, and frameworks and routines in understanding individual mental models are considered. Links between mental models, learning and cognitive style are also discussed.

### 4.3 INDIVIDUAL MENTAL MODELS

We have a limited ability to capture and process information, and are unable and unwilling to take in all the data available for or pertaining to an issue. Consequently, we habitually make decisions based on limited option sets and in situations where we do not fully understand the environment in which we act (Watson 1996; Nisbett and Ross 1980). Such behaviour is characterised as occurring within 'bounded rationality' (Swan 1995; Senge



1990a), where individuals select limited subsets from available data and from these derive their own simplified understandings. Mental models are a manifestation of these simplified understandings, and their importance stems from the recognition that they represent the idiosyncratic, subjective and incomplete understandings that drive our behaviour (Kim 1993a; 1993b; Senge 1990a; Payne 1991; Swan 1995). In other words, mental models are simplifications drawn from both explicit and implicit understandings (Nonaka 1991; 1994) that can be used to circumvent our limited capacity for processing information (Daniels DeChernatony & Johnson 1995), and allow us to control systems and operate within environments which are too large or complex for all the variables to be monitored.

The mental model concept is not a catch-all, and there are limitations related to their use. Some of these have already been highlighted. Firstly, it should be recognised that they are functional, i.e. context-specific (Mantovani 1996). Secondly, issues created by bounded rationality need to be remembered (Senge 1992; Evans 1989). Norman (1983) summarises other limitations of the concept, including their incomplete, unstable and ever-changing nature, as well as their lack of clear boundaries. Norman (1983), Forrester (1971; 1994) and Santamarina and Salvendy (1991) also criticise mental models for creating models which are unscientific, which are constructed implicitly rather than explicitly from incomplete understanding of their operation and environment. The individuality of models is a particular problem when comparability between models is a requirement of research.

As simplifications, mental models are generally poorly rationalised, often misinterpreted and can exist below an individual's level of awareness (Senge 1992). A case in point is the gap between what people believe their mental models to be and the mental models they actually use ('espoused-theories' vs. 'theories-in-use'; Senge 1990a). Identification of such differences is critical if researchers are to uncover the true, underlying model, this means that mental models can be difficult to identify and represent. Mental models are, however more than simplifications or collections of ideas, they act as a window or filter through which we interpret information (Hayes and Allinson 1998), and as such they not only help us make sense of what we see, but also only let us see what makes sense to the mental model. This becomes a particular problem when individuals take actions based on their mental models as if they *were* reality.

Mental models have been represented above as conceptual entities. Development of this concept is needed in order that the relationships between mental models, learning and cognitive style can be espoused. In particular, two further aspects of the mental model

concept need to be considered: the domains of knowledge that mental models represent; and the relationships between frameworks and routines within mental models.

#### **4.3.1 Domains of Knowledge**

The ‘physical’ (operational) and ‘conceptual’ domains of knowledge (Kim 1993a) were presented in Chapter Two (page 14), and understanding of mental models is typically limited to one or the other of these domains.

Gentner and Stevens (1983) focus on the physical domain and systems because of their simplicity. There exists for physical domains “some form of normative knowledge that is relatively easy to detail explicitly” (Gentner and Stevens 1983: 2). Alternatively, the conceptual domain of knowledge is characterised by models representing abstract aspects of the wider environment (as opposed to the physical domain which concentrates on the ‘real’ world). Conceptual models are essentially linguistic and as a consequence, the language used to convey the meaning in the model becomes much more important as it is open to misinterpretation (Garnham 1987). This is important when you consider that, in actuality the mental models we use are not only characterised linguistically, they are also constructed primarily from language, through reading texts and listening to others rather than from actual external stimuli or ‘real-world’ experience (Kim 1993a).

The importance of this distinction between physical and conceptual domains is two-fold. Firstly, the models upon which this research will focus are, essentially conceptual, representing at the individual level our abstract understanding of an individual’s knowledge and understanding. Secondly, despite this their content is not exclusively conceptual. As will be seen below, an individual’s model can, and indeed should contain both conceptual and operational knowledge.

#### **4.3.2 Frameworks and Routines**

Frameworks and routines are aspects of mental models, identified by Kim (1993a), which link to the concepts of operational and conceptual learning and domains of knowledge discussed above.

Routines are those aspects of mental models which consist of procedural knowledge derived from operational learning. They consist of know-how, captured as the

information required to complete specific tasks. Routines operate exclusively in the physical domain of knowledge and result from adaptive or single-loop learning.

Frameworks are derived through conceptual learning, leading to the development of know-why. Learning is driven by challenging assumptions, procedures and established ways of thinking and working, which together represent the framework of a mental model. Learning here occurs primarily within the conceptual domain and as a result of generative or double-loop learning.

These concepts are important because they help identify the dynamics of the links between mental models as conceptual representations of understanding and the knowledge and information those models contain. We ‘operate’ our (conceptual) mental models through the application of routines, applying established ways of working or understandings to the tasks that face us, and the existence and importance of routines in various forms (e.g. standard operating procedures) for organisations and the individuals within them has long been recognised (March and Simon 1958; Nelson and Winter 1982; Hendry, Arthur and Jones 1995; Sadler-Smith, Chaston and Spicer 1999). These routines are defined by the conceptual framework of the mental model, yet the idea of a framework supporting individuals’ routines is less widely ascribed to. Nevertheless, these are concepts which have been linked to operational and conceptual learning, and can be linked with learning at the dichotomous levels identified (Chapter Five).

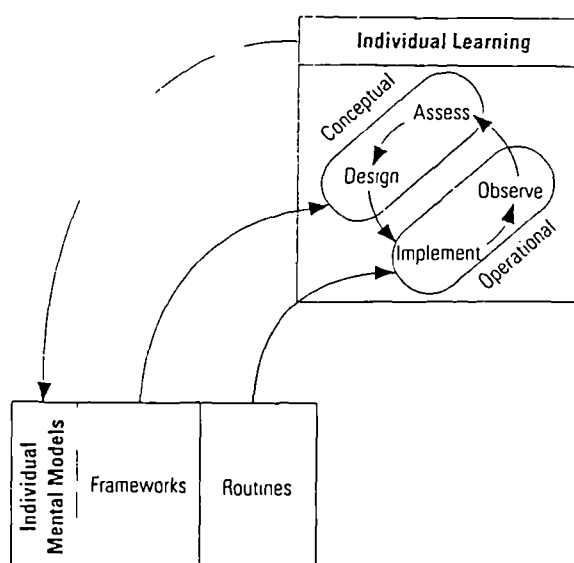
### **4.3.3 Mental Models, Learning, and Cognitive Style**

One limitation of Kolb’s (1984) experiential model was that it failed to account for the ways an individual retains and maintains the knowledge and information created through learning (Rumelhart and Norman 1985). It was suggested, that this was the role of memory (Kim 1993a; Postman 1976; Kepner and Tregoe 1965).

Memory as a means of retaining learning is often characterised as being analogous to a storage device (Powers 1973), with the knowledge we hold being contained in our minds in much the same way that papers are stored in a filing cabinet or data on a hard disk. Yet this information is useless without the ability to access and utilise the stored knowledge. Memory can therefore be thought of as consisting of both storage and retrieval systems, this suggests that it is a static system consisting solely of stored information.

Memory also has an ‘active’ element: the processes that entities adopt in order to retain, maintain and utilise information (Kim 1993a).

It is suggested here (following Kim 1993a; 1993b), that mental models fulfil this role. Mental models guide peoples perceptions, decisions and behaviour (Kearney and Kaplan 1997), appropriate mental models are therefore critical to effective learning as they act to transfer and filter the knowledge and information created through the learning process, and allow entities to apply knowledge and information to actions and decisions (Swan 1997). Kim (1993a; 1993b) makes this link explicit, describing a model of individual learning that integrates the *ODI* model of experiential learning (Figure 2.5) with the concept of individual mental models, composed of frameworks and routines. Here, the inclusion of individual mental models overcomes the stated limitation of the *ODI* cycle, in that it does not allow for the fixing of learning in memory. Kim’s model the ‘*ODI-IMM*’ Cycle (Observe-Assess-Design-Implement - Individual Mental Model) is presented in Figure 4.3.



**Figure 4.3: A Simple Model of Individual Learning: *ODI-IMM* Cycle** (Source: Kim 1993b: 40)

Furthermore, it is possible, by extension to make explicit the relationship between the levels of learning identified and frameworks and routines. In Chapter Two the two principal elements of the *ODI* were linked to operational and conceptual learning (Kim 1993a; 1993b). Operational learning occurs within an individual’s frameworks, leading

them to reinforce and support their existing routines (understanding and ways of working). Conceptual learning occurs when established routines are no longer appropriate, leading individuals to question the frameworks that define these routines and develop or alter these frameworks, ultimately creating new routines in response to changes in the environment (Vaudreuil 1995). The links between operational and conceptual learning and frameworks and routines which links mental models to the learning process are critical to developing a complete understanding of learning at the individual and organisational levels.

The relationship between mental models and learning is not as straightforward as described. An individual's existing frameworks and routines are likely to be resistant to change, and the actual process of developing new or refined ways of thinking can be difficult. Individuals will only take onboard information they see as relevant, and it is only knowledge created from this that will enter into their mental models (DeGeus 1994). Furthermore, conceptual learning is highly dependant upon an individual's own agenda, values or personal preferences (Kim 1993a).

An individual's cognitive style may also interact with their mental model. In Chapter Three cognitive style was identified as potentially affecting the development of an individual's mental model (Hayes and Allinson 1998), and can be seen as a variable intervening between mental models and learning. An individual's cognitive style will influence their preferred forms of knowledge and understanding, which in turn will influence the form of the knowledge in their mental models. This means that the form a mental model takes will influence the effectiveness of learning (Hong and O'Neil 1992; Lawless 1994). Furthermore, as analytical and intuitive cognitive styles can be linked to operational and conceptual learning, it is also possible that individuals' routines and frameworks will be influenced by their cognitive style.

To summarise, mental models affect individual's ability to create, develop, retain and maintain knowledge and information, and as a result allow them to utilise the new and changed knowledge and understanding they create through the learning process. Cognitive style has the potential to influence the effectiveness of this relationship. However, the relationships between mental models and organisational learning are more complex. Key here are shared mental models, and these are discussed next.

#### 4.4 SHARED MENTAL MODELS

It can be argued that organisations could not exist without some form of shared cognitive device (Douglas 1986). One way to characterise this is as organisational memory, recognising the risks of anthropomorphism, this can be seen as being analogous to individual memory as described above, with the role of shared mental models in organisational learning being essentially the same as the role of individual's mental models in their own learning. Organisational memory includes all the knowledge and information contained in an organisation that is retrievable by its members (Kim 1993a; 1993b). This includes: (i) formal information written down as rules and procedures; (ii) information held in computerised systems; and (iii) knowledge and information (explicit and tacit) held in the individual memories of the organisation's members (Argyris and Schon 1978). This view of organisational memory can be criticised as being static, with the relevant aspect of organisational memory for organisational learning being its dynamic parts, which influence the goals, action, and direction of the organisation and defines what an organisation chooses to remember from its experience (Kim 1993a; Jelinek and Litterer 1994). This has already been identified as the role of mental models in learning. In organisations, however there is additional complexity, as alongside their own mental models, an organisation's members also have to develop shared mental models that allow for the transfer of learning between individuals and within the organisation. These represent the common understandings and shared knowledge and experiences that allow individuals to interact in an organisational setting (Kim 1993b).

The term 'shared mental models' is used as opposed to 'organisational mental models' because whilst mental models exist in organisations, they rarely extend across the whole of an organisation. Instead organisations operate several linked models that connect the organisation's and all its members' knowledge and understanding. Not all the shared mental models that exist in an organisation will be accessible by all its members. Dixon (1994) distinguishes between 'collective meaning structures' which are held jointly by all members of an organisation, 'accessible meaning structure' held by specific groups and individuals, but accessible to the rest of the organisation as required, and 'private meaning structures' which individuals and groups withhold from the rest of the organisation. Also, as the knowledge and information held in individuals' mental models which contributes to shared mental models can be implicit, there exists in organisations knowledge which is not explicitly recognised and cannot be categorically articulated. The extent to which

individuals' mental models are integrated with an organisation's shared mental models is likely to be a function of their role and experience and the extent to which they understand and are able to articulate their own mental model, with those individuals who require greater insight into the organisation holding more complex mental models (Hodgkinson and Johnson 1994).

The models upon which this research focuses are conceptual. This links with Kim's (1993a) assertion that the organisational domain of knowledge is a subset of the general conceptual knowledge domain, and with Weick (1979) and Weick and Bougon (1986) who see organisations not as physical systems defined by place and structure, but as entities that exist largely in the mind. What happens in an organisation when people leave, is that they take with them their knowledge and expertise, aspects of the conceptual domain which are difficult to replace (Naughton 1998). This is because, in losing the knowledge and abilities of its members, the organisation has lost some of its active memory: those individuals' mental models. The development of shared mental models is one way organisations can overcome this problem. Also, the effectiveness of an organisation stems, at least in part from its ability to act in concert, and shared mental models can be identified as critical to ensuring this comes about (Spicer 1998a; 1998b; Gioia and Sims 1986; Morgan 1986).

#### **4.4.1 *Weltanschauung* and Organisational Routines**

Individuals in organisations work together through shared mental models, which consist of routines and frameworks in the same way that individual mental models do. In shared mental models these represent the active portions of organisational memory, and are characterised as: 'organisational routines' and '*weltanschauung*'.

Organisational routines are analogous with routines in individual mental models. According to Hendry, Arthur and Jones (1995) and Sadler-Smith, Chaston and Spicer (1999) they provide links between the organisation's systems and procedures, its formalised ways of working and the thinking that drives them. Their existence is supported by Costello (1996) who cites evidence of firms adopting standard forms of behaviour when dealing with problems. They can also be seen as the 'grammar' linking individuals to an organisation (Cohen 1991; Hendry Arthur and Jones 1995). Pentland and Reuter (1994: 491) describe routines as "a set of possible performances for a particular task", and within these possible performances they identify a hierarchical structure describing the differing

ways a particular routine may be enacted. This highlights the idea that a routine does not create a single pattern of behaviour but a range of potential patterns, dependent on the organisational and environmental contexts (Sadler-Smith et al. 1999). Routines therefore represent “the trade-off between efficiency and effectiveness” (Sadler-Smith et al. 1999: 6) in that they contain a limited suite of potential behaviours that an individual can apply to solving problems within a specified environment.

As described organisational routines are not without their limitations and routinised behaviour has been criticised for limiting both information search and receptivity in organisations (Weick 1979; Hendry et al. 1995). As a result, routinised behaviour can become dysfunctional. Furthermore, the individual and shared knowledge structures contained in routines are “inevitably approximations of external reality” but still represent a “rational and optimal heuristic for exploring the consequences of individual and organisational actions” (Sadler-Smith et al. 1999: 4). As such, they are developed over time through operational learning and reinforced through single-loop learning, as are routines at the individual level (Kim 1993b).

According to Hedberg (1981: 8), *weltanschauung* acts as the definition of a situation: “it influences what problems are perceived, how these problems are interpreted and what learning ultimately results.” *Weltanschauung* is a German term (Hegel 1959), and can be loosely translated as a ‘world-view.’ In organisations they are constructed from the mental models of their members (Lee, Courtney and O’Keefe 1992; Kim 1993b; Kleindl 1997). An organisation’s *weltanschauung* are analogous with the frameworks that exist within those individual mental models, consisting of conceptual knowledge and having been developed through double-loop learning, and like the frameworks at the individual level, the recognition of *weltanschauung* in the literature is less frequent.

Being analogous with the frameworks and routines of individual mental models, *weltanschauung* and organisational routines suffer from the same limitations. They are likely to be resistant to change, with organisations only taking onboard information they see as relevant or have the capability to recognise (DeGeus 1994). New ideas in organisations can fail because they conflict with the organisations existing models (Senge 1992). In organisations this problem is further compounded by the fact that the shared mental model is created in concert and as a result is dependant upon a number of individuals, all of whom have their own agendas, values or personal preferences (Kim 1993a). The utility of the shared mental model can therefore be limited by the roles that



power and influence play in organisations (Kim 1993a; Senge 1992; Probst and Buchel 1998). The relevance of and context in which mental models are operationalised are also important. For example, in the development of standard operating procedures for machinery, it is logical to expect the shared mental model to be derived from the machine operators, their trainers and the machine's manufacturers, rather than their managers.

#### 4.4.2 Shared Mental Models and Organisational Learning

Links similar to those identified between individual learning and mental models can be identified at the organisational level. Shared mental models (or their equivalent) are widely identified as critical to organisational learning (Argyris and Schon 1978; Downey and Brief 1986; Lord and Foti 1986; Senge 1990a; Kim 1993b; Jelinek and Litterer 1994; Anderson Gustavsson and Melin 1995; Price 1995; Vennix Andersen and Richardson 1997; Barker Van Schaik and Hudson 1999).

The importance of mental models stems from the fact that they have the capacity to influence the actions and decision making of both individuals and organisations. Shared mental models allow individuals in organisations to understand what is going on around them (Gioia 1986a), and organisational learning depends upon individuals making their models explicit in order that the organisation can develop shared mental models (Lee Courtney and O'Keefe 1992; Kim 1993b; Morgan 1993; Corner Kinicki and Keats 1994). Espejo (1994) sees shared understanding created through shared interactions and experiences in organisations as critical for organisational effectiveness. Nonaka, Takeuchi and Umemoto's (1996) theory of organisational knowledge creation sees the knowledge system of an organisation acting in the same way, whilst Goodwin and Ziegler (1998) suggest that increased 'cognitive complexity' (i.e. more complex mental models) increases both individual and organisational capacity to perform successfully. Hayes and Allinson (1998) suggest a more explicit relationship, where organisational learning is both governed and aided by organisational mental models which facilitate information processing and maximise the 'fit' (and communication) between the different parts of an organisation. In their action and interaction the *weltanschauung* and organisational routines of shared mental models interact with the learning and behaviour of organisations in the ways identified for frameworks and routines above, with learning in an organisation ultimately independent of any specific individual. Nevertheless, the individual is key and cannot be

divorced from the shared mental model, as it is here that the shared mental model resides (Barley and VanMaanen 1985).

These links can also be seen at the level of the group or team. Teams have been identified as important in the creation of shared vision in organisations (Van Der Heijden 1995). Also, group learning occurs when knowledge, insights, language or ideas are transferred between individuals and teams (Watkins and Marsick 1993), and shared mental models are critical to team learning (Carley 1997; Kraiger and Wenzel 1997).

The link between shared mental models and organisational learning can be further developed. Hendry, Arthur and Jones (1995) suggest that routines are important mechanisms by which individual learning can be incorporated into organisational learning, and in the same way that links were made between operational and conceptual knowledge and learning and mental models at the individual level, similar relationships can be espoused between shared mental models and learning in organisations. The link between the reinforcement and development of routines (individual and organisational) and the notions of operational and single-loop learning have been made above. Beyond this however, it is recognised that routines will ultimately need to be changed or new routines imported (Hendry et al. 1995), usually in response to significant environmental change resulting in uncertainty for an organisation (Weiss and Ilgen 1985; Tranfield and Smith 1998). Under these circumstances conceptual/ double-loop learning is required, causing individuals to examine and change or develop their frameworks, and organisations their *weltanschauung*, and develop new routines from these.

Kim (1993a) expands on this link between shared mental models and both single- and double-loop learning, recognising that at the organisational level not only is incorporation of both routines and *weltanschauung* in learning required, but the individual level also has to be integrated. He suggests that effective organisational learning (organisational 'double-loop' learning) only truly occurs when individual mental models become incorporated into the organisation through shared mental models which in turn, affect organisational learning and action. Gioia (1986b), March, Sproull and Tamuz (1991), Lee, Courtney and O'Keefe (1992) and Jelinek and Litterer (1994) all see the development of shared mental models as occurring through the experiences of both an organisation and its members, and link their idea's with those of Kolb. Recognising this, Kim (1993a; 1993b) has extend the *OADI-IMM* cycle of individual learning (Figure 4.3) to

the organisational level. This represents one of the most complete models of organisational learning currently available and will be considered in the next chapter.

It should also be recognised that cognitive style may influence the relationships between shared mental models and organisational learning, as it influenced mental models and learning at the individual level. For example, analysts and intuitives may interact with a shared mental model in different ways: Hayes and Allinson (1998) make the point that habit (both conscious and unconscious), in terms of individuals' preferred ways of processing information, is also a factor on the way organisations use mental models.

Shared mental models and their relationship with organisational learning as discussed above create a number of issues. Many of the ideas presented above extend individual constructs to the level of the organisation and could be criticised for their anthropomorphism (Glynn 1996). Although mental models have been described as conceptual, this does not mean that their content is exclusively conceptual, an individual's (or organisation's) model can, and indeed should contain both conceptual and operational knowledge. Also, models act as a filter for information, which can lead to ineffective learning if this is not recognised (Hayes and Allinson 1998).

It should be evident from the discussion above that mental models (individual and shared) are widely seen as having an important role in organisational learning and can be linked theoretically to the experiential learning model. The idea that learning in organisations occurs through and between individual and shared mental models, is mostly speculative: to date there has been little empirical research into the role played by mental models in learning. In order to undertake such research, a first and necessary step is the ability to access and understand individual and shared mental models. Consequently, the next issue considered is mental model research.

#### **4.5 MENTAL MODELS: ELICITATION AND REPRESENTATION**

The definition of mental models chosen (after Johnson-Laird 1983) places them in the conceptual knowledge domain (Kim 1993a). This creates a significant problem when we look at how we can obtain information on these models. As simplifications or representations of understanding, which can be utilised as frameworks for more complete understanding of the way we develop and refine our knowledge, mental models do not lend themselves to the representation or elicitation. They are dynamic constructs utilised,

developed and changed on a continuous basis. Classically, mental model research is driven by the desire to understand the thinking processes characterised by the mental model and usually operates through an attempt to draw fragmented information out of peoples' minds and capture it on paper or in a computer (Howard 1989). Any image produced by a researcher in this way can therefore be criticised for not truly representing an individual's mental model as the picture produced will be static and will be influenced by the researcher and the elicitation and representation techniques used (Bougon 1992). Each mental model is just one of a number of possible mental models (which may or may not be effectively understood), and any image produced by a researcher is only one of many possible representations of that model (Cossette and Audet 1992). This problem is essentially impossible to resolve, but needs to be allowed for when drawing inferences and conclusions from any images obtained. In order to provide a clear distinction between the conceptual mental model and its representation, it is suggested here that the term 'cognitive map' is utilised.

#### 4.5.1 Cognitive Maps

Cognitive mapping is allied to mental models, and draws on many of the same theories. Cognitive mapping is often seen as coming from the ideas of Tolman (1948), but should more properly be thought of as being derived from Personal Construct Theory (Kelly 1955).

Originally proposed by Kelly (1955) as a complete theory of personality, Personal Construct Theory has been latterly applied primarily as a theory of cognition (Huff 1990). The theory is based upon a fundamental postulate, that "a person's processes are psychologically channelized by the way in which he interprets events" (Kelly 1955: 46), and suggests that understanding how individuals organise their environments requires that subjects themselves define the relevant dimensions of that environment. According to Kelly, all of us attempt to construe our world, we interpret, try to understand, and explain, and to do this we employ personal constructs. These are the conclusions, interpretations or deductions that we make about life, a kind of cognition or private logic (Phares 1988). It should be recognised from this brief description that Personal Construct and mental models are theoretically similar, and as described mental models could be interpreted as a form of personal construct. Mental models have been used as the framework for this

research because they represent a current area of research concern, because they are recognised, accepted and applied in theories of organisational learning, and because in their complexities mental models link specifically with the other key concepts in this research (i.e. cognitive style and adaptive/ generative learning). These relationships are discussed in the next chapter (Section 5.6).

Cognitive mapping represents a suite of techniques which have been designed to attempt to gain insights into these personal constructs (Eden 1992). Whilst repertory grids are the empirical application which has the closest link to Kelly's theory, it has been more widely used in explaining managerial thought (Huff 1990), and all the techniques described below take their theoretical basis from personal construct theory. Significantly, personal construct theory is the key antecedent of the causal mapping methodology described and applied below (Eden Jones and Sim 1979).

Recognising the representational significance of the word map (whether we choose to interpret it literally or not), a cognitive map can be defined as a "graphical description of the unique ways in which individuals view a particular domain (field of thought or action)" (Langfield-Smith 1992: 350). Cognitive mapping draws as strongly upon geographical as it does psychological theory (Kitchin 1996), and the majority of definitions stress the idea of a cognitive map as a graphic representation of an individual's (or group's) understanding of and knowledge about a particular object, issue, problem or context (Cossette and Audet 1992; Bougon 1992; Eden 1992; Kitchin 1994; Kitchin and Fotheringham 1997). In effect, the map, is seen as a representation of spatial and environmental knowledge, but like mental models, a cognitive map can be realised through both words and pictures.

The definition of a cognitive map outlined is significantly different from that provided for a mental model. Whilst mental models are characterised as conceptual constructs for comprehension of understanding, the cognitive map is seen here as a form of representation, which allows us to obtain, picture, analyse and compare the mental models of individuals. This distinction is drawn implicitly from the emphasis given to the concepts by their users, with those using the concept of mental models being biased towards conceptual discussion (e.g. Gentner and Stevens 1983; Johnson-Laird 1985; Price 1995; Vaudreuil 1995; and Hayes and Allinson 1998), whilst work using cognitive maps tends to be more analytical (e.g. Eden 1992; Langfield-Smith 1992; Langfield-Smith and Wirth 1992; Lee Courtney and O'Keefe 1992; and Kitchin 1994). In essence we are using the cognitive map to provide us with an insight into individuals and organisations

‘theories-in-use’ (Easterby-Smith, Thorpe and Holman 1996). A key advantage of cognitive mapping over mental models, is that there exists an array of validated methods for the elicitation and representation of cognitive maps, which overcome some of the problems identified for eliciting and representing mental models.

This distinction between mental models and cognitive maps does create an additional problem, in that each cognitive map is only one of a number of possible cognitive maps that could represent the mental model, which is only one of a number of possible mental models. This is an issue which is essentially impossible to resolve, indeed the difference between deep understanding and its surface representation has been an ongoing issue in cognitive modelling (Kosslyn 1985), but it needs to be recognised and allowed for when drawing inferences and conclusions from any maps we obtain. It also needs to be recognised that having an explicit map does not guarantee the existence of a mental model (Senge 1990b). This means that any study that uses cognitive mapping to interpret mental models has to recognise the limitations of both concepts, and the fact that a cognitive map represents another layer of interpretation between our understanding of a mental model and its owners use of that model. It does however allow this difference to be explicitly identified. This addresses one of the criticisms of mental model research, that it often fails to identify any difference between an individuals mental model and any image of it obtained (Cossette and Audet 1992).

#### **4.5.2 Elicitation and Representation of Individual Mental Models**

Interviews are the most widely used methodologies for mental model elicitation. Techniques, reviewed by Swan (1995) and Huff (1990), all broadly require the researcher to draw up the cognitive map of the interviewee on the basis of their on-going discussion. Examples of interview based methodologies include: ‘open’ interviews (Scheper and Faber 1994); ‘self-Q interviews’ (Bougon 1983; Rowe and Cooke 1995), ‘Triading’ interviews (Walton 1986), and ‘Repertory grid analysis’ (Easterby-Smith Thorpe and Lowe 1991; Reger 1990; Ginsberg 1989).

Second most common are questionnaire approaches (e.g. Roberts 1976b; Day and Nedungadi 1994; Kleindl 1996; 1997; Ferguson, Kerrin and Patternson 1997). Whilst there is some contention over the validity of a questionnaire approach to elicit the complex and highly personal information characterised by mental models, this is to some extent

subordinate to the opportunity furnished by a questionnaire to collate data from a much larger percentage of a population than interviews allow, and from the potential questionnaires create in terms of comparability of response (Kleindl 1997; Day and Nedungadi 1994). To overcome their limitations, mental model questionnaires must be rigorous in their construction, testing concepts that have been previously obtained from an 'expert' sample of the population under study (Roberts 1976b). There are also a limited number of researchers who construct cognitive maps from documentary (secondary) sources (Wrightson 1976; Eden 1992).

After elicitation, a map must be drawn, and the choice of representation can result in the map obtaining a number of very different appearances, which in turn lead to different interpretations of the map's meaning (Bougon 1992). Fiol and Huff (1992), outline four examples of 'managerial maps' which represent the primary forms that can be adopted for cognitive maps. These are causal, star, hierarchical and action maps. Of these, it is causal maps which represent the core of work in cognitive mapping and are most widely used in studies of organisation.

Causal mapping assumes that individuals' knowledge and understanding is based around beliefs about causality. This type of study has endured in the literature since Bougon, Weick and Binkhorst's (1977) widely cited analysis of the mental models of the Utrecht Jazz Orchestra. Causal maps take the general form shown in Figure 4.4, which represents the 'corporate context' of personal computer suppliers in the UK (Eden and Huxham 1988) and identifies the causal relationships (links) between the issues (concepts) identified. The numbers assigned to concepts are arbitrary labels, arrows can be read as 'leads to' and dots as 'rather than'. Negative relationships are shown by a minus sign (-) next to a link, no arrowhead on a link implies that it has no identified causality.

The other forms of maps identified by Fiol and Huff (1992) have more specific applications. Star maps come from research into strategy formulation using cognitive maps (Cosier and Schwenk 1990), and have been used by Walton (1986) and Bowman and Johnson (1991). Hierarchical maps are used by those researchers interested in classification theory, such as Porac, Thomas and Emme (1987) and Hodgkinson and Johnson's (1994). Action maps are concerned with the ongoing needs of managers to understand the ways in which they interact with their environments and highlight the differing ways in managers link issues (see for example, Eden and Ackermann 1992).

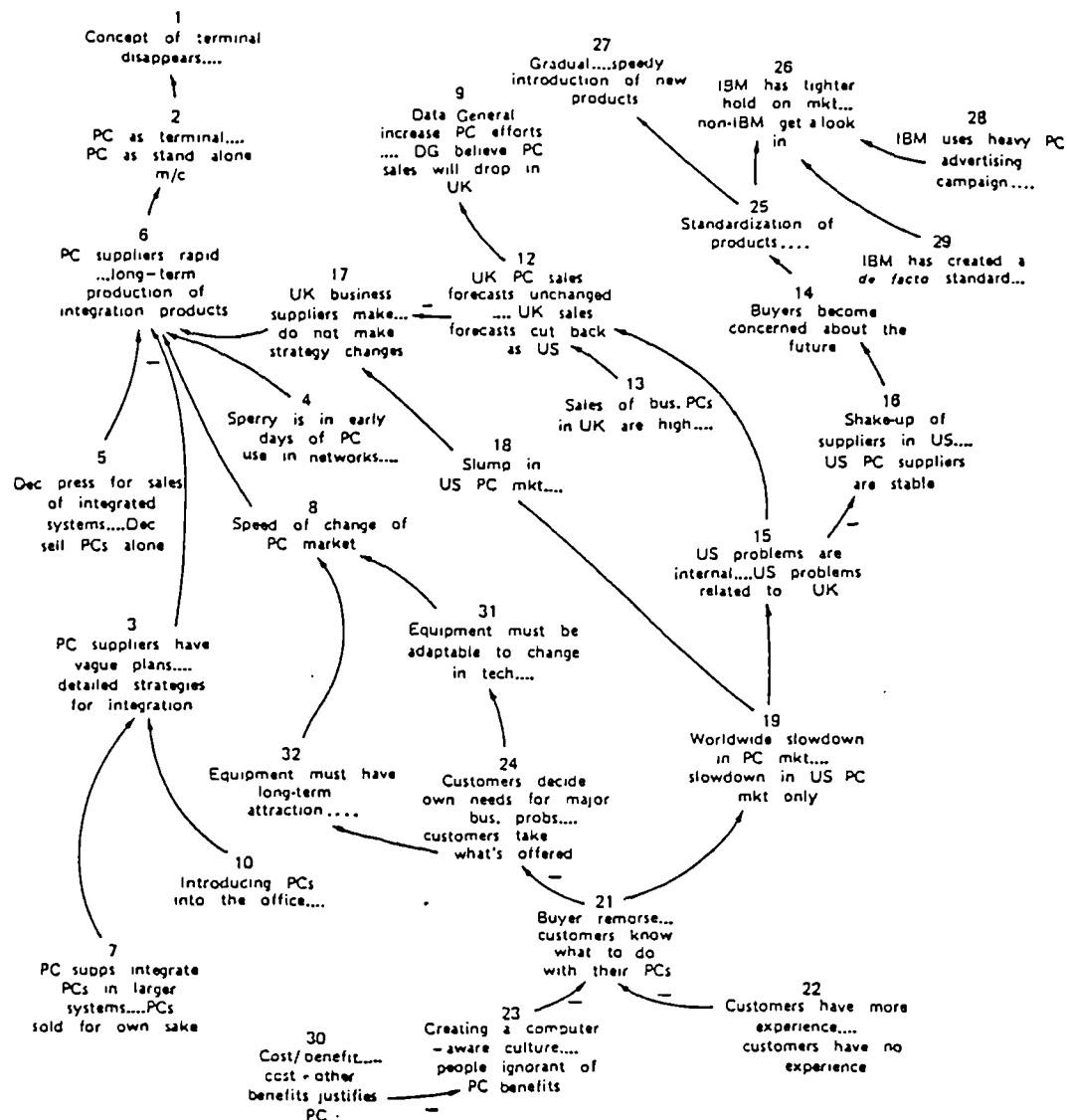


Figure 4.4: An Example of a Causal Map (Source: Eden and Huxham 1988: 892)

The importance of these techniques is their ability to structure individuals' understanding, through a simplified and logical framework which has the potential to communicate that model to others. Eliciting and representing mental models in this way therefore, provides us with the opportunity to begin a structured process of understanding organisational learning through the sharing of mental models. To do this techniques which provide information on shared mental models are required. These are considered below.

The elicitation methodologies presented are not without their problems. Cognitive mapping tends to be time consuming and complex to operate (Huff 1990). Consequently, it can be difficult to involve organisations in cognitive mapping, and research programmes have to be designed with this in mind and provide tangible benefits for participants. Also, effective cognitive mapping depends heavily on the skill of the researcher (Brown 1992),



and if cognitive maps are to be effective and bias free, researchers need to be trained and competent with the techniques. It should also be recognised that many of the techniques can be criticised for not providing quantitative data (Axelrod 1976). The choice of elicitation technique and graphic expression can result in very different appearances for the cognitive map (Bougon 1992). The real problem occurs when these are presented as *the* map rather than just one representation of it (Calori, Johnson and Sarnin 1994). Finally, as cognitive maps are representative highly subjective and personal mental models which consist of both explicit and implicit knowledge, and can be ingrained, taken for granted and hidden from their users (Fiol and Huff 1992), they at best represent guesses at rather than copies of individuals' understanding (Aitchison 1987).

#### 4.5.3 Elicitation and Representation of Shared Mental Models

The techniques described above are aimed at studying the cognitive maps and mental models of individuals, others have looked specifically at how collective maps can be obtained. These can be used for the study of shared mental models. For example, Andersen and Richardson (1997) describe techniques for group model building as part of systems dynamics research and Eden (1992) suggests that shared maps can be obtained from documentary (secondary) evidence, by building a map directly with a group or by averaging maps from individuals. A number of typologies for shared maps exist (e.g. Scheper and Faber 1994; Weick and Bougon 1986). Bougon's (1992) which describes two general forms of shared map is adopted here:

- *Aggregate* maps, which are assemblages of the cognitive maps of individuals, obtained by merging or overlaying all the labels from those maps assumed 'with great care' to denote similar concepts;
- *Congregate* maps which consist of full individual cognitive maps connected 'only and exclusively' by labels drawn from a social system map.

The form of a collective map will be influenced by the nature of the study, by the form of individual maps, and the time and resources available. Shared cognitive mapping represents a trade-off between complexity and similarity of models produced, with the desire for and extent of each these dependant upon the purpose for which models have been obtained and the mapping methodology chosen (Salancik and Porac 1986). The variety of techniques available precludes their discussion in detail here. The majority

follow similar procedures, whereby the shared map is drawn up by the researcher merging concepts taken from individual maps as a posthoc exercise (Carley 1997; Scheper and Faber 1994; Vennix Andersen Richardson and Rohrbaugh 1992; Eden Jones and Sims 1983). Alternatively, methods to develop shared maps with groups do exist, but are fraught with complexity (Langfield-Smith 1992; Risch, Troyana-Bermudez and Sterman 1995).

As well as the elicitation and representation techniques outlined above a range of techniques exist that allow for systematic and statistical analysis of cognitive maps which allow researchers to empirically compare and contrast not only shared maps but also the cognitive maps of individuals (Eden, Ackermann and Cropper 1992). These are rooted in 'Graph Theory', the branch of mathematics concerned with the investigation and analysis of simple topological structures (Harary, Norman and Cartwright 1965; Harary 1969; Swamy and Thulasiraman 1981; Wilson 1985; Santarelli 1995), as used in the study of networks in Geography (Dalton, Garlick, Minshull and Robinson 1973; Tinkler 1977; Johnson, Gregory and Smith 1986). These include the mathematical operations for the analysis of cognitive maps described by Axelrod (1976), the simulation techniques described by Nozicka, Bonham and Shapiro (1976), and the comparative techniques outlined by McKeithan, Reitman, Reuter and Hirtle (1981), Langfield-Smith and Wirth (1992) and Eden Ackermann and Tait (1993). Techniques available for the analysis of causal maps in particular are reviewed by Daniels, Markoczy and DeChernatony (1994).

The mapping process is also supported by a number of computer packages developed to aid researchers and managers with the elicitation, representation and analysis of individual and shared maps. These include '*Automap*' (Carley 1997), and '*Decision Explorer*' (Ackermann Eden and Cropper 1990; 1996; Eden 1992; 1995).

Despite the growing research into collective maps, it should be recognised that there exists the opinion that the vast majority of collective maps in the literature do not represent shared meaning (Scheper and Faber 1994). Additionally, the elicitation of shared mental models through the production of collective cognitive maps creates some specific issues. Specifically, Scheper and Faber (1994) identify three key problems. Firstly it needs to be recognised that individuals can assign different meanings to common concepts or elements on the collective map, ill defined concepts may lead to the mistaken assertion that shared meaning exists (Carley and Kaufer 1993). Also, there is no guarantee that similarity between maps results in shared meaning: it is possible that such similarities occur by coincidence, and are not truly representative of shared understanding. Thirdly, a

question arises as to how much similarity is required between maps is indicative of truly shared understanding. Conceivably, anything between zero and 100 percent of any two maps' elements could be in common: at what level (80, 70 or ? percent) could these maps be identified as shared? This is essentially a pragmatic question, with the level chosen being appropriate to a study (Carley 1997).

#### **4.5.4 Elicitation and Representation Methodology**

The complexity and range of cognitive mapping methodologies available precludes reviewing them all here. Procedures "differ in terms of the level at which they analyse concepts and relationships amongst concepts" (Swan 1995), care must therefore be taken to choose an appropriate technique. For example, repertory grid techniques (Easterby-Smith Thorpe and Lowe 1991; Reger 1990), are regarded as more rigorous than open interviews, but interviewing techniques have greater credibility with managers than repertory grids (Calori Johnson and Sarnin 1994). A researcher may therefore choose to use interview techniques which will identify less detailed maps and be more open to bias or misinterpretation, in order to ensure greater and more willing participation. Ultimately, the method chosen for a study must be appropriate to the domain or information we hope to record in the cognitive map, the type of mental model we are trying to represent, and the use to which the maps produced will be put (Eriksson and Musen 1992; Fiol and Huff 1992). Logically, a technique needs to be chosen which will provide the most relevant information, in the most relevant form for the study in question.

The discussion above aimed to introduce cognitive mapping. Details of the actual methodology used, the rationale behind it and its specific strengths and limitations are described in detail in chapters which address the research design and methods below.

### **4.6 MENTAL MODELS RESEARCH**

These examples are drawn from the literature on both mental models and cognitive maps.

Classically mental model research has been focused within the physical knowledge domain, and has concentrated on simple concepts and systems, such as Collins and Gentner's (1987) work on mental models of evaporation, Girotto, Mazzaocco and Tasso's (1997) research into conditional/ deductive reasoning, Kulhavy and Stock's (1996) work

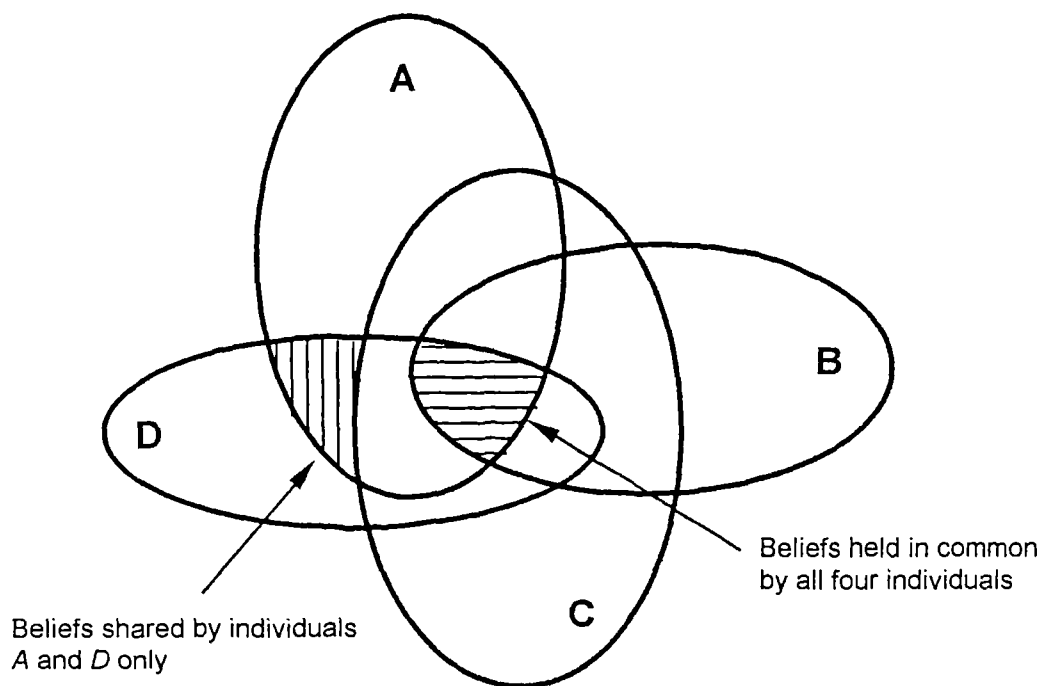
on how human cognitive systems interact with cartographic entities ('real' maps) and studies of hazard perception (Birkner and Birkner 1996; Bostrom Fischhoff and Morgan 1992). Much of this work deals with models of operating procedures, exponents include Young (1983), Matsuo, Matsui and Tokunaga (1991) and Payne (1991).

Of more direct interest to students of management, is research into strategy and strategic thinking. This includes work looking at managers mental models of competitive strategy (Daniels, DeCernatony and Johnson 1995; Daniels, Markoczy and DeCernatony 1994; Hill and Levenhagen 1995; Calori, Johnson and Sarnin 1994; Hodgkinson and Johnson 1994; Porac, Thomas and Baden-Fuller 1989; Porac and Thomas 1990; Day and Nedungadii 1994) which has been reviewed by Hodgkinson (1997). Eden and his associates have also built up a considerable body of work linking cognitive map to strategy development and implementation (Eden 1995; 1994; 1980; Eden and Ackermann 1992; Eden and Radford 1990; Eden and Hukham 1988; Cropper Eden and Ackermann 1990; Huxham and Eden 1990). Other examples include Hart's (1976), Bennett's (1990), Brown's (1992), Bougon's (1992) and Langfield-Smith and Wirth's (1992) work with cognitive maps of strategic environments, and work addressing entrepreneurial and innovative behaviour (Jenkins and Johnson 1997b; Swan and Clark 1992). Keindl's (1997) work on mental models of the product development process, work on decision making (Andersen, Maxwell Richardson and Stewart 1994; Ford and Hegarty 1984; Brannback and Malaska 1995; Volkema and Gorman 1998), Jungermann and Thuring's (1987) application of mental models to scenario planning, Isenberg's (1986) research into management knowledge, Fourier's (1996) research into work role transition and work linking individual cognition and organisational performance (Jenkins and Johnson 1997a) are also of interest.

Eden's work on strategy development and implementation mentioned above has been extended to studies with groups (Eden 1995; Eden, Jones, Sims and Smithin 1981). This work is similar in content to Risch, Troyano-Bermudez and Sterman's (1995), and Carley's (1997). Another example is Langfield-Smith's (1992) study of the collective cognitive maps of fire-prevention specialists, which describes the overlap between their individual cognitive structures in terms of shared beliefs (Figure 4.5).

Research on the relationships between mental models and learning is more limited. At the individual level, Hong and O'Neil's (1992) study demonstrates how the form of the mental model espoused in teaching can affect the quality of learning whilst both Vermunt's (1996) and Lawless' (1994) research suggests that appropriate mental models

and cognitive maps are important tools for facilitating learning. In the organisational sphere, Kim's (1993a) work on Total Quality Management and Product Development supports his assertions on the relationships between mental models and learning, whilst Thomas and Al-Maskati's (1997) work relates how links between individuals' learning behaviour and learning routines can be affected by the organisational routines under which they operate. Anderson Gustavsson and Melin's (1995) research on cross-cultural organisational expansion suggests that organisational learning occurs through mental models, although it is their intervention which creates most of the learning they describe with evidence for other learning in the company they study being limited. Spicer and Sadler-Smith (1998b) also report limited evidence for a link between mental models and learning in organisations, here in terms of single-loop and double-loop learning. Lee, Courtney and O'Keefe's (1992) work developing software designed to support the development of cognitive maps in organisations, leads them to the idea that an organisational cognitive map acts as a repository for organisational knowledge which guides individual and organisational action. They do not, however suggest how this map comes into being nor how knowledge is transferred into it.



**Figure 4.5: Four Individual Cognitive Maps with Commonly Held Beliefs** (Source: adapted from Langfield-Smith 1992: 362)

Despite the research described above, there is still a lack of empirical work on the relationships between individual and shared mental models and upon the role of these concepts in individual and organisational learning (Dunn and Ginsberg 1986). The first step needs to be an examination of the existence and extent of individual and shared mental models in organisations, before this can be extended to consider the relationship between the models and learning. Methodologies aimed at undertaking these steps are included in the research described below.

#### 4.7 SUMMARY

This chapter began by providing a definition of mental models which sees mental models, as simplifications or representations of understanding (Johnson-Laird 1983). Theory driving the mental model concept was considered and the importance of mental models as the mechanism through which knowledge and information is stored and utilised was identified. In this context mental models were characterised as consisting of both routines (which guide behaviour on a day to day basis) and frameworks (which define the deeper understanding and reasons that drive the routines).

The importance and role of shared mental models within an organisation was also identified. These were characterised as consisting of *weltanschauung* (world-views) and organisational routines, which were described as representing the operational aspect of organisational memory that allow for the transfer of knowledge and understanding between individuals and an organisation. Learning in organisations was recognised as occurring through these shared mental models and a theoretical link between shared mental models, learning levels and the experiential learning model was identified.

Techniques available for the representation and elicitation of mental models were also discussed, and the cognitive map was introduced as the preferred form of mental model representation, in order that a distinction was identified between conceptual and dynamic mental models and their formalised and static representations. Research into mental models was also described, and the point was made that there exists a paucity of effective empirical research into the role of mental models learning.

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## CHAPTER FIVE

# Organisational Learning

### 5.1 INTRODUCTION

It has been suggested that the importance of organisational learning has grown out of organisations' desires for increased competitiveness, which has led to the transfer of the idea that learning is key to survival from the individual to the organisation. This is one of the factors behind the strength of biological metaphors of organisation (Morgan 1986; 1997; Price 1994; 1995). Organisational learning is widely seen as critical if an organisation is to succeed in a rapidly changing and often poorly understood environment (DeGeus 1988; Stata 1989; Prahalad and Hamel 1990; Senge 1990a; Dodgson 1993; Garvin 1993), yet there is a paucity of evidence for this. Organisational learning can be seen as building upon individual learning to the extent that learning in organisations can be seen as being as natural and inevitable as learning by individuals (Dodgson 1993). This is an idea that can be criticised for its anthropomorphism, endowing organisations with human characteristics. In reality, the true value of learning to the organisation comes from moving beyond 'natural' learning to a status where learning is systematic and integrated throughout the organisation's activities.

Given the quantity and variety of information that exists around the organisational learning concept, it would be impractical, if not impossible to cover all of it in detail. Consequently, this review of organisational learning is aimed at describing an understanding of this concept which is appropriate to the current study and the development of the research model described in the next chapter. The chapter takes a constructive approach, beginning by discussing definitions of learning at the organisational level, and the implications of this for group/ team learning. Relationships between the process of organisational learning discussed here and the allied concept of the learning organisation are also outlined, and typologies of organisational learning and the two-level models of learning identified initially at the individual level are discussed. Following this, models of the organisational learning process are identified and explored, with Kim's

(1993b) *OADI-SMM* Cycle of Organisational Learning identified as the most complete and complex model currently available. Sources of complexity in organisational learning are then discussed and the importance of unlearning and incomplete learning are identified. The chapter then considers the assessment of and research into learning in organisations, and concludes by presenting an integrated perspective on organisational learning.

## 5.2 DEFINING ORGANISATIONAL LEARNING

Whilst there is considerable and widespread acceptance of the existence of organisational learning as a concept, there is less agreement between researchers as to what is meant by organisational learning (Tsang 1997). For example, Fiol and Lyles (1985) identify four phenomena which nine sets of researchers identify as organisational learning (Table 5.1). This confusion is exacerbated by other researchers who, rather than talking about learning, use alternative labels for these phenomena, including adaptation and change. The extent of the alternative definitions available is shown in Appendix A which incorporates 35 alternative definitions of organisational learning, and is by no means an exhaustive list.

<i>Learning as...</i>	<i>Theorists</i>
new insights or knowledge	Argyris and Schon (1978) Hedberg (1981)
new structures	Chandler (1962)
new systems	Jelinek (1979) Miles (1982)
mere actions	Cyert and March (1963) Miller & Friesen (1980)
some combination of the above	Bartunek (1984) Shrivastava & Mitroff (1982)

**Table 5.1: Learning Phenomena** (*Summarised from Fiol & Lyles 1985: 803*)

Despite the variety of emphasis in Appendix A, there does exist a number of common elements. Firstly, all identify with a process view of learning, the rationale for this (after Kolb 1984), was explained in Chapter Two, and this point of view is retained here. Secondly, a number of the definitions in Appendix A make an explicit link to the notion of



learning as an experiential process (e.g. Anderson, Gustavsson and Merlin 1995; Argyris 1977a; Glynn, Lant and Milliken 1994; Hayes and Allinson 1996; Lant and Mezias 1992; March and Olsen 1975; Stata 1989), which was also identified in Chapter Two as a central element of the model of learning developed here. Thirdly, the majority of the definitions presented identify learning as a process of change (e.g. Dixon 1994; Duncan and Weiss 1979; Edmondson and Moingeon 1998; Fiol and Lyles 1985; Hedberg 1981; Huber 1991; Nicolini and Mezner 1995; Shrivastava 1981; Swieringa and Weirdsma 1992), sometimes couched in evolutionary terms (e.g. Bain 1998; Price 1995), and for the most part as developmental change leading to improvements in efficiency and effectiveness (e.g. Dodgson 1993; Fojt 1995b; Huber 1996; Kim and Senge 1994; Probst and Buchel 1997; Snell and Chak 1996; Stein and Vandenbosch 1996), again this was identified as important in Chapter Two; in organisational terms, the only truly beneficial learning is that which creates enhanced organisational effectiveness and improved competitive advantage (DeGeus 1988 and others). As these points tie in with the definition of individual learning provided in Chapter Two, recognising the need for learning to incorporate developmental change that leads to increased effectiveness, and identifying learning as an experiential process, it is this definition (after Kolb 1984, and Kim 1993b) which will be used here to describe learning at the level of the organisation as well as the individual:

*Learning is the process whereby entities create knowledge through the transformation of experience in order that they may increase their capacity to take effective action.*

The term 'entities' can apply equally well to both individuals and organisations. Kim (1993a: 57) suggests that the meaning of the term 'learning' remains unchanged, instead, what we are looking at in organisational learning is "a semantic shift from a singular to a plural reference of a generic learning process." Nevertheless, whilst the focus for learning is still the individual, (and a number of the definitions in Appendix A make the role of the individual in organisational learning explicit: e.g. Argyris and Schon 1978; Cangelosi and Dill 1965; Dixon 1994; Kim and Senge 1994; March and Olsen 1975; Simon 1969; 1991), organisational learning is more than a magnification of individual learning (West 1994a; Spicer 1998a), and is of much greater potential benefit than the learning of the individuals within an organisation in isolation.

With the definition adopted, two important points need to be recognised. Firstly, it is not all encompassing. The point was made in Chapter Two that individual learning is not a process in isolation, and the environment in which learning occurs needs to be recognised. Whilst some definitions in Appendix A recognise this (e.g. Duncan and Weiss 1979; Hayes and Allinson 1996; Hedberg 1981; Lee Courtney and O'Keefe 1992), it is not incorporated explicitly into the definition used here. Likewise, the role of mental models, identified as critical to the learning process in organisations (Chapter Four), and in a number of the definitions in Appendix A (Anderson, Gustavsson and Merlin 1995; Argyris and Schon 1978; Cook and Yarrow 1993; Hayes and Allinson 1996; Levitt and March 1988; Stata 1989) is not incorporated into the definition presented here. It can be argued that these are concepts which are unnecessary in defining learning, but both are important aspects for developing a complete understanding of the organisational learning process, and their roles will be discussed further below. Secondly, not all authors recognise the need for learning to result in increased effectiveness (Sutton 1994). Huber (1991) makes the point that learning does not always increase effectiveness, and that it is possible for individuals and organisations to learn incorrectly or learn incorrect information, likewise learning need not result in changed behaviour. Choosing to focus on developmental and experiential learning which leads to increased organisational effectiveness, does not however mean that these circumstances do not exist. What Huber (1991) is describing are failures in effective learning. Importantly, the point made for individual learning and reiterated above holds true: learning which does not increase an organisation's effectiveness is essentially pointless (Freidlander 1983; Hawkins 1994), as time and money has been used without creating benefits for the organisation or increasing competitiveness.

### **5.2.1 Group or Team Learning**

In the discussion above, the individual and organisation have been identified as the two key units of analysis used here in describing learning. Other sites for learning are recognised, in particular groups or teams (Senge 1990a; Mayo 1993; Miner and Mezias 1996; Probst and Buchel 1997), with some researchers taking them as their particular focus for understanding learning in organisations (Watkins and Marsick 1993; Edmondson 1998). Whilst benefits may be gained from the consideration of learning at a group or team level, not least of all from the reduction of potential complexity (sources of complexity in

organisational learning are discussed below), no explicit consideration of team or group learning will be made here. This is partly to retain a manageable number of constructs, but also in recognition of the difficulties of identification and separation of the group/ team and organisational levels. Consequently, in subsequent discussion, organisational learning should be taken as referring to all collective learning. To be 'organisational' learning does not have to involve all the members of an organisation, and can occur within a sub-group, however it does have to be accessible to all those members and lead to benefits for the organisation as a whole.

### 5.3 CONTRASTING ORGANISATIONAL LEARNING WITH THE LEARNING ORGANISATION

Alongside those researchers concentrating on the learning process in organisations, there exists another group of writers who describe learning in organisations in terms of its outcomes. The first of these represents 'organisational learning', the second the 'learning organisation', and it is this concept which is considered briefly here.

One of the most widely used and accepted definitions of the learning organisation (or learning company) is Pedler, Burgoyne and Boydell's (1991; 1997) which sees a learning organisation as "an organisation that facilitates the learning of all its members and **consciously transforms itself and its context**" (*sic*). Other definitions exist, and if outcomes-based definitions of the learning organisation such as these were included alongside the process definitions of organisational learning in Appendix A its length would easily double. Within the literature these two terms are often misinterpreted, confused, and used interchangeably (Leitch, Harrison, Burgoyne and Blanter 1996). Exemplars of this failure include Edwards (1997), Garvin (1993) and Sutton (1994). There does however exist a significant and important difference.

Writers concerning themselves with the learning organisation (see, for example Garratt 1987; Beck 1989; Burdett 1993; Sutton 1994; Watkins and Golemniewski 1995; Snell and Chak 1996; Gardiner and Whiting 1997), are biased towards describing the learning in an organisation as an ideal or orientation. The learning organisation is seen as a goal to inspire and focus change, development and the creation of a learning emphasis, what Beck (1989) calls a 'paradigm of excellence'.

Seeing the learning organisation as an ideal to be aspired to, differentiates it from organisational learning. Organisational learning has been identified here and elsewhere (Hedberg 1981; Dixon 1994; Dodgson 1993; Calvert, Mobley and Marshall 1994) as describing the experiential learning process in organisations, and while the learning organisation is an orientation to which firms aspire, organisational learning represents the processes of learning that exist within an organisation. Lundberg (1995) describes this difference as representative of behavioural and cognitive perspectives, although this split is somewhat simplistic, not allowing for the complexities of these ideas and their coverage. Tsang (1997) also recognises this difference, seeing the learning organisation as being concerned with the question ‘how *should* organisations learn?’ and organisational learning with ‘how *does* an organisation learn?’ According to Tsang (1997) this difference extends further, with research into the learning organisation tending to be prescriptive, practitioner or consultancy based, and rarely rigorous, whilst organisational learning research is more descriptive, strives for scientific rigour and is characterised by a more academic approach.

<i>The Learning Company (Pedler et al. 1991; 1997)</i>	<i>The Global Learning Organisation (Marquardt and Reynolds 1994)</i>
1. A Learning Approach to Strategy;	1. Strategy
2. Participative Policy Making;	2. Supportive Atmosphere
3. Informating;	3. Learning Technology
4. Formative Accounting and Control;	4. Quality
5. Internal Exchange;	5. Knowledge Creation and Transfer
6. Reward Flexibility;	6. Vision
7. Enabling Structures;	7. Appropriate Structures
8. Boundary Workers as Environmental Scanners;	8. Environmental Scanning
9. Inter-company Learning;	9. Teamwork and Networking
10. A Learning Climate;	10. Corporate Learning Culture
11. Self-development Opportunities for All.	11. Empowerment

**Table 5.2: 11 Characteristic Models of the Learning Organisation**

Tsang’s (1997) point of view is supported by the literature that discusses the learning organisation, much of which is concerned with the delineation of learning organisation characteristics. For example, Pedler et al. (1991; 1997) describe an ‘identikit’

learning company which consists of 11 characteristics. Similar to this model is Marquardt and Reynolds' (1994) 'Global Learning Organisation' which also identifies 11 elements within an ideal learning organisation. Both these models are summarised in Table 5.2, which demonstrates the overlap between them.

Senge (1990a) is closely associated with the concept of the learning organisation (Luthans, Rubach and Marsnik 1995). He identifies five disciplines for the learning organisation: systems thinking; personal mastery; mental models; building a shared vision; and team learning. According to Senge, these represent the basic capabilities that an organisation needs to possess in response to their changing environment.

Alongside Pedler et al.'s (1991; 1997), Marquardt and Reynolds' (1994) and Senge's (1990a) models, there are a number of other examples of 'prescriptive' models (e.g. Mayo 1993; West 1994a; MacCody 1993; Gardiner and Whiting 1997). Within these, there is considerable re-invention, with significant similarities existing between all these characteristic based models. All can also be criticised along the lines outlined by Tsang (1997): they are prescriptive, derived for the most part from consultancy projects, and are therefore open to bias and lacking in scientific rigour. There is also a tendency amongst writers to over generalise their models, assuming that characteristic sets drawn up with a limited number of firms or within a specific industry is applicable to any and all organisations. Guile and Young (1996) also criticise the learning organisation for divorcing learning at the individual and organisational levels and for failing to link these to the production of knowledge. Additionally, being descriptive, they are limited in their ability to contribute to our understanding of the process of learning. Their usefulness stems from the recognition that assessment of the extent to which learning organisation characteristics exist within their organisation can help in the creation of specific programmes for organisational change or development (Pedler et al. 1991; 1997; Marquardt and Reynolds 1994). They can also be used to monitor the development and extent of learning in organisations (Gardiner and Whiting 1997; Mayo 1993; Sligo 1993).

This research is concerned with how learning occurs in organisations, in particular with the role of mental models within the learning process, and chooses to identify with organisational learning as an experiential process. Nevertheless the ideal of the learning organisation is still potentially relevant; it helps provide a focus for organisational learning, and enables the identification of organisations who learn. The discussion that

follows will incorporate literature that identifies with both concepts (partly because of the indistinct way in which the terminology is used), but will concentrate on developing a model of organisational learning.

#### 5.4 ORGANISATIONAL LEARNING LEVELS

The notion of levels of learning was introduced in Chapter Two, and the point was made that the majority of the dichotomous models of learning identified (Table 2.1) are drawn from theory on organisational learning. These are considered in more detail below, beginning with Argyris and Schon's (1974) model of single-loop and double-loop learning.

Single-loop learning occurs when an organisation solves a problem or reacts to a change in its environment without changing the underlying model that guides its processes and behaviour (Argyris 1976; 1977b). It reinforces established ways of working and problem solving in an organisation and does not lead to significant changes in ways of working in the long term. Schon (1983) gives the example of members of an organisation instigating a new system of overtime work designed to overcome a fall-off in production as indicative of single-loop learning.

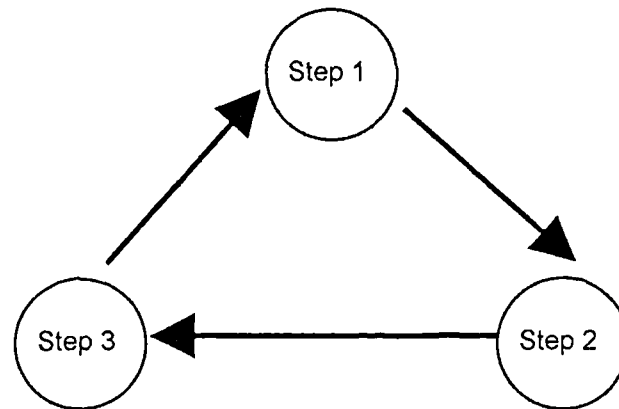
Double-loop learning occurs when more radical solutions are required. An organisation therefore modifies its underlying norms, rules, policies, or procedures in response to external stimuli. Here the organisation questions and re-frames the models which guide behaviour in response to a change in their external environment (Argyris 1976) and consequently develops new ways of working. Extending Schon's (1983) example, double-loop learning would require the members of the organisation to come up with an innovative solution to the fall-off in production. This could include, but would not be limited to, diversifying into new markets to make use of the excess production capacity.

Morgan (1986) describes single- and double-loop learning diagrammatically (Figure 5.1), and sees learning as a three stage process of: (1) monitoring the environment; (2) comparing this with existing routines and operating procedures; and (3) taking appropriate action. When double loop learning occurs, Morgan introduces an additional step: (2a) where the organisation questions its existing routines and operating procedures and re-frames them in response to the environmental change experienced. It should be recognised that whilst these two terms (single-loop and double-loop learning) describe

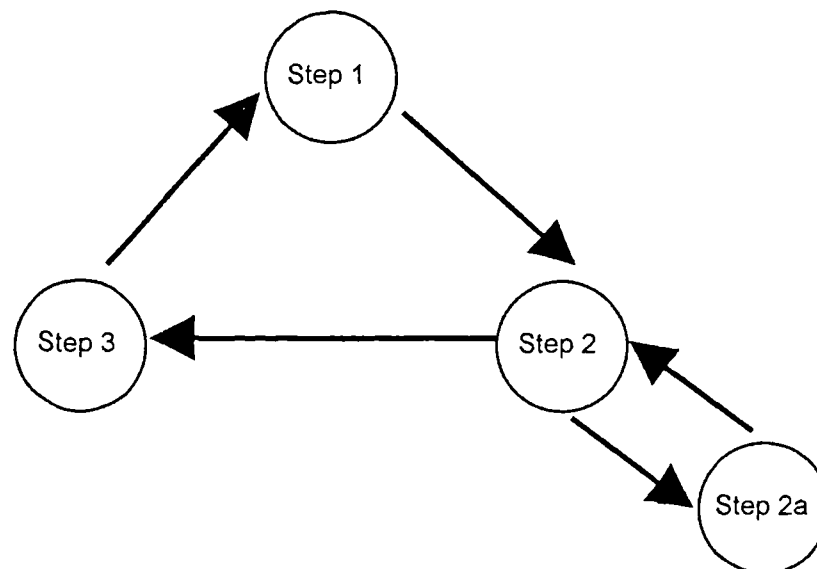
different ways or levels of learning, in much of their usage “double-loop is assumed to be quantitatively better than (rather than qualitatively different from) single-loop learning” (Sadler-Smith, Badger and Chaston 1998). Argyris himself (1977a) recognised that double-loop learning was more critical, subsuming and supporting single-loop learning.

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*Single-loop learning* rests in an ability to detect and correct error in relation to a given set of operating norms:



*Double-loop learning* depends on being able to take a “double look” at the situation by questioning the relevance of operating norms:



Step 1 = the process of sensing, scanning, and monitoring the environment.

Step 2 = the comparison of this information against operating norms.

Step 2a = the process of questioning whether operating norms are appropriate.

Step 3 = the process of initiating appropriate action.

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**Figure 5.1: Single- and Double-loop Learning** (Source: adapted from Morgan 1986: 88)

It should be recognised that the alternatives presented in Table 2.1 can all be linked to single- and double-loop learning. For example, Fiol and Lyles' (1985) distinction of learning as consisting of higher and lower levels can be linked to Argyris and Schon's (1974; 1978) model. Furthermore it can also be linked with Kim's (1993b) conceptual and operational learning, and one consequence of this is that whilst Argyris and Schon's theory is rooted in studies of organisation, it can be applied to individual learning (Dodgson 1993; Snell & Chak 1996).

Another alternative to Argyris and Schon's model is Senge's (1990b) description of learning as adaptive or generative. Adaptive learning is about coping and dealing with the current environment in new and better ways, and equates well with single-loop learning. Senge (1990b) takes a behavioural basis for his model, and adaptive learning can be seen as representing organisations' and individuals' propensity to behave in a 'conservative' manner. Generative learning moves beyond and builds upon adaptation, requiring individuals and organisations to develop "new ways of looking at the world" (Senge 1990b: 8). Generative learning can be characterised as the development of new skills and new ways of working, and is representative of a propensity to 'innovate'. Senge's terms, like Argyris and Schon's can be linked to the others identified, however, Senge's terminology has a number of advantages over Argyris and Schon's. Senge (1990b) explicitly recognises it as applying to the learning of both individuals and organisations. Also Senge's behavioural emphasis means that adaptive and generative learning can be linked to the observable behaviour of individual and organisations. This is particularly important for researchers aiming to identify the existence of these levels of learning in organisations. Additionally, Senge's (1990b) terms are more descriptive, and hence more easily understood than those of Argyris and Schon (1974; 1978). Consequently subsequent discussions that incorporate a two level model of learning will use Senge's terms.

Double-loop learning was identified above as quantitatively better than single-loop learning, and this distinction applies equally well for generative over adaptive learning (Argyris 1977a; DeGeus 1988; Stata 1989; Garvin 1993; Sadler-Smith, Badger and Chaston 1998). However, organisations (and individuals) do need learning of both types (Argyris 1992). Adaptive (single-loop) learning is appropriate for the routines and systems that guide the repetitive everyday behaviours of the organisation and its individuals. Generative (double-loop) learning is necessary for the development of new solutions in the



light of change, or to deal with the failure of existing working patterns. It is also important to recognise that in both cases the organisation needs to be able to recognise the need for learning (Schon 1983). These distinctions are important in part because, whilst most organisations are competent in learning adaptively, very few are capable of maintaining effective generative learning (Argyris 1977b).

Not all researchers distinguish different types of learning in this way, critics include Burgoyne and Hodgson (1983), and Klein (1989), who suggest that the types of learning identified are not unique but are inextricably linked. This criticism comes about in part because identification of where adaptive learning stops and generative learning starts is difficult, and often relies upon subjective assessment, but it is also derived from the lack of definition is brought about by the attempts by some authors to add additional types around the pairs typically identified. For example, Argyris and Schon's (1974; 1978) model has additional types identified (see for example, Hawkins 1994; Snell & Chak 1996; Torbet 1994). These include zero or 'not' learning, a state which may seem obvious but nevertheless is worthwhile identifying, and triple-loop learning which is where single-loop and double-loop learning are combined, individuals become more inventive, and can be characterised as being able to 'learn about learning' (Dodgson 1993). Given the speculative nature of these additional types, and for the sake of clarity and simplicity a two fold model will be used as the basis for this research.

The importance of adaptive and generative learning within this research stems from the links between these concepts and the other key aspects of the learning environment previously identified. Argyris and Schon (1974; 1978) see single- and double-loop learning as representing two key ways organisations (and individuals) can respond to and learn from their experiences. Senge's (1990b) model builds upon this to describe the behaviour individuals and organisations need to develop in order to learn from experience in both adaptive and generative ways. From this, it is possible to link the ideas of adaptive and generative learning to mental models. Mental models were identified as the mechanisms that allow individuals and organisations to retain and transfer their learning (Chapter Four), and consist of two key elements: routines and frameworks. Routines hold procedural and operational knowledge and are developed through adaptive learning. Frameworks (*weltanschauung* in shared mental models) consist of conceptual knowledge and are developed through generative learning. This elaboration potentially overcomes one of the

criticisms of the two learning levels identified above, in that as generative learning leads to the development and creation of frameworks, and adaptive learning to routines, the identification of whether learning is adaptive or generative, no longer relies entirely on subjective assessment, but is evidenced by changes in the routines and frameworks in use in an organisation. Furthermore it is through collective adaptive and generative learning within organisations, and individuals sharing their (adaptive and generative) learning with each other and the organisation as a whole that shared mental models are developed.

## 5.5 ORGANISATIONAL LEARNING TYPOLOGIES

When defining learning, the point was made above that no real consensus exists between authors and researchers in organisational learning as to what the term itself means, with researchers all placing their own 'spin' on the study of learning in organisations. This combined with the popularity of organisational learning (Figure 1.1), has lead to an impressive, if somewhat unwieldy literature, and as a result, organisational learning theory can and has been criticised for a lack of both consensus and consistency in approach (Shrivastava 1983; Huber 1991; Crossan, Lane, White and Djurfeldt 1995; Easterby-Smith 1997; Spender 1996). This is demonstrated in the range of alternative typologies describing organisational learning (Nicolini and Mezner 1995). Thee extent of these precludes considering them in detail here. However, eight key typologies (Hedberg 1981; Shrivastava 1983; Huber 1991; Glynn, Lant and Milliken 1994; Crossan, Lane, White and Djurfeldt 1995; Miller 1996; Easterby-Smith 1997; Edmondson and Moingeon 1998) are summarised in Appendix B. In Appendix B, the descriptors used by these researchers for their differing forms of learning in organisations are identified and the core ideas represented by each learning form is summarise and exemplars of work on each of these forms is provided. This is not an all encompassing list, these examples have been included here because they are heavily referenced and characterise the range of typologies available. Other examples include Addleson (1996), Miner and Mezias (1996), Sutton (1994), Levitt and March (1988), and Leary, Boydell, van Boeschoten and Carlisle (1986).

All of the dichotomies of learning identified in Table 2.1 and discussed in the previous section could also be included in Appendix B. These are much more significant and are even more widely referenced than any of the more complex alternatives identified, many of which represent extensions or elaborations which can be aggregated into a two

level model. This aggregation is supported by Hedberg (1981), Glynn et al. (1994) and Miller (1996) who explicitly identify two-fold typologies in their respective frameworks. This does not negate the existence of other more complex forms of learning in organisations (Huber 1991; Miller 1996). However as a typology should *simplify* the complexity of the real-world processes, the retention of the long standing, recognised and well supported two level model is the most logical and appropriate conclusion. This is also the only model which can be clearly linked to the other elements of learning identified here. For these reasons, this research will continue to develop a model of learning which incorporates the notion of adaptive (single-loop) and generative (double-loop) learning (Senge 1990b; Argyris and Schon 1978). Nevertheless, as a model of organisational learning, this excludes one important element. Some of the writers included above (e.g. Huber 1991; Crossan et al. 1995; Edmondson and Moingeon 1998) identify that learning on the part of individuals contributes to learning at the organisational level. This has already been identified as an important aspect of organisational learning, and ideally a typology should recognise the role played by individuals. Other units exist, with some researchers including the group, team or even industries as units of analysis in their typologies. However, in common with the approach described above only the individual and organisation are identified here as key.

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		UNIT OF ANALYSIS	
		Individual	Organisation
LEARNING LEVEL	Adaptive	Individual Adaptive Learning	Organisational Adaptive Learning
	Generative	Individual Generative Learning	Organisational Generative Learning

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**Figure 5.2: A Level and Unit Typology of Organisational Learning**

Figure 5.2 describes a simple typology of organisational learning that incorporates the two key dimensions identified. Learning levels are described according to the adaptive/generative distinction identified above. No specific relationship between these two levels of learning is supposed. Whether adaptive and generative learning represent poles of a single factor, two linked (correlated) factors, or orthogonal (uncorrelated) factors, is less important than the recognition that they characterise fundamental differences in the approaches organisations (and individuals) take to learning. Figure 5.2 also distinguishes the organisation and individuals as units of analysis, which themselves were incorporated in some of the typologies identified above (Huber 1991; Crossan et al. 1995; Edmondson and Moingeon 1998). The point was also made above that adaptive and generative learning are constructs which apply equally well to the individual and the organisation, and this typology recognises this explicitly.

Whilst simplistic, this model (Figure 5.2) is nevertheless inclusive incorporating the fundamental aspects of learning identified here. Furthermore, it allows for expansion of the notions it contains to incorporate the wider descriptions of learning that exist in the literature (Appendix B), and retains a structure which links explicitly to the other key elements of the understanding of learning developed here (experiential learning, cognitive style, and mental models).

## **5.6 MODELS OF THE ORGANISATIONAL LEARNING PROCESS**

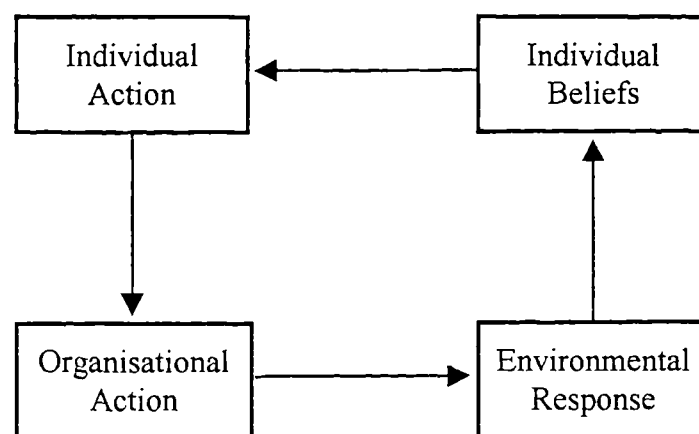
Moving beyond the description of learning types and levels, models which describe the process of learning in organisations, and build upon the experiential models of individual learning described in Chapter Two are described below. Consideration is limited to models which contribute to the development of an understanding of organisational learning aimed at developing the research model described in Chapter Six. To this end two key models of organisational learning will be outlined, beginning with one of the earliest, and most recognised, March and Olsen's (1975) 'Behavioural Model of Organisational Learning'.

### **5.6.1 A Behavioural Model of Organisational Learning (March and Olsen 1975)**

March and Olsen's (1975) cycle of organisational learning is arguably the most popular and widely accepted model of organisational learning in existence (Hedberg 1981; Kim

1993a; Glynn, Lant and Milliken 1994). March and Olsen (1975) characterise the organisation as a behavioural system, and see the individual as an integral element of the organisational learning process, making a clear distinction between individual and organisational action. Individual beliefs drive individual actions. Individual actions lead to organisational actions which produce a response in the environment, which ultimately affect individual beliefs (Figure 5.3). Organisational learning occurs in the cycle when the changes in the environment lead individuals to change their beliefs about it, and as a result, develop a new set of individual and organisational actions (March and Olsen 1975).

A key strength of this model is that it clearly differentiates the roles of the individuals and organisations in the learning process. It is also identified by Argyris and Schon (1978) as a precursor of the model of single- and double-loop learning described above. March and Olsen's (1975) model also recognises that learning is not a process in isolation but occurs in response to a wider environment. This model also (implicitly) recognises the role of mental models in the learning process, as individual beliefs can be characterised as existing within mental models. However, this understanding is simplistic: the operation of individual beliefs on organisational action is more complex.



**Figure 5.3: A 'Behavioural' Model of the Organisational Learning Process** (After March and Olsen 1975)

### 5.6.2 The 'Observe-Assess-Design-Implement - Shared Mental Model' Cycle of Organisational Learning (Kim 1993a; 1993b)

The alternative exemplar presented here is Kim's (1993a; 1993b) 'integrated' model of organisational learning: the '*OADI-SMM*' Cycle (Observe-Assess-Design-Implement - Shared Mental Model). This incorporates the experiential learning model (Kofman 1992; after Kolb 1984), the 'behavioural' model of organisational learning (March and Olsen 1975), single- and double-loop learning (Argyris and Schon 1978), and makes explicit the roles of individuals and organisations, operational and conceptual learning, and individual and shared mental models (Kim 1993b) (Figure 5.4).

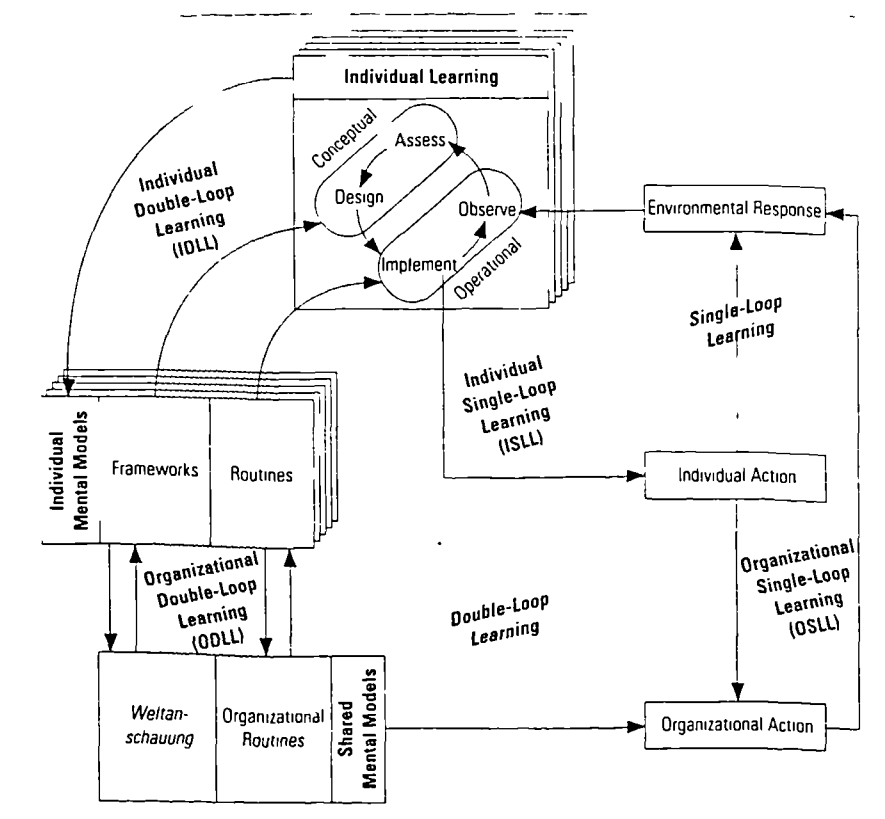


Figure 5.4: The Observe-Assess-Design-Implement - Shared Mental Model (*OADI-SMM*) Cycle (Source: Kim 1993b: 44)

In Kim's (1993a; 1993b) model, March and Olsen's (1975) 'individual beliefs' has been extended to incorporate the *OADI-IMM* model (Figure 4.1), which was identified as making explicit the relationship between individuals' experiential learning and their mental models. According to Kim (1993b) it is through the action of the individual experiential learning cycle that individual beliefs can change, but these changes will only be ratified by individuals when they become codified in their mental models. The role of shared mental models in organisational learning is also made explicit. Having been defined as the operational aspect of organisational memory (Chapter Four), these can be characterised as mechanisms that allow an organisation to retain and utilise knowledge and information. Also, individual mental models have been characterised above as collectively contributing to the shared mental models in an organisation, and in Kim's model, this link is made explicit with effective learning at the organisational level occurring through the interaction of individual and shared mental models.

Kim's (1993b) model (Figure 5.4) also identifies where in the organisation single- and double-loop learning occur. Individual single-loop learning is seen as occurring when individual action leads to an environmental response that is observed by the individual but where the individuals mental model remains unaffected. Organisational single-loop learning occurs when individual action leads to organisational action, which creates a response in the environment, which whilst it is observed by individuals in the organisation does not lead to changes in either individual or shared mental models. Individual double-loop learning is when the environmental response to individual action leads that individual to develop their mental model. Organisational double-loop learning is when the environmental response to individual and organisational action leads to the development of both individual and shared mental models.

Kim's model may however be criticised on a number of grounds. O'Brien (1994) suggests that it represents common sense, in that the processes it describes already occur in many organisations. This assertion is doubtful, and does not mean that the structuring and surfacing of these ideas for less effective organisations is not worthwhile, nor does it negate the academic process of attempting to develop and understand the complexities of the process it describes. DeGeus (1994) also make the point in response to Kim's model that only 'relevant' information is turned into knowledge which enters into the mental models of individuals and the institution, and identification of which information is

relevant is central to effective organisational learning. Additionally, if the individual is the seat of learning in organisations, placing a box around the individual experiential learning cycle is divisive as it divorces the process of learning at the individual level from the learning of the organisation as a whole. The relationship and means of interaction between individual and shared mental models are also not adequately espoused. Furthermore, the relationship between organisational learning and the wider environment is incomplete: the model (in common with many others) fails to allow for the fact that learning can occur from actions outside the organisation. Finally, the model does not incorporate the notion of cognitive style, identified above as potentially having a significant impact upon the learning process. Despite these criticisms, Kim's (1993a; 1993b) model represents a significant theoretical advance upon March and Olsen's (1975), and represents the most complete model of organisational learning available.

### **5.6.3 Organisational Learning Models: Commentary**

The two models presented are not the only ones, other examples include: Daft and Weick (1984); Lee, Courtney and O'Keefe (1992); Van Der Ven and Polley (1992); Corner, Kinicki and Keats (1994); Dixon (1994); Robey and Sales (1994); Sterman (1994); Van Der Heijden and Eden (1995); Snell and Chak (1996); and Synder and Cummings (1998), all of which attempt to describe the learning process in organisations, often from a specific point of view. They also recognise many of the key aspects and elements of learning identified above. The experiential learning model is incorporated into the learning models of Daft and Weick (1984), Dixon (1994) and Van Der Heijden and Eden (1995). Synder and Cummings' (1998) model includes a recognition of March and Olsen's (1975) behavioural model. The roles of individuals and organisations in learning are made explicit by Corner, Kinicki and Keats (1994). Robey and Sales (1994) recognise the role of the wider environment. Snell and Chak's (1996) model incorporates single- and double-loop learning. Mental models are recognised as elements of organisational learning (at least implicitly) by Daft and Weick (1984), Lee, Courtney and O'Keefe (1992), Robey and Sales (1994), and Snell and Chak (1996), whilst Corner, Kinicki and Keats (1994), and Sterman (1994) see the sharing of these models as critical.

All these models can be criticised for their anthropomorphism, for describing organisational learning in less than explicit terms, for mostly ignoring that learning takes



different forms or occurs through different modes (i.e. adaptively or generatively), and specifically (excepting Corner et al. 1994) for failing to characterise the role of the individual in the organisational learning process. Given that organisational learning has been characterised above as being driven by individual learning, this is a major failing. More importantly none of these models add significantly to the simple model espoused by March and Olsen (1975) over twenty years ago, which is still widely cited and utilised by researchers today. Only one model represents any improvement: Kim's (1993a; 1993b). Despite the criticisms outlined above, this represents the current apogee of theorising on the organisational learning process, it expands upon rather than replaces March and Olsen's (1975) model, making explicit many of its implicit elements. Additionally, unlike most of the alternatives presented above Kim's (1993a), is at least partially supported by (his own) research.

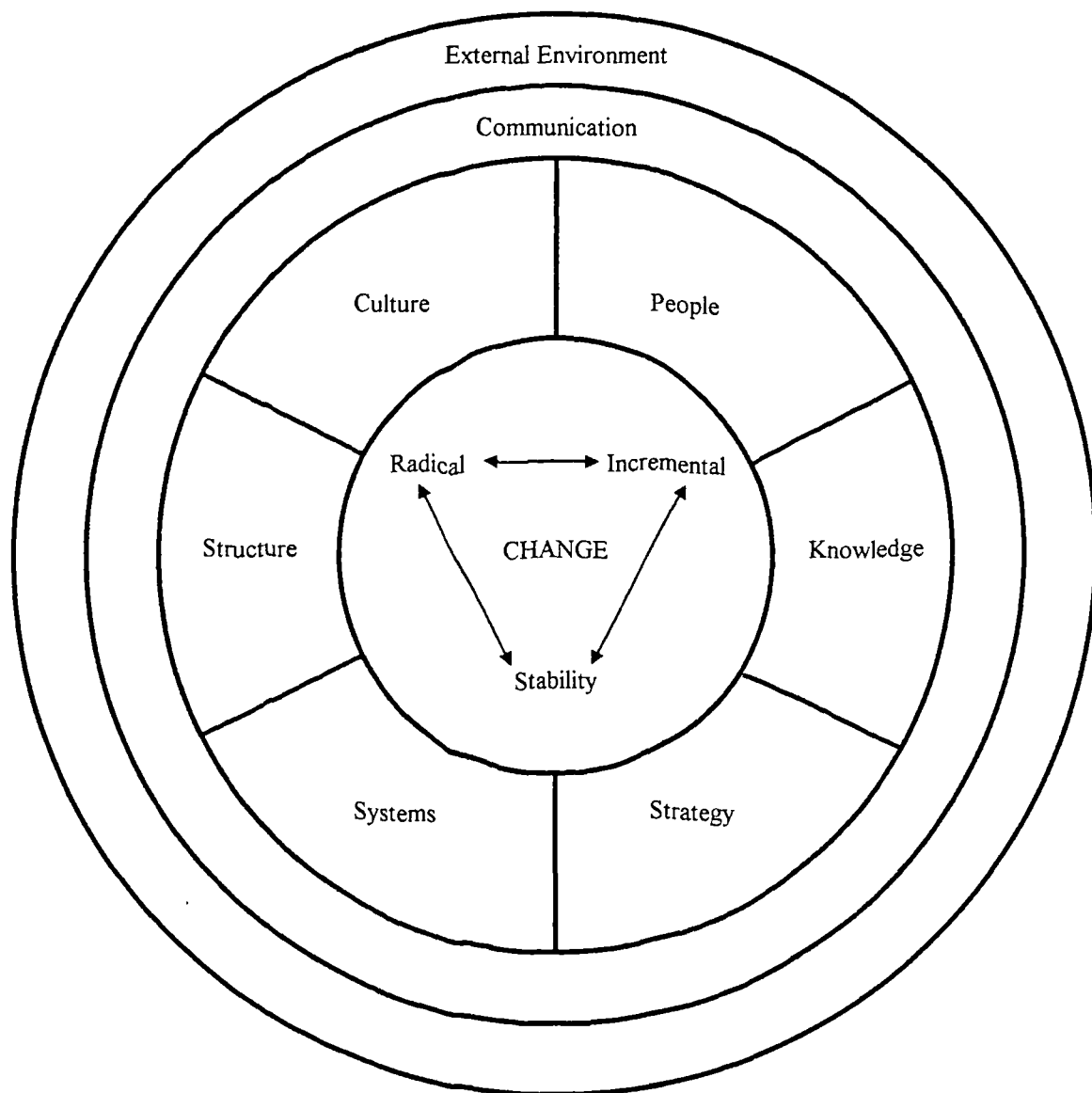
## 5.7 THE COMPLEXITIES OF THE ORGANISATIONAL LEARNING PROCESS

The next step in developing our understanding of learning is to consider the operation of learning in the organisational setting. It has been suggested that learning in organisations is more than an aggregation of individual learning, whilst the models considered above do (to a greater or lesser extent) describe the process of organisational learning they fail to address the actualities of learning in organisations. Organisational learning adds complexity to individual learning and in order to fully understand the learning process in organisations, we need, in turn to understand the sources of this complexity.

Writers considering the sources of complexity in organisations use a range of terms, e.g.: agents and triggers (Probst and Buchel 1997); barriers (Easterby-Smith 1997); factors (Sattelberger 1991); problems (West 1994a; Price 1995); and drivers (Torbet 1994). All of these represent elements of an organisation's environment which influence its learning effectiveness, and all can have both positive and negative influences upon organisational learning, and discussion of these issues solely as 'barriers' or 'problems' creates an overly negative attitude which is divisive when effective learning is required Hedberg (1981). These elements, alongside two further issues 'unlearning' and 'incomplete learning' are discussed below.

### 5.7.1 Elements Influencing Organisational Learning Effectiveness

Figure 5.5 identifies elements of an organisation's environment which influence its learning effectiveness. Change is at the centre of this model, surrounded by six sectors: people; knowledge; strategy; systems; structure; and culture. These represent key aspects of the organisation's internal environment which have been identified from the literature, and are surrounded by a seventh aspect: communication which allows the other aspects to interact. Communication also mediates between the internal aspects of the environment and the external environment. Each of these aspects is considered briefly below.



**Figure 5.5: Environmental Elements Influencing Organisational Learning Effectiveness**

### 5.7.1.1 *Change*

The importance of change in organisational learning is widely recognised (Cummings and Huse 1989; Klein 1989; West 1994a; Price 1995; Nicolini and Mezner 1995; Synder and Cummings 1998), and the nature of change and an organisation's responses to it can significantly impact upon the effectiveness of learning. Recognising this Figure 5.5 identifies three change states which require differing responses from the organisation.

Radical changes and the influence of significant change events are widely recognised as triggers of learning in organisations (Hedberg 1981; Easterby-Smith 1990; Benjamin and Mabey 1993; West 1994a; Probst and Buchel 1997). Incremental change is less widely recognised (Weick 1996), representing periods where change is continuous and less dramatic, but still requires organisations to respond (Miller and Freisen 1980; March and Olsen 1989; March Sproull and Tamuz 1991). Whilst change instigates learning, organisations also require periods of 'stability' (Figure 5.5) which allow them to take stock, and provide opportunities to reflect upon experience, which leads to the fixing of learning in the organisation (Lant and Mezias 1992; Van der Heijden and Eden 1995). Without these periods of calm, organisations would be unable to learn unless they had problems, and it has been posited that always reacting to change is not always necessary nor advisable for learning in organisations (Cyert and March 1963; Herriott, Levinthal and March 1985). They also provide the time needed for the active aspects of learning on the part of individuals and organisations that are required to both fix and create learning (Daft and Weick 1984). The effectiveness of learning will depend upon organisations' ability to deal with change (Kim and Senge 1994) and the interaction of the three change periods identified (Lant and Mezias 1992; Van der Heijden and Eden 1995). The only proviso is that the overall degree of learning must be at least equal to or greater than the rate of change in the environment (West 1994b). It should also been recognised that seeing change in this way, could like a number of the other organisational constructs discussed here be criticised for its anthropomorphism.

### 5.7.1.2 *People*

Probably the greatest potential source of learning in an organisation is its members (Hedberg 1981; Jones and Hendry 1994; Locke and Jain 1995; Probst and Buchel 1997). The idea that the individual represents the primary focus of learning in the organisation has

already been identified (Chapter Two) and is widely recognised, with the effects of groups (Schon 1983; Garratt 1990; Brown and Duguid 1991; Mayo 1993; Chaharbaghi and Newman 1996; Wenger 1998), leaders (Duncan and Weiss 1979; Smircich 1983; Sims and Lorenzi 1992; Burgoyne 1994; Smith 1994; Thomas and Al-Maskati 1997; Petts, Herd and O'hEocha 1998), elites (Sattelberger 1991; Probst and Buchel 1997) and power and interpersonal relationships (Paton, Brown, Spear, Chapman, Floyd and Humvee 1984; Corner, Kiniki and Keats 1994; Iles 1994; West 1994a; Fojt 1995c; Harvey 1995), as well as many other human factors all discussed in the organisational learning literature.

#### *5.7.1.3 Knowledge*

The importance of knowledge with respect to learning is increasingly recognised (West 1994a; DiBella, Nevis and Gould 1996; Huber 1996; Roth and Senge 1996; Gnyawali and Grant 1997; Starkey 1998). Ultimately, as knowledge is created or acquired through learning (Argote 1996), and the creation or acquisition of knowledge is seen as critical for organisational success (Nonaka 1991; Nonaka, Takeuchi and Umemoto 1996), the effectiveness of learning and of an organisation's ability to respond to change is dependant upon its ability to use, develop, create and acquire knowledge (Kearney and Kaplan 1997). It is for these reasons that knowledge is included in the model (Figure 5.5), and the relationships between knowledge and learning have been discussed above (Chapter Four).

#### *5.7.1.4 Strategy*

Strategy is also widely seen as influencing organisational learning effectiveness (Fiol and Lyles 1985; Huber 1991; Dodgson 1993; Carmona and Gronlund 1998; Fulmer, Gibbs and Keys 1998). Strategies which foster learning allow flexibility and adaptability and ensure that the organisation is open and responsive to changes in its environment (Fiol and Lyles 1985). They also need to be open to innovative and experimental solutions to problems (Huber 1991; March, Sproull and Tamuz 1991; Van de Ven and Polley 1992; Price 1995; Chan Kim and Mauborgne 1997a; Carmona and Gronlund 1998). Furthermore, an organisation's approach to strategy can also affect its learning and ability to respond to change (Lessing 1991; Corner, Kiniki and Keats 1994; Jones and Hendry 1994; Van der Heijden 1995; Van der Heijden and Eden 1995; Richmond 1997). Strategy also acts as a

filter between the environment and an organisation (Ansoff 1965; Chandler 1966; Snow and Miles 1983), and effects the disbursement of resources, which affects the level and direction of resources devoted to learning (Dodgson 1993). Finally, the success or failure of an organisation's strategy can also influence its learning (Carmona and Gronlund 1998). Past success acts as a barrier to learning, reducing an organisation's desire and incentives to learn (Argyris 1990; Easterby-Smith 1990; Probst and Buchel 1997). Garvin (1993) identifies this as 'unproductive success' and contrasts it with 'productive failure', where the organisation gains long term benefit by learning from its mistakes.

#### *5.7.1.5 Systems*

An organisation's systems are another element which can contribute to its learning effectiveness (Sattelberger 1991; Lessem 1993; West 1994a; Probst and Buchel 1997). Frequently systems are seen as aspects of an organisation's technology (Dodgson 1991; Attewell 1992), particularly when linked to the growing recognition of the importance of knowledge (Epple, Argote and Devadas 1991). However technology is only one aspect of an organisation's systems that can influence learning. Social and other systems (such as working practices) can also contribute to and detract from organisational learning (Ackoff 1994). More generally, organisations have themselves been described as learning systems (Smircich 1983; Simon 1991; Brown and Duguid 1991; Kim 1993b; Iles 1994; Sutton 1994), where learning occurs through change and development within the system, particularly where the system begins to exhibit 'emergent' characteristics, developing abilities or function that cannot be explained from the parts of the system alone (Willke 1991). Again this links back to the idea of mental models (Chapter Four) and links to issues discussed under 'knowledge' above, this builds into the idea that learning can occur through deliberate manipulation of an organisation's systems (De Geus 1988; Huber 1991; Garvin 1993; Kim and Senge 1994; Roth and Senge 1996; Brodtrick 1998; Wenger 1998).

#### *5.7.1.6 Structure*

Organisational structure is important because it is structure that ultimately defines the way in which processes interact within an organisation (Chandler 1990; Pedler et al. 1997). Consequently, a number of writers identify structure, and the size and form of

organisations as affecting organisational learning (Argyris 1967; Levinthal 1991; Corner, Kiniki and Keats 1994; West 1994a; 1994b; Harvey 1995; Nicolini and Mezner 1995; Rahim 1997; Carmona and Gronlund 1998). Different parts of an organisation may also exhibit different learning patterns (Crossan and Hulland 1996), and that the size of an organisation may affect its learning (Chaston, Badger and Sadler-Smith 1999). Easterby-Smith (1990), Torbet (1994), and Smith (1994) all identify inappropriate structure as a learning barrier. Appropriate structures are flexible (Fojt 1995a), and open to innovation, insight and change (Fiol and Lyles 1985; Ackoff 1989; Dodgson 1993; Romme 1996). More generally, organisations need to adopt a contingency approach to their structure, adopting and adapting new forms as appropriate. This is enshrined in Morgan's (1993; 1997) 'Holographic Organisation' which was developed from the 'Knowledge Creating Company' (Nonaka 1988; Nonaka and Takeuchi 1995).

#### *5.7.1.7 Culture*

The interaction between culture and the organisation is complex (Silvester, Anderson and Patterson 1999), culture has the potential to influence not only the extent and effectiveness of organisational learning, but also what it is that the organisation actually does learn, and as a result is one of the most widely recognised actors on organisational learning (Fiol and Lyles 1985; Feldman 1986; Beck 1989; Easterby-Smith 1990; Muller and Watts 1993; Iles 1994; Luthan, Ruback and Marsnik 1995; Pedler et al. 1997; Rahim 1997; Bain 1998). Organisational culture needs to be conducive to, supportive of and open to learning (Fiol and Lyles 1985; Iles 1994; West 1994a; 1994b; Fojt 1995c; Tompkins 1995), with mismatched or inflexible 'corporate' cultures often cited for learning failures (Harvey 1995; Locke and Jain 1995; Schein 1996). Others see learning as creating cultural attributes (Argyris and Schon 1978; Dutton and Duncan 1983; Jelinek 1979; Shrivastava and Scheider 1984; Mayo 1993).

#### *5.7.1.8 Communication*

Communication is shown in the model (Figure 5.5) encircling the internal environment as effective communication is essential in ensuring that the internal aspects of the environment can respond to change and learn (Handy 1993; Watkins and Marsick 1993;

Fojt 1995b; Harvey 1995; Locke and Jain 1995; Rahim 1995; Morgan 1997; West and Meyer 1997). Poor communication between individuals and organisations can act as a major block to learning effectiveness (Stata 1989). Communication therefore has to be open and inclusive, involving as many individuals within the organisation as possible (Probst and Buchel 1997; Petts, Herd and O'hEocha 1998), and consistent and immediate feedback is key (Feldman 1986; Sterman 1994; Lock and Jain 1995). Effective communication is also essential for ensuring that an organisation understands the external environment and is aware of the changes that are occurring around it (Paton et al. 1984; West and Meyer 1997).

#### *5.7.1.9 The External Environment*

The final element, the external environment (Figure 5.5), is not split in the same way as the internal environment, as this research is concerned with learning within organisations. Nevertheless, in the same way that elements of the internal environment have been described as impinging upon organisational learning effectiveness, elements of the external environment can be identified as acting in the same way. For example, an organisation's opportunities for learning are affected by the links between its strategy and the wider environment (Parkhe 1991; Attewell 1992), and national cultures can also influence the potential for learning in organisations (Beck 1989; Carmona and Gronlund 1998). More generally, organisations are continually influenced by and can influence their environment (West 1994a), and the wider world in which an organisation operates is the source of most of the change that drives learning in organisations (Sterman 1994).

#### *5.7.1.10 Elements Influencing Organisational Learning: Commentary*

The model (Figure 5.5) described above summarises the elements identified from the literature as influencing organisational learning. These have both positive and negative impacts which can contribute to or detract from organisational learning effectiveness. It should also be recognised that all these aspects of an organisation are linked and the adjacencies within the model are an attempt to show which elements of the model are most closely linked. Despite this the true complexity of these interrelationships are hidden and other links do exist. Finally, whilst the model represents a brief attempt to overcome

criticisms of organisational learning being characterised in a closed system (Huber 1991; March 1991; Ford and Ogilvie 1996), it still does not represent a complete set of all the factors which can influence organisational learning. Identification of all the potential sources of complexity in the organisational learning environment, is beyond the scope of this current study, focused as it is upon experiential learning, but what the environmental elements identified here do is identify the most important and widely recognised issues.

### 5.7.2 Unlearning

Unlearning is the process by which individuals and organisations discard and erase knowledge and information, in order to uptake new knowledge and learn new forms of behaviour. Unlearning is important as it adds another, often unrecognised stage to the process of learning. Recognised explicitly by Hedberg (1981), Chaharbaghi and Newman (1996) and Probst and Buchel (1997), unlearning is sometimes a necessary prerequisite for learning, overcoming individuals' and organisations' limited capacities for knowledge and information (Behling, Gifford and Tolliver 1980), particularly for generative learning. Such learning typically occurs through the creation or acquisition of new knowledge and information, but for individuals and organisations to take up the new knowledge, they must first remove the old. This requires unlearning. With adaptive learning, whilst unlearning may be required, revision or representation of knowledge in light of new understanding or data would be a more typical way for the uptake of learning to occur.

Unfortunately, getting organisations to 'forget' what already has been learned can be difficult (Argote 1996). Unlearning is as complex as learning, and is influenced by all the same elements as organisational learning (Figure 5.5). Success, in particular is a major barrier to unlearning (Hedberg 1981; Probst and Buchel 1997), as it reduces the desire of individuals and organisations to discard familiar and proven forms of behaviour. Without unlearning however, any attempt to create new forms of behaviour is doomed as these will only be superficially imposed on top of existing behaviour, and at the first sign of trouble and difficulty will be discarded in favour of the older, proven and comfortable solutions. This is a particular problem in organisations. Little is known about how organisational unlearning differs from individual unlearning (Hedberg 1981), but what is evident is that the complexity in organisations tends to create an environment that fails to recognise the importance of unlearning (Probst and Buchel 1997).



Unlearning, as described above is essentially part of generative learning. Adaption requires the modification of existing knowledge and behaviour and as a result does not require information to be discarded. However, the creation and development of new knowledge and information (generative learning) does require old knowledge, behaviour and working practices to be discarded. Consequently, organisations not only require the ability to unlearn, but also the capability to recognise what to unlearn and when to unlearn it. Recognising this identifies a potential problem with unlearning, in that inappropriate unlearning or 'organisational forgetting' can impede the effectiveness of learning (Carmona and Gronlund 1998). This when the organisation forgets knowledge and information that it still requires and thereby reduces its effectiveness.

### 5.7.3 Incomplete Learning

Learning is not a process that is likely to occur without problems. Reference has not yet been made to the fact that learning rarely occurs without hindrance, does not always follow the neat lines described above, and can often be characterised as incomplete, occurring in environments where it is not fully understood, utilised or recognised. March and Olsen (1975) identify four forms this incomplete learning can take, linked to each phase of their organisational learning cycle, (one to four below) being widely recognised in the literature (Argyris and Schon 1978; Hedberg 1981; Kim 1993a; 1993b). These have been added to and extended (Kim 1993a; 1993b; Kim and Senge 1994) to describe seven forms of incomplete learning that potentially affect learning in organisations:

1. *Role-constrained Learning* occurs at the individual level, when an individual learns but their learning has no lasting effect on their actions due to the limitations of an individual's role, and the influence of standard operating procedures.
2. *Audience Learning* is where an individual acts in an ambiguous way which prevents the rest of their organisation understanding and taking up the action, or where the organisation fails to recognise the change in the individual's action.
3. *Superstitious Learning* is where organisational action occurs in response to learning, but the true effect of that action cannot be identified in the environment, and as a result its outcome is incorrectly (superstitiously) attributed.

4. *Learning under Ambiguity*, occurs when the causal connections between events are unclear, and changes in behaviour occur apparently independently of actual change in the environment. In effect the connections within an organisation and between an organisation and the wider environment are unclear.
5. *Situational Learning*, which is when an individual solves a problem on a spot, creating a new response, but fails to retain their new behaviour.
6. *Fragmented Learning*, where an individual learns, but fails to share that learning with the rest of the organisation.
7. *Opportunistic Learning*, which is when organisational action is driven by a single individual or a limited number of individuals, rather than the organisation's routines and operating procedures as a whole. Opportunistic learning can occur both deliberately to develop new ways of working as well as accidentally.

All of these alternative forms of incomplete learning have the potential to influence the extent and effectiveness of learning in an organisation. Kim (1993a; 1993b; Kim and Senge 1994) links them to different stages of the 'OADI-SMM Cycle of Organisational Learning', seeing them as representing different places where learning can break down in an organisation (Figure 5.6).

The effectiveness of learning, will depend upon the ability of the individual and organisation to prevent and overcome these break-downs. Recognising them is the first step in doing this, and can itself allow organisations and individuals to manipulate the learning process in order to help develop new ways of working. However, it is also possible to learn through mistakes without directing that learning (Edmondson 1996), though in organisations which does not recognise the causes of incomplete learning, effective learning is likely at best to only be accidental.

'Complete' learning is rare, yet it should be evident that under incomplete learning organisations are still able to act, but their actions are driven by theories and understandings that have low validity (Argyris and Schon 1978; Hedberg 1981). The behaviour that drives individual and organisational actions, is frequently only tenuously linked with reality, but tenuous links are better than none. One of the key abilities of the human mind (and it is human minds which decide organisational action) is its ability to deal with situations where information is missing and knowledge is incomplete. Without

this ability (which is enshrined in mental models) individuals and organisations would be unable to react in incomplete learning environments. Incomplete learning, does however add additional complexity to the learning process. Failures in learning cannot be planned for, but awareness of their possibility can minimise their impact when they occur.

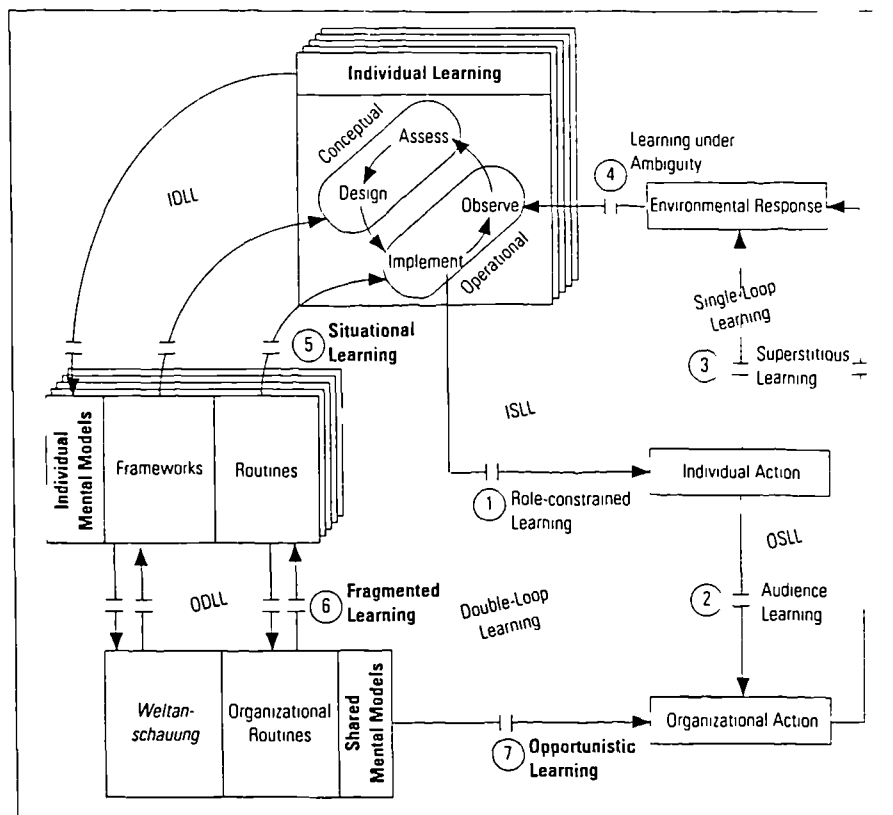


Figure 5.6: Incomplete Learning Cycles (Source: Kim 1993b: 47)

#### 5.7.4 Organisational Learning Complexity: Commentary

The discussion above has considered the complexities of the wider environment(s) in which organisations operate. Change, unlearning, incomplete learning, and all the

elements identified can impinge upon organisational learning effectiveness. These issues affect whether or not learning takes place, if that learning will be adaptive or generative, and whether learning will be transferred from individuals to organisations (and visa versa). They represent details which are excluded from models of the organisational learning process, but are nevertheless important. However, when assessing learning and undertaking research into organisations their complexity and the complexity of their interaction means that their influence can be difficult to identify.

## 5.8 ASSESSING LEARNING IN ORGANISATIONS

One of the key deficiencies in organisational learning research is a lack of large scale empirical work (Leitch, Harrison, Burgoyne and Blanter 1996). Literature is characterised by a plethora of comment which discuss the high ideals of learning in organisations and posits theories, but contains little evidence of an empirical foundation supporting this theory. This lack of research comes partly from the difficulties of identifying a measure of learning (Hinkin 1995: 982). There are however a number of researchers who are attempting to overcome the difficulties to undertake systematic empirical work. However, much of this work represents the learning organisation and can be criticised for a consultancy perspective, open to bias, and lacking in scientific rigour (Tsang 1997).

The majority of empirical researchers use questionnaire surveys to assess the extent and strength to which learning characteristics exist in particular organisations. These typically ask individuals to rate the extent to which key attributes identified from the literature are evident in their own organisation. For example, Pedler, et al. (1991; 1997). link their learning company characteristics to a survey containing 55 items, against which respondents rate 'how it is' and 'how I would like it to be' on a five point scale. The learning company questionnaire also has undergone some validation (Leitch et al. 1996). Alternatives to the learning company questionnaire do exist. These include the *Organisational Learning Modes Questionnaire* (Boydell and Leary 1996), which asks individuals to rate the extent to which their organisation exhibits seven modes of learning: adhering; adapting; relating; experiencing; experimenting; connecting; and dedicating. This differs from the other questionnaires presented here in that it is focused more upon learning processes and less upon the characteristics or evidence of learning in

organisations. It is however derived from a solely individual perspective on learning, and can therefore be criticised for its piecemeal application to organisations.

Other alternatives include the *Learning Organisation Research Index* (LORI; Gardiner and Whiting 1997). LORI is similar to the learning company questionnaire, and is designed to elicit information on nine 'conceptual categories', comparing the individual's perception of their organisation's 'present' and 'ideal' positions. This has undergone only limited application and its psychometric properties are unclear. Another alternative is the *SLAM* (*Strategic Learning Assessment Map*) (Crossan and Hulland 1996). This is designed for middle and senior management, and is aimed at the diagnosis of leverage points for investment in learning. However, it is still under development and has yet to be adequately validated. Of potentially more use is the *Organisational Learning Orientation Scale* (Sadler-Smith, Chaston and Spicer 1999). This differs from the alternatives being focused upon organisational learning (as opposed to the learning organisation), using individual's attitudes to their working environment to assess the extent of double-loop learning, single-loop learning and zero learning evidenced within an organisation, and has shown some temporal stability and internal reliability (Sadler-Smith, Chaston and Spicer 1999: 12).

All of these questionnaires are broadly similar, and represent a major improvement over traditional, mechanistic solutions such as 'learning curves' and 'manufacturing progress functions' (Argote, Beckman and Epple 1990; Argote 1996), which are limited, focussing solely on results and unable to characterise the existence of incremental and long-term learning. The questionnaire approaches described have the ability to overcome this as they focus on the extent to which an organisation's individuals recognise learning characteristics. However, these are for the most part as yet unvalidated, and as they concentrate on the characteristics of learning organisations, there still exists no accepted, validated and all encompassing means for assessing the organisational learning process.

## 5.9 LEARNING IN ORGANISATIONS: RESEARCH

Much of the 'research' into learning in organisations represents reports of consultancy-based work with learning organisations. This includes the array of organisations who claim learning organisation status, but base this solely upon the opinions of their leaders or consultants, rather than upon objective or empirical assessment. These include Coopers and Lybrand (Fojt 1995c), Courage (Greenwood 1995), and Motorola (Wiggenhorn 1990).

Others do not talk about organisational learning or the learning organisation as a whole, instead using specific firms to illustrate aspects of their own theory. These include McGill, Slocum and Lei (1992) who suggest that the way Taco Bell in the US redefined their business in response to a declining market and price-war is an example of generative learning and see IBM's 'open systems' policy as representative of transformative learning. Yet, as a whole, neither of these companies could be seen as being good examples of organisational learning in practice. Still others suggest that organisational learning or learning organisations exist in incomplete environments. Marquardt and Reynolds (1994) give a number of examples of their 'global learning organisation' in their book, but none of these exhibit all the characteristics that they identify as important.

Other writers and consultants identify learning as the ideal framework for explaining the changes and developments they claim. Examples of this type of work are summarised in Table 5.3. The growth of work which seeks to drive learning through 'communities-of-practice' (Wenger 1998) and 'practice-fields' (Kilmann 1996) is similar, and is indicative of a structured (and sometimes artificial) approach to change and development through learning (see for examples: Burke 1996; Carley and Svoboda 1996; Hendry 1996; Keys and Fulmer 1996; Roth and Senge 1996).

<i>Author(s)</i>	<i>Learning applied to...</i>
Herriott, Levinthal and March (1985)	<ul style="list-style-type: none"> <li>• organisational development</li> </ul>
Anderson, Gustavsson and Melin (1995)	<ul style="list-style-type: none"> <li>• systematic establishment process for a Swedish company in China</li> </ul>
Beck (1994)	<ul style="list-style-type: none"> <li>• a 'new paradigm' of management education</li> </ul>
Beer and Eisenstat (1996)	<ul style="list-style-type: none"> <li>• implementation of strategic HRM</li> </ul>
Birkner and Birkner (1996)	<ul style="list-style-type: none"> <li>• health and safety</li> </ul>
Gibb (1997)	<ul style="list-style-type: none"> <li>• small business development</li> </ul>
Knowles (1990)	<ul style="list-style-type: none"> <li>• Human Resource development</li> </ul>
Wong (1997)	<ul style="list-style-type: none"> <li>• trans-national graduate training</li> </ul>

**Table 5.3: Examples of Learning Driven 'Research'**

There are however a growing number of researchers who move beyond subjective assertions of the existence or potential of learning into the empirical realm, even as far back as Cangelosi and Dill's (1965) study of the learning processes of teams engaged in a

simulation exercise. More recently, these include Bower's (1993) survey of employee attitudes at Rover which, whilst it did not find evidence of learning organisation characteristics did show a strong orientation to learning. Other examples who didn't find evidence of organisations reaching 'learning organisation status' include Sligo (1996) and Mayo (1993), but what all these researchers and organisations have in common is the recognition of a learning focus, described above as the starting point for any organisation wishing to improve the learning of itself and its individuals.

Looking specifically at the examples of learning assessment questionnaires described above the most widely used is the *Learning Company Questionnaire* (Pedler et al. 1991; 1997). For example, Leitch et al. (1996) in a validation study obtained 222 questionnaires from 23 companies, however their published analysis is limited, focussing on a single owner-managed business with a response of only 17 questionnaires, all from middle and senior management. Crossan and Hurland (1996) recognise that the *SLAM* is still under development. It has been applied in 'one large organisation,' but has, according to its authors identified four key leverage points for learning in organisations: the cognition-behaviour gap; learning flow; the relationship between learning and leadership; and organisational impediments. The *LORI* is also still under development and having only been utilised in two engineering firms, providing "important information for organisational development" (Gardiner and Whiting 1997: 47). The *Organisational Learning Orientation Scale* used with 300 owner-managers and directors in *SMEs* by Sadler-Smith, Chaston and Spicer (1999) has had more comprehensive exploratory research.

### 5.10 ORGANISATIONAL LEARNING: AN INTEGRATED VIEW

This research is concerned with both individual and organisational learning. Throughout the discussion of organisational learning above this has been recognised. Both the typology suggested (Figure 5.2) and the model of the organisational learning process identified (Figure 5.4; Kim 1993b) explicitly incorporate individual learning. However, it should be reiterated that organisational learning is not simply the sum of individual learning (Argyris and Schon 1978; Fiol and Lyles 1985; Probst and Buchel 1997; Spicer 1998a).

The point was made when initially defining learning that effective learning which leads to benefits for the organisation is key. It was suggested that characterising learning as a process created through experience, and the *OADI* (Observe-Assess Design-Implement)

adaption (Figure 2.5; Kofman 1992) of the Lewinian experiential learning cycle (Figure 2.3; Kolb 1984) represented the strongest models available for characterising this process. Consequently, the model identified for organisational learning (Figure 5.4; Kim 1993b) also incorporates the notion of experiential learning through the inclusion of the *OADI* cycle. Additionally, to be effective, an organisation needs mechanisms that allow it to incorporate its individuals' learning. It was suggested in Chapter Four, that this interaction occurs through mental models. Again these are incorporated in Kim's (1993b) model, which also links learning at the individual and organisational levels to Argyris and Schon's (1974; 1978) notions of single-loop and double-loop learning, and through them to Senge's (1990b) adaptive and generative levels of learning. These have been identified above as the most appropriate descriptors of the key forms of learning undertaken by individuals and organisations.

Nevertheless, this model is not without its failings and has been criticised above for a number of these. Consequently the next chapter will outline a 'research model' which will link the key issues identified above and will be used to inform the research process subsequently discussed.

## 5.11 SUMMARY

This chapter has looked at learning in organisations, and began by looking at the range of alternative definitions available for the concept of organisational learning (Appendix A). The point was made that the original definition chosen for learning, which sees it as the process whereby entities create knowledge through the transformation of experience in order that they increase their capacity to take effective action, is as valid at the organisational level as it is at the individual.

The concept of the learning organisation was also considered, and contrasted with organisational learning. A distinction was made between the two that sees organisational learning as the processes which drives and facilitate learning at the organisational level. The learning organisation characterises an orientation towards learning, but was criticised for its consultancy basis and a lack of academic rigour.

The chapter looked at the two level descriptors of organisational learning prevalent in the literature. From these, Senge's (1990b) terminology which describes learning as



adaptive or generative was adopted for this research. This is recognised as being more descriptive, can be linked explicitly to workplace behaviour and is seen as to applying to both individuals and organisations. Subsequently, typologies of organisational learning were considered (Appendix B), and a simple typology, linking adaptive and generative levels of learning and individuals and organisations as units of analysis, was described (Figure 5.2).

Following this, two key models of the organisational learning process were described. These were March and Olsen's (1975) 'behavioural' cycle of organisational learning (Figure 5.5), and Kim's (1993a; 1993b) 'Observe Assess Design Implement - Shared Mental Model' cycle of organisational learning (Figure 5.6). The second of these was identified as the most comprehensive model of organisational learning currently espoused in the literature.

The next section looked beyond these models to identify the elements of an organisation's environment which add to the complexity of the learning process. In doing this a model was described (Figure 5.5) which identified a central role for change in creating the need for learning in organisations. The model also identified six key aspects of an organisation's internal environment, its people, knowledge, strategy, systems, structure and culture. These were linked to the wider external environment through a seventh critical issue, communication, and it was suggested that, all of these include elements which can both add to and detract from the effectiveness of organisational learning. The contributions of unlearning and incomplete learning were also considered.

Alternative approaches to assessing learning in organisations were also described, and it was suggested that, as yet no true empirical measure of organisational learning existed. This lack of a measure was supported by the paucity of empirical research into organisational learning identified in the literature.

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## CHAPTER SIX

# Mental Models, Cognitive Style and Organisational Learning: A Research Model

### 6.1 INTRODUCTION

The key issues identified in this research have, in preceding chapters, been dealt with broadly separately. Whilst links between individual and organisational learning, cognitive style, and mental models have been espoused, no theory which integrates all these concepts has been identified. The aim of this chapter is to present a research model which does this. Prior to this, however, the chapter begins by summarising the literature discussed in preceding chapters, and identifies those concepts which are key to the model and understanding of organisational learning presented here.

### 6.2 LITERATURE ON MENTAL MODELS AND LEARNING: A SYNTHESIS

The discussion that follows links those issues from the literature discussed above which are central to the theory of organisational learning constructed in the subsequent research model. Key issues identified in the literature review and the relationships between them are shown in Figure 6.1. This diagram was drawn using *Decision Explorer* (Version 3.0.6; 1997), a specialist cognitive mapping tool, which has been utilised in the operational phases of this research, and is discussed further below (Chapter Eight). In Figure 6.1 arrows should be taken to show the direction of influence of the ideas, concepts and theories shown. For example, theories on learning levels are shown contributing to the issues of both individual and organisational learning, and more specifically to Kim's (1993b) *OADI-SMM* Cycle. Figure 6.1 is included here to summarise and highlight the scope of this research and the variety of inter-linkages and relationships it contains. Despite this it should be recognised that this thesis does not incorporate all the ideas discussed in the literature with respect to organisational learning and in order to cope with this complexity, a specific point of view on learning has been adopted here.

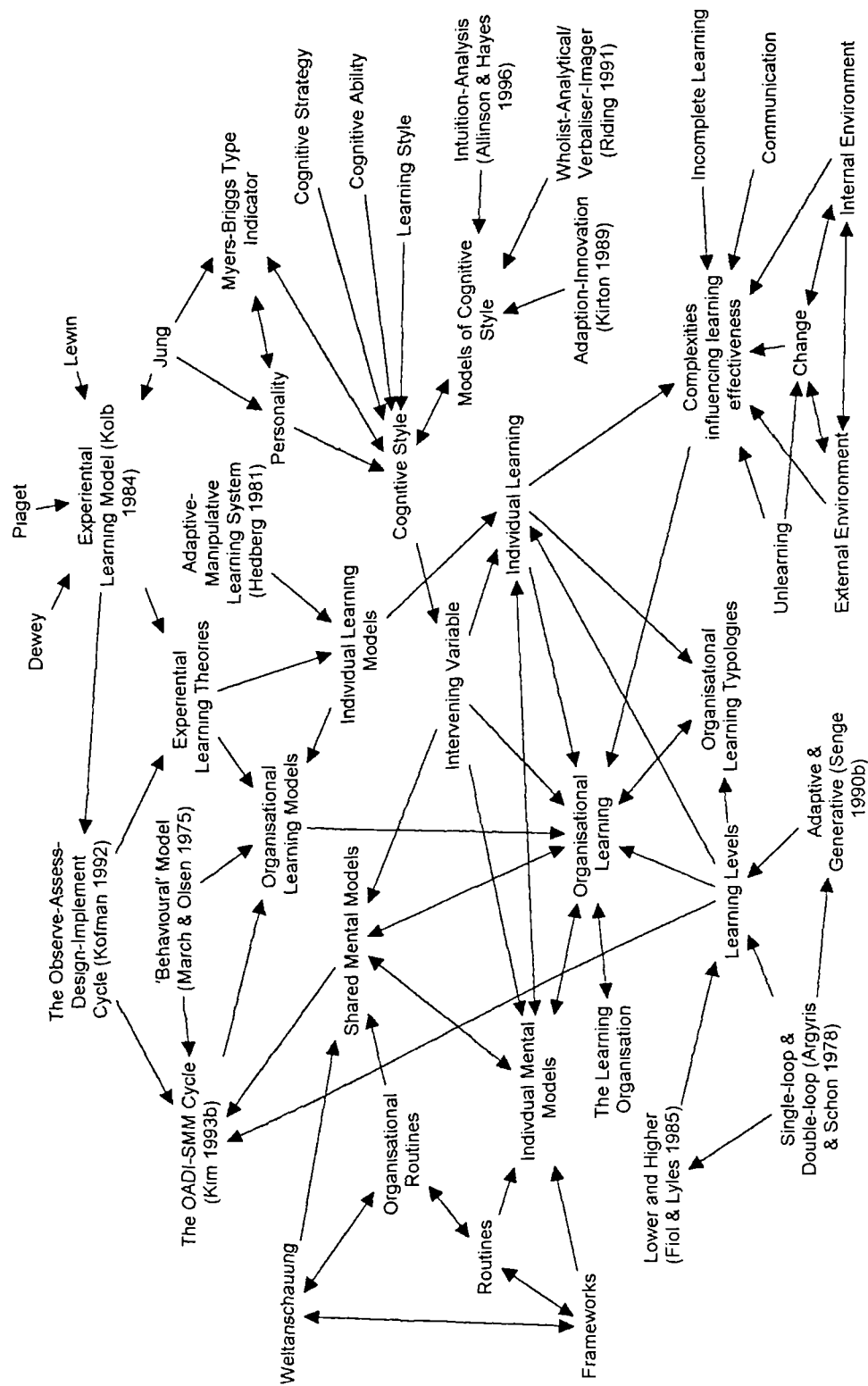


Figure 6.1: The Role of Mental Models in Individual and Organisational Learning: Literature Summary

This section seeks to develop a specific theory of organisational learning from the ideas incorporated in the preceding discussion. Key issues identified are reiterated below. Learning was defined as the process whereby entities create knowledge through the transformation of experience in order that they may increase their capacity to take effective action. Drawing upon the work of Kolb (1984) and Kim (1993b), this new definition identifies with the view of learning that sees it as a process driven by experience which offers a “holistic, integrative perspective on learning that combines experience, perception, cognition and behaviour” (Kolb 1984: 21). This definition builds upon existing theory on learning in organisations which follows an experiential approach, and identifies the need for learning to be effective and developmental, leading to improvements in action, behaviour or decision making. This need was identified as important in organisations given the cost (both fiscal and temporal) of learning. It was also identified as applying equally well to both individuals and organisations.

At the level of the individual two sets of issues were identified as important. The first of these are individual learning models, focused on experiential learning theories rooted in the work of Lewin (1951), as developed by Kolb (1984). Of these it was suggested that Kofman’s (1992) *OADI* cycle was most appropriate to the current study. This was because whilst the *OADI* cycle shares many of the criticisms of other experiential learning models, it has two key advantages. It has been linked by Kim (1993a; 1993b) to the notion of learning (by both individuals and organisations) occurring at two distinct levels, and its terminology is clearer and simpler than that of Lewin’s model.

Also identified as important at the individual level was cognitive style, defined above as “consistent individual differences in preferred ways of organising and processing information and experience” (Messick 1976: 5), this has been characterised as being classically represented as a bipolar dimension. Three models of cognitive style were identified, from which Allinson and Hayes’ (1996) ‘Intuition-Analysis’ dimension was chosen for this study, reasons for this choice were discussed in Chapter Three. This dimension is linked to a self-report measure (the *Cognitive Style Index*) for which its authors claim both reliability and construct validity. Simply put, the relevance of cognitive style here is that it acts as an intervening variable which mediates upon the effectiveness of learning and, in particular the transfer of learning to and between mental models.

A number of two fold typologies of learning, which describe the ‘simple’ and ‘complex’ forms of learning were also identified. Of these, Senge’s (1990b) description of learning as adaptive or generative is used here. Partly because Senge’s (1990b) terminology is more descriptive than Argyris and Schon’s (1974; 1978) longer standing model, but also because Senge clearly identifies his model as applying to both individuals and organisations, and links adaptive and generative learning to workplace behaviour.

The other key aspect of the understanding of organisational learning developed here which is recognised as applying equally and explicitly at the individual and organisational levels is mental models. These represent (after Johnson-Laird 1983) simplifications or representations of knowledge and understanding, and can be visual or verbal, simple or complex. Mental models are described here as representing the operational and conceptual aspects of memory that allow for the retention and transfer of knowledge and understanding, and hence learning. At the individual level, mental models were characterised as consisting of frameworks and routines which were linked to the notions of adaptive and generative learning respectively, and a model which links these ideas to the *OADI* (Figure 4.1) was introduced (Kim 1993a; 1993b). Organisational learning was characterised as occurring through shared mental models that allow for the transfer of knowledge and understanding between individuals across an organisation. These consist of *weltanschauung* and organisational routines, akin to the frameworks and routines of individual mental models.

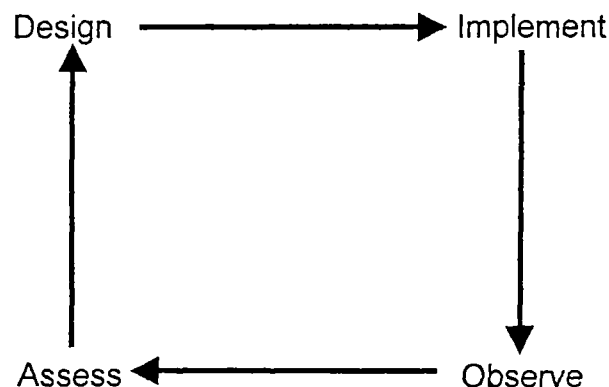
At the organisational level, experiential models of learning were again discussed, alongside consideration of the complexities resulting from the fact that learning is not a process in isolation but occurs in a wider environment. Kim’s (1993a; 1993b) *OADI-SMM* Cycle of Organisational Learning was identified as the most developed model of organisational learning currently available in the literature (Figure 5.4). This incorporates the notions of experiential and developmental learning, Kofman’s (1992) incarnation of the individual experiential learning model, single and double-loop learning, individual and shared mental models and March and Olsen’s (1975) Behavioural Model of Organisational Learning. Despite this, Kim’s model does have its limitations, and as a result a model of organisational learning that builds upon Kim’s and the literature discussed in preceding chapters is presented below.

### 6.3 MENTAL MODELS, COGNITIVE STYLE AND ORGANISATIONAL LEARNING: A RESEARCH MODEL

No model has been identified which adequately incorporates all the issues identified above (individual and shared mental models; cognitive style; the individual and organisation as units of analysis; experiential learning theory; and adaptive and generative learning), in order to ensure a comprehensive description of organisational learning as a developmental process. Consequently, a research model which synthesises the theories discussed, addresses the need for an integrating model of organisational learning and overcomes the limitations of pre-existing theory and models identified is provided below. Whilst this model owes much of its content and context to Kim's (1993a; 1993b; Figure 5.4), and should be recognised as being developed from the *OADI-SMM* Cycle, it is constructed below from first principles and is built sequentially. This starts with the experiential learning model and builds upon this adding ideas from the theories described above in order to overcome the limitations of earlier models.

#### 6.3.1 Individual Experiential Learning

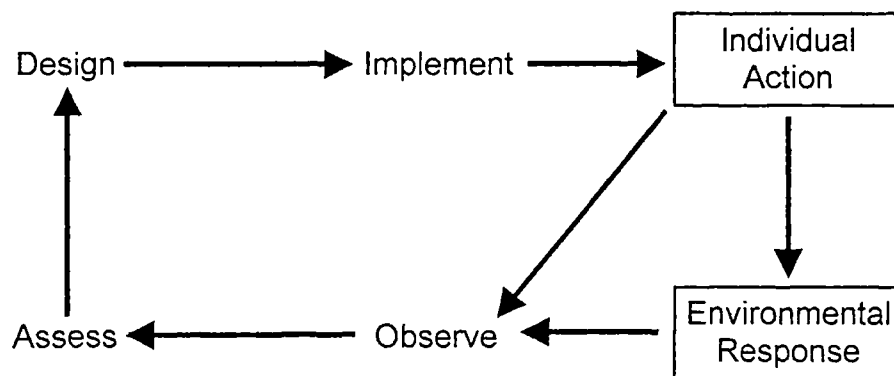
Kofman's (1992) interpretation of the individual experiential learning model is taken as a starting point (the *OADI* Cycle; Figure 6.2). This clearly identifies the model with the notion of experiential learning, but is open to all the existing criticisms of experiential learning models and is therefore essentially incomplete, begging the questions: what do learners observe, implement, assess and design?



**Figure 6.2: Individual Experiential Learning: The *OADI* Cycle** (After Kofman 1992)

### 6.3.2 Addition of Action and Response

Learning is not something that occurs in isolation (March and Olsen 1975; Hedberg 1981), and the notions of individual action and environmental response are incorporated into the model to represent this (Figure 6.3). It is action which is implemented in order to learn, but to learn effectively both that action and the response that it creates in the environment must be observed (Figure 6.3). It is not enough for a learner to just know what it was they did, they must also know what difference (if any) their action(s) made in the environment.

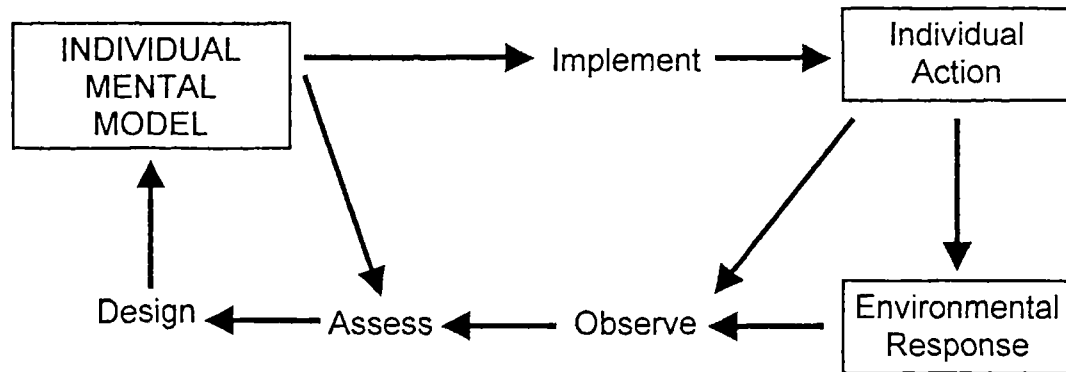


**Figure 6.3: Individual Experiential Learning, Action and Environmental Response**

### 6.3.3 Introduction of an Individual Mental Model

Whilst the addition of action and response identifies what learners implement and observe, it does not identify what they assess and design. In line with Kim (1993a; 1993b), Vaudreuil (1995) and Swan (1997), mental models are recognised here as providing a dynamic and interactive link between the process of learning and the retention of knowledge and information by individuals. This is shown by the addition of an individual mental model between the design and implement stages of the experiential learning cycle (Figure 6.4). This recognises that the design that individuals undertake as part of the learning process is evidenced through changes in their mental models and it is through application of these mental models that learners decide what action they will implement. This also recognises that effective assessment leading to appropriate and effective design can only occur if the observations made by learners are assessed in relation to their mental models (shown by the addition of an arrow from the individual mental model to the assess stage of the experiential learning cycle: Figure 6.4). This creates a feedback loop that

allows for the development of mental models, and links the model espoused here to the ideas of Richardson, Andersen, Maxwell and Stewart (1994), and Hill and Levenhagen (1995) who describe mental models as being developed through action and interrogation.



**Figure 6.4: Individual Experiential Learning, Action, Environmental Response and Individual Mental Models**

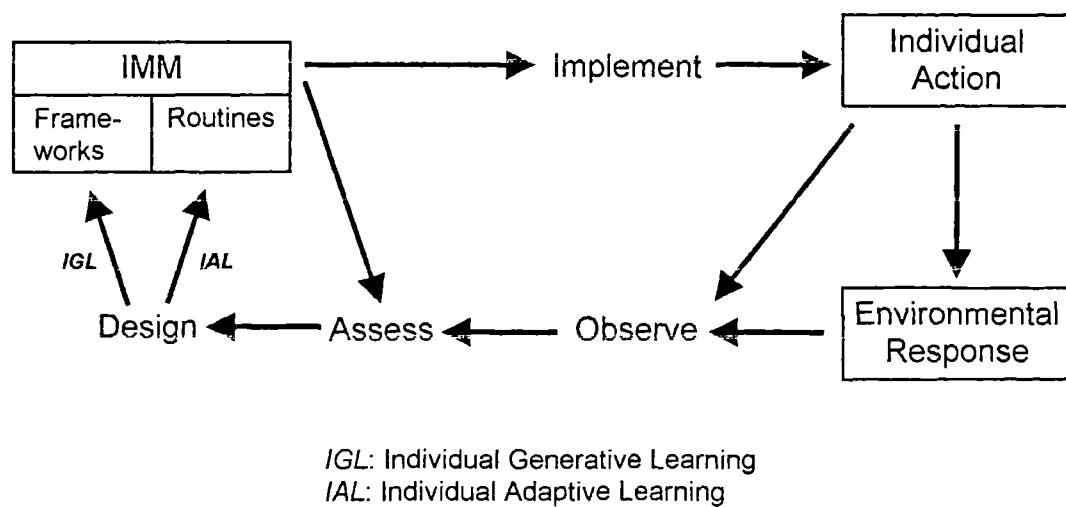
### 6.3.4 Describing Adaptive and Generative Learning

Figure 6.5 introduces adaptive and generative learning (after Senge 1990b), these are shown as operating through the two key aspects identified within individual mental models: routines and frameworks. Adaptive learning, which can be characterised as an incremental process leading to the reinforcement or enlargement of *existing* ways of working, is shown as occurring through interaction with routines. Generative learning, which is more open and developmental is shown as acting through interrogation of and ultimately change in frameworks, leading to *new* ways of working.

This conceptualisation of the learning process is significantly different to Kim's (1993a; 1993b) which shows double-loop (generative) learning as occurring through mental models, whilst single-loop (adaptive) learning does not. This change identifies the fundamental nature of the mental models which guide individuals learning, behaviour and decision making. Given that mental models are as often tacit and implicit as they are open and explicit, and have been recognised as both the storehouses of and mechanisms for learning, it would be unreasonable to expect learning to occur without reference to them. This also highlights an additional reason for using Senge's (1990b) terms over those of Argyris and Schon (1978). Under this conceptualisation (Figure 6.5), the difference between the levels of learning espoused is one of degree and location, which sits well with Senge's explanation of the difference between adaptive and generative learning, and the



notion of radical and incremental change identified above. It is however somewhat at odds with the iterative approach to more developmental learning implied by Argyris and Schon's explanation of double-loop learning. However, irrespective of which form learning (adaptive or generative) takes, it is always the routines that create the behaviour or decision to be implemented. These routines are derived in response to the frameworks an individual holds in the mental model. Therefore whilst adaptive learning only develops (or reinforces) existing routines, generative learning will result in change to both frameworks and the routines derived from them.

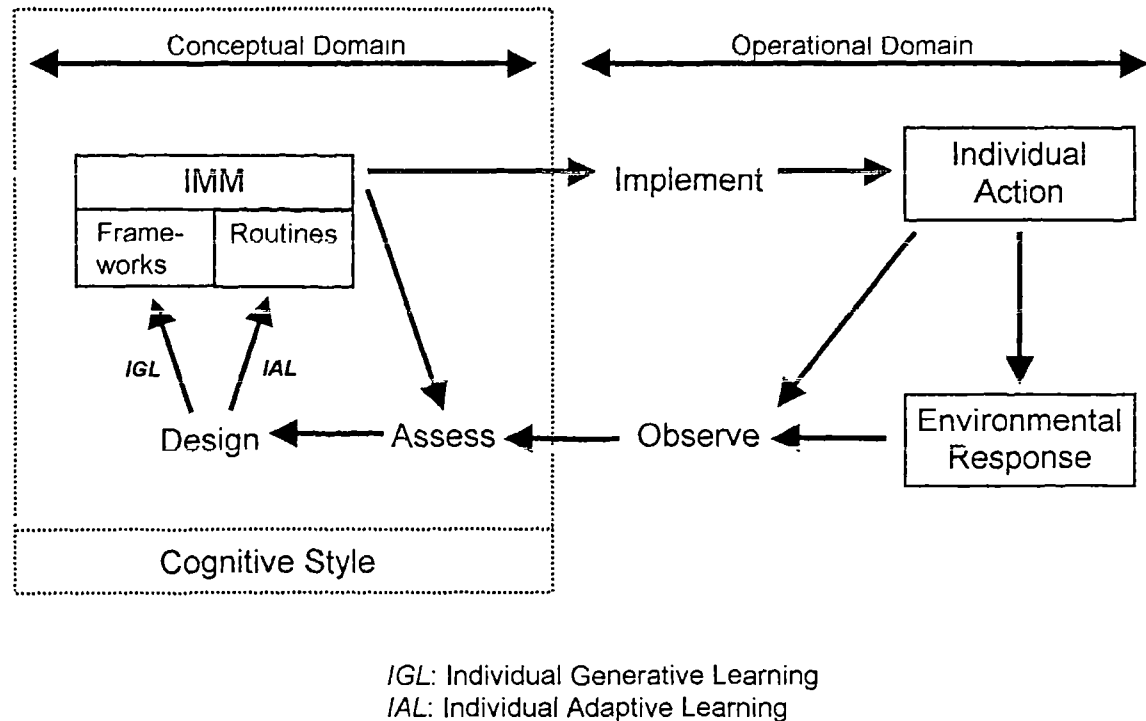


**Figure 6.5: Individual Experiential Learning, Action, Environmental Response, Individual Mental Models and Adaptive and Generative Learning**

### 6.3.5 The Influence of Cognitive Style

Cognitive style was described in Chapter Three as an intervening variable between learning and mental models influencing the organising and processing of information (conceptual domain) and ultimately the ways in which an individual interacts with the wider environment (operational/ behavioural domain). In Figure 6.6 this split is made explicit, with cognitive style shown surrounding the conceptual domain, and those aspects of the learning environment which are internal to the individual. Implementation, Action, and Observation all occur in the wider operational environment. Assessment and Design however are aspects of learning internal to the individual, as such they cannot be observed directly, and like the mental models to which they relate, they represent facets of that individual's conceptual domain. Cognitive style may therefore have the greatest impact upon those aspects of learning within its boundaries, but that impact is more likely to be

evidenced where learning crosses the perceptual barrier it creates, in the ways individuals chose to implement their mental models and how they assess their observations in relation to those models.



**Figure 6.6: Individual Experiential Learning, Action, Environmental Response, Individual Mental Models, Adaptive and Generative Learning, and Cognitive Style**

### 6.3.6 Individual and Organisational Learning: A Research Model

The final step in developing the research model is to move beyond the individual level. Imagine, in the first instance, two individuals learning together. One can learn from the other and visa versa. However, for this joint learning to be effective both individuals need to understand the full scope of the others learning. Irrespective of the original impetus for learning (i.e. who implements the action that leads to an environmental response) this would require the sharing of the observations, assessment and designs the individuals undertake, although each individual would interact with these differently, dependant upon the mental models they hold and the influence exerted by their cognitive style. Consequently, a shared model of learning could be conceptualised as one where mental models, their implementation and the resultant action are distinct individual aspects but where the responses in the environment, their observation, assessment and design are elements of the learning process which are shared. If this second individual is replaced as

the learning entity by an organisation, the resultant learning model is that which is presented in Figure 6.7. Individual learning is shown in the top half of this model, following the mechanisms built and described above. This is linked to learning at the organisational level in the same way described for two individuals above. However, in the bottom half of the model, it is organisational rather than individual action that is implemented, and the differences between adaptive and generative learning occur through the application *weltanschauung* and organisational routines held in shared mental models.

In the model (Figure 6.7) learning at both the individual and organisational levels is seen as being driven by the experiential learning process, with ‘observations’ of some form of action (individual, organisational, or external) and the response it creates in the environment being ‘assessed’ in relation to individual (for individual learning) or shared (for organisational learning) mental models. On the basis of the assessments made, new aspects of those mental models are ‘designed’. Adaptive learning results in changes to, developments in or reinforcement of the design of routines (both individual and organisational) alone, whilst generative learning changes, develops or reinforces the design of frameworks (individual learning) or *weltanschauung* (organisational learning) which then affect routines. These processes of assessment and design are internal to the individual (who is seen by the model as the site for learning at both the individual and organisational levels), and occur within the conceptual knowledge domain. As such these processes and the mental models (individual and shared) with which the act are influenced by the cognitive styles of learners. Cognitive style is characterised as a perceptual filter surrounding the conceptual domain. Learning is returned to the operational knowledge domain when routines (from both individual and shared mental models) are ‘implemented’. This leads to new actions and subsequent responses in the environment, ‘observation’ of which closes the experiential learning cycle.

The model (Figure 6.7) is developed from the theories of learning at the individual and organisational levels discussed above, with the explicit aims of identifying the relationships between mental models, adaptive and generative learning, and cognitive style at the individual and organisational levels, and represents a development of Kim’s (1993a; 1993b) *OADI-SMM* Cycle of Organisational Learning (Figure 5.4) and the earlier models from which this was constructed. It nevertheless overcomes the key criticism of Kim’s model, in that here the experiential learning process is not isolated from mental models, action and the environment.

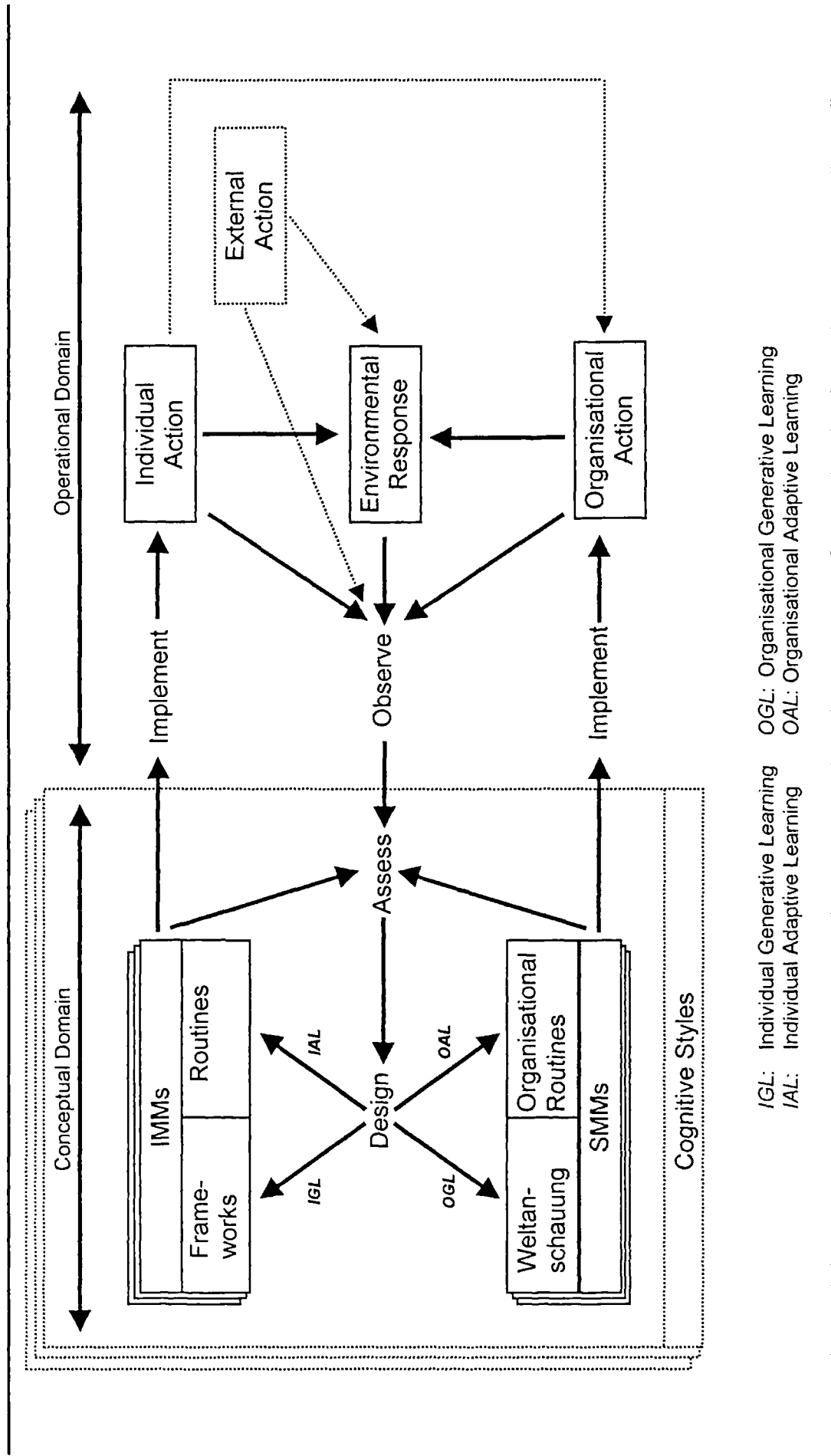


Figure 6.7: The Role of Mental Models in Individual and Organisational Learning: A Research Model

Key to this model (Figure 6.7) is recognition that you cannot describe organisational learning without reference to individual learning, and the notion that all learning in organisations is driven by the experiential cycle. Whilst this is essentially a model of learning at the individual level, and integrating it this closely with learning across the organisation could open the research model to criticism of anthropomorphism, it is a view which is entirely consistent with the importance placed upon individuals within the organisational learning process above.

It also needs to be recognised that whilst other sources of shared knowledge and information do exist in organisations, and are excluded from the model, it is the shared mental models, which represent the common understandings held by individuals in organisations which are most significant in learning (Lee, Courtney and O'Keefe 1992; Kim 1993a; 1993b; Price 1995; Hayes and Allinson 1996). These, like individual mental models are held by individuals. However here, unlike Kim's model no direct link is shown between individual and shared mental models. This is not because these do not interact but in recognition of the fact that the development of one from the other is best characterised as occurring through the learning process itself, rather than in isolation from it. The developmental feedback loops from shared and individual mental models allow either or both to be assessed alongside observations of actions and their response in the environment. This identification of individuals as the locus for organisational learning is consistent with the ideas and understanding developed above.

Another outcome of seeing both individual and shared mental models as residing within individual's conceptual domains is that cognitive style is as likely to mediate between shared mental models and learning as it is individual mental models. Complexity results from the interaction of individuals in organisations as each has distinct individual mental models, shared mental models and cognitive style. The model (Figure 6.7) shows more than one individual mental model, shared mental model and cognitive style in recognition of this. Equally, the inclusion of adaptive or generative learning inside the perceptual filter recognises that this is a choice which is influenced by cognitive style.

Relationships between shared mental models and adaptive and generative learning at the organisational level can be seen as acting in ways analogous to those described at the individual level. In terms of this research, it is organisational generative learning that is of critical importance. The point was made when defining learning that it was only to be seen as having occurred if benefits were forthcoming. In looking at organisational learning

we are, by definition looking for learning that is of benefit to the organisation, and whilst both the development of organisational routines through adaptive learning and the changing of *weltanschauung* following generative learning may both lead to improvements, it is likely that only generative learning and changes to *weltanschauung* will be of long term benefit to the organisation.

Finally, learning does not necessarily rely upon action on the part of the individual or organisation who learns. In March and Olsen's (1975) and Kim's (1993a; 1993b) models learning is a proactive process that can only occur through action upon the part of an individual or the organisation, and whilst both these models recognise that individual action can potentially also lead to organisational action, as is recognised in the research model (Figure 6.7), neither allow for the possibility of learning from other sources. The model addresses this through the addition of 'external action' recognising the possibility of learning from observation of others behaviour and actions in the wider environment.

#### 6.4 SUMMARY

This chapter began by summarising the literature reviewed (Figure 6.1), and aspects this identified as significant were highlighted. Subsequently, a model describing the role of mental models in individual and organisational learning was posited and described (Figure 6.7). This provides an explanation of learning as an experiential process at both the individual and organisational levels that overcomes many of the limitations of the models previously discussed. It also incorporates cognitive style, adaptive and generative learning, and makes the role of mental models in the learning process explicit. This model identifies the focus of the research which is described below.

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## CHAPTER SEVEN

# Research Design

### 7.1 INTRODUCTION

This chapter outlines the design and methodology used below, and begins by reviewing the research need. The philosophy which informed the research process is then outlined. Aims and objectives for the research are identified, from which specific research questions and hypotheses are developed. The design of and rationale for the research are outlined. The detail of the specific methods applied in this research are provided in Chapter Eight. The sourcing of participant organisations is also discussed.

### 7.2 THE RESEARCH NEED REVISITED

The need for empirical work addressing organisational learning was considered in the introduction where, despite the growth in literature (Figure 1.1) the lack of operational research into organisational learning was highlighted (Hedberg 1981; Shrivastava 1983; Fiol and Lyles 1985; Senge 1990a; Huber 1991; Kim 1993b; Hawkins 1994; Crossan, Lane, White, and Djurfeldt 1995; Easterby-Smith 1997; Miner and Mezias 1996; Andersen, Richardson and Vennix 1997; Huz, Andersen, Richardson and Boothroyd 1997; Rahim 1997). Furthermore the lack of a single integrating experiential model of learning which incorporates mental models and cognitive style at the individual and organisational levels of analysis identified above, points to a pressing need.

A fundamental barrier to effective empirical research is the lack of a coherent theory in organisational learning and the attendant failure of theory to build upon established work (Crossan et al. 1995; Miner and Mezias 1996; Easterby-Smith 1997). One strategy for dealing with these failures is for writers and commentators to suggest specific aspects of the organisational learning environment they identify as the key areas in which future research should focus (e.g. Miner and Mezias 1996; Rahim 1997). For example, Kim (1993b) explicitly articulated the need for consideration of mental models and

organisational learning, and both Hayes and Allinson (1998) and Sadler-Smith (1998a) have built upon this, highlighting the need to integrate consideration of cognitive style. Others identify needs for research at a more general level. For example, Lahteenmaki, Mattila and Toivonen (1998) identify four organisational learning research gaps:

Gap 1: A holistic model of organisational learning needs to be developed.

Gap 2: More emphasis on learning of organisations instead of learning of individuals is required.

Gap 3: Empirical validation of learning organisation models are required.

Gap 4: The lack of conceptualisations of the true nature of the organisational learning process or descriptions on how learning of individuals could be transferred into the learning of organisations needs to be addressed.

This research goes some way to addressing three of these. The learning organisation is not considered here (Gap 3), having been identified above as representing a consultancy perspective at odds with the academic study undertaken below. In respect of the other gaps identified by, Lahteenmaki, Mattila and Toivonen (1998), it could be argued, that the research model described above presents a holistic and integrative model of organisational learning which builds upon existing theory and research (Gap 1). The effectiveness of this is something that the research described below will address, as are the mechanisms for the transfer of learning between individuals and organisations (Gap 4). In respect of the relative importance of learning of organisations over learning of individuals (Gap 2), it is understanding the relationships between the individual and the organisation as units of analysis in the study of the learning process which is of greater importance, and this is also addressed here.

### **7.3 RESEARCH PHILOSOPHY**

Research is a process of systematic enquiry “concerned with seeking solutions to problems or answers to questions” (Allison 1993: 14). Classically, this process is seen as being driven by a choice between the positivist and phenomenological schools of thought.

Positivism is linked to the scientific method (Allison 1993) and is described by its proponents as the most efficient means of investigating human and social behaviour (Aiken 1956). It is based on the idea that the external world can and should be measured



through objective methods, with knowledge only being significant if it is based upon observation of the external reality under consideration (Easterby-Smith, Thorpe and Lowe 1991). Advocates identify advantages for a positivistic approach that are linked to its independence, objectivity, generalisability, and its scientific and causal approach, with positivism largely being associated with quantitative techniques (Allison 1993).

Phenomenology represents the realisation that subjective processes such as creativity, intuition, and reflection are as important in creating advances of knowledge as the logical, objective approaches of positivism (Easterby-Smith et al. 1991). It has been linked with classical sociological approaches to (Berger and Luckman 1966) and qualitative methods of (Taylor and Bogdan 1984) research, and is based on the assumption that every phenomenon that can be observed is unique, and it is this uniqueness which is important (Allison 1993), phenomenological research therefore proceeds by researchers assessing the reasons behind peoples understanding and experiences and in doing so identifies the social and human interactions that construct and give meaning to particular phenomena (Easterby-Smith et al. 1991).

Despite the tendency to present these two approaches as distinctive, and for the exponents of one epistemology to criticise the other, there is a recognition that these 'pure' paradigms and the approaches they represent should be viewed as complementary (Morgan and Smircich 1980; Bryman 1988; Easterby-Smith et al. 1991; Allison 1993). There is also a significant body of work which recognises that researchers should not be limited to a perspective defined by one of the paradigms, and that significant benefits can accrue through combining aspects of both approaches (Filstead 1979; Reed 1985; 1990; 1992; Gioia 1986b; Bryman 1988; Willmott 1990; 1993; Ackroyd 1992; Bailey 1994).

This integrative philosophical approach is described by the strategy of 'pragmatic pluralism' proposed by Watson (1997). This is "effectively an approach whereby a researcher, in producing an analysis of some aspect of social life, draws elements from various disciplines to produce what amounts to their personal paradigm - with its own ontological, epistemological and methodological integrity - to stand as the conceptual foundation of that particular piece of research" (Watson 1997: 6). This approach is pragmatic because the question 'what is it that I want to know?' is more important than any epistemological question (Sussman 1983), whilst the pluralism recognises that combining ideas from different traditions will allow for greater insight into the complexity and ambiguity of the issues and phenomena under assessment (Reed 1985). Pragmatic

pluralism can be linked to Hassard's (1993) multi-paradigmatic strategy, Donaldson's (1996) structural contingency research paradigm, and represents the approach taken here.

It should be recognised that this integrative view is not all encompassing, and that a number of writers and researchers continue to argue against combination of approaches (Burrell and Morgan 1979; Bogdon and Biklen 1982; Delamont and Hamilton 1984; Jackson and Carter 1991), citing the problems that combining perspectives creates, but researchers with fixed theoretical backgrounds can become isolationist (Watson 1997). Furthermore, Bryman (1988) and Watson (1997) argue that research into the complex and multifaceted issues within management and organisation is particularly open to the benefits of combining approaches, and that these vastly outweigh the problems which can be minimised if the disciplines are not used indiscriminately and if the design and construction of research is sound. Watson (1997) therefore outlines what is required of the researcher undertaking work within a pragmatic pluralist perspective. Unlike the theory specialist who is expected to produce a comprehensive theoretical perspective, the pragmatic pluralist is required to establish the particular grounds for the credibility of their theorising, focused upon the specific objectives of their research (DeVaus 1991). Their theory must therefore be first and foremost plausible, providing insights felt worthwhile by the reader. Research must not be haphazard however, and a study must be logical, and have theoretical coherence, provided by a framework of assumptions and concepts which has its own integrity. As well as allowing integration of ideas from a variety of sources, this approach provides a logical mechanism for researchers seeking to identify a clear theory and understanding in fields of study characterised by a wealth of literature and a range of perspectives. This is the case within organisational learning, and it is partly in response to this that a pragmatic pluralist approach has been adopted here, both in the construction of the research model delineated in the previous chapter (where the approach taken in describing the model was aimed at clearly identifying and describing the logic of the model's theoretical construction) and in the operation of the research described subsequently.

#### **7.4 AIMS AND OBJECTIVES**

The overall aim of the thesis is to investigate the model outlined in Chapter Six which presents an explanation of how the process of knowledge transfer and exchange occurs

between individuals and organisations. Mental models have been identified as critical to this process, and cognitive style as a factor incident upon it. In other words;

**The aim of this research is to investigate the relationships between individual and shared mental models, cognitive style, and individual and organisational learning, and in doing so gain insight into the organisational learning process.**

Objectives which stem from and expand upon this aim are outlined below. As the research has developed through its application, most notably through the addition of further learning measures (described below) to the second application of the survey research, not all of these are addressed initially:

1. Identify and describe the individual and shared mental models that exist at the senior management level, with respect to a specific organisational issue, within participating organisations.
2. Assess the extent to which participating organisations show evidence of learning at the individual and organisational levels.
3. Assess attitudes in respect of learning systems and learning climate across participant organisations.
4. Assess the extent to which the shared mental models identified at the senior management level are recognised (assimilated) throughout participating organisations.
5. Explore the relationships between respondent characteristics (age, gender, job level, length of service, and department) and individual learning, organisational learning, learning systems, and learning climate.
6. Assess the cognitive styles of the individuals in participating organisation, and investigate the relationships between cognitive style, individual and organisational learning and learning systems and climate.
7. Assess the extent to shared mental model assimilation is influenced by the other factors identified (individual and organisational learning, learning systems and climate, cognitive style, and respondent characteristics), and examine the relationships between these factors.

## 7.5 HYPOTHESES AND RESEARCH QUESTIONS

Specific hypotheses and research questions can be drawn from the objectives stated above. In line with a pragmatic pluralist approach, both are included, in order that the issues under consideration are framed in ways appropriate to the design of the research, with the research questions being address through a broadly qualitative approach, and the hypotheses linked to quantitative methods and analysis. Again, some of these relate to the subsequent development of the instrument and are not addressed initially below.

### 7.5.1 Research Questions

Three specific research questions (RQs) framed as statements, have been identified:

**RQ1:** *Individual mental models of specific issues may be identified and elicited through application of cognitive mapping procedures.*

This question is methodological, and represents a pre-requisite for the subsequent research. Mental models have been identified as key above, and assessment of the research model must begin with elicitation and representation of these models. The effectiveness of this characterisation needs to be considered.

**RQ2:** *Shared mental models may be constructed through the aggregation of individual mental models which are representative of the shared understandings of the issues identified and elicited through the cognitive mapping procedure.*

This is another pre-requisite for the research. Representation and understanding of both individual and shared mental models within organisations is required, and again consideration of the effectiveness of the process adopted to obtain these models and how representative they are is important.

**RQ3:** *Techniques may be developed which allow structured comparison of the complexity and similarity of the individual and shared mental models obtained within an organisation.*

The extent of the similarity of the mental models identified concerning specific issues in organisations (i.e. the extent to which they overlap) is significant for an organisation itself, but also is important within the wider terms of this research. Consequently, techniques which allow comparisons between models will be explored.

These three key issues will be addressed through primarily qualitative means in Phase One of the research.

### 7.5.2 Hypotheses

Eight hypotheses (H), linked to the quantitative aspects of the research are defined below.

**H1:** *The shared mental model obtained at the management level is assimilated and evidenced by individuals throughout an organisation.*

This addresses the extent to which the shared mental models derived at the management level in Phase One are taken-up by the organisation as a whole.

**H2:** *Assimilation of the shared mental model by individuals throughout an organisation is consistent, in that this assimilation is representative of a single factor depicting consistent understanding of the mental model 'issue' across that organisation.*

In each organisation studied, the mental model explored concentrates on a 'specific issue' identified as important by that organisation. Hypothesis Two addresses the nature of these models, and the expectation that, as each organisation has identified a 'single' issue, assimilation of this will be uniform.

**H3:** *Adaptive and generative learning represent the poles of independent scales for learning at the individual and organisational levels.*

In Chapter Six, adaptive and generative learning levels, and individual and organisation units of analysis were identified as important in characterising the nature of learning in organisations, however the nature of relationship and interaction between these aspects was not identified. Hypothesis Three is included to allow this issue to be explored here.

**H4:** *The attitudes of individuals towards organisational learning are commensurate with their espoused approach to individual learning.*

Hypothesis Four is included in recognition of the importance placed upon individuals' learning in the understanding of organisational learning, in order that the relationship between these two key levels can be explored.

**H5:** *The attitudes of individuals towards learning systems and learning climate represent linked but independent scales describing differing aspects of the learning environment.*

This hypothesis represents developments made to the survey in its second application. It is included in order that the relationship between learning systems and climate, identified as two key aspects of an organisation's learning environment below, can be explored.

**H6a:** *Attitudes in respect of organisational learning are independent of cognitive style.*

**H6b:** *Attitudes in respect of individual learning are independent of cognitive style.*

**H6c:** *Attitudes in respect of learning systems are independent of cognitive style.*

**H6d:** *Attitudes in respect of the learning climate are independent of cognitive style.*

Hypothesis Six explores the relationships between cognitive style (measured by the CSI) and the four measures of learning identified.

**H7:** *Responses in respect of the learning variables identified (individual and organisational learning; learning climate; learning systems) are independent of respondent characteristics (gender; age; length of service; job level; department).*

This hypothesis is included in order that the potential influence of respondents characteristics on the learning variables can be explored.

**H8a:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to generative learning at the individual level.*

**H8b:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to generative learning at the organisational level.*

**H8c:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to espoused attitudes in respect of its learning system.*

**H8d:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to espoused attitudes in respect of its learning climate.*

**H8e:** *Individuals' assimilation of the shared mental model throughout an organisation is positively related to intuitive cognitive style.*

**H8f:** *The effects of organisational learning, individual learning, learning climate, learning systems and cognitive style on shared mental model assimilation are independent.*

**H8g:** *The extent of assimilation of the shared mental model throughout an organisation is independent of respondent characteristics (gender; age; length of service; job level; department).*

The eighth hypothesis identifies the key issue: the effects the variables identified on shared mental model assimilation. The expectation is that the larger the recognition (assimilation) of the shared mental model, the greater the extent of generative learning at both the organisational and individual levels (Hypotheses Eight-a and Eight-b), and the more positive attitudes are in respect of learning systems and climate (Hypotheses Eight-c and Eight-d). In terms of cognitive style (Hypothesis Eight-e), the expectation is that the more intuitive an individual's cognitive style, the more open they will be to new ideas, and hence the greater their assimilation of the mental model. In their relationships with shared mental model assimilation these variables are seen as independent constructs (Hypothesis Eight-f). The final sub hypothesis, is included in order that the effect of respondent characteristics on shared mental model uptake is explored.

The hypotheses will be explored through a quantitative methodology in Phase Two.

Six results chapters which provide evidence in respect of the research questions and hypotheses identified above are presented below. Results from Phase One, addressing the research questions are included in Chapters Nine to Twelve. Survey results from Phase Two, which address the hypotheses are presented in Chapters Thirteen and Fourteen. Learning systems and learning climate were added to the quantitative survey after its initial application, and these are discussed in Chapter Fourteen only. Discussion of these scales is held over until this stage of the research is addressed (Chapter Fourteen).

## 7.6 RESEARCH DESIGN AND METHODOLOGY

The design of the research and methodologies used in its application are described below. These differ from the methods described in the next chapter. 'Methods' are the specific research techniques or tools used to gather data, whilst 'methodology' is concerned with

the rationale, philosophy and approach adopted for the research (Bailey 1994). It is therefore the rationale for the approaches adopted that is outlined below, whilst their specific application and the methods followed are described in Chapter Nine.

At the organisational level, this research is best viewed as adopting a case study approach. The issues identified above are addressed in a small number of organisations, and each study has a unique organisationally derived issue at its centre. Consequently, the potential for inter-organisational comparisons is limited.

### **7.6.1 Phase One: Mapping Mental Models**

Phase One of the research adopts a broadly (but not exclusively) qualitative methodology in which representations of individual and shared mental models within organisations are identified through application of cognitive mapping. Identification and characterisation of individual and shared mental models is key to this research, and whilst there exists a wealth of literature addressing the elicitation and representation of mental models (examples include Porac and Thomas 1990; Calori, Johnson and Sarnin 1994; Day and Nedungadii 1994; Daniels, DeCernatony and Johnson 1995; Hill and Levenhagen 1995; Hodgkinson and Johnson 1994), this can be confused and undirected. Cognitive mapping was therefore introduced in Chapter Four to distinguish between the techniques available for elicitation, the elicited images themselves and the mental models they represent.

The strengths and limitations of cognitive maps as representations of mental models were discussed in Chapter Four. It should be noted that the representation and characterisation of cognition in these ways can be viewed as contentious, and the reduction of an individual's mental model to a fixed, two-dimensional graphic represents a simplification of issues that are inherently and fundamentally complex (Gioia 1986b). This does not mean that attempts at understanding these issues should not be made. Indeed, all data collected in organisation studies can be characterised as representations of aspects of an organisational reality (Stablein 1996), and to discard one form of representation because it is recognised as a representation would be inappropriate. Nevertheless, representations must be effective, logical and rigorous (Stablein 1996), and the approaches adopted here are drawn from those that are identified in the literature as appropriate for this form of study (Scheper and Faber 1994; Kitchin 1996). The effectiveness of these



approaches is what the research questions identified above address, and their success will be reviewed in the concluding chapter of this thesis.

As a methodology cognitive mapping represents a suite of techniques. In its application below, three stages can be identified, to which differing techniques have been applied: individual mental model elicitation and representation; shared mental model development; and mental model characterisation and analysis. These stages can be linked directly to the three research questions identified above, and the selection and application of the techniques and tools utilised in realising each stage is described in the next chapter.

### **7.6.2 Phase Two: Mental Models, Learning Levels and Cognitive Style Surveys**

Phase Two of the research applies to the hypotheses. A quantitative approach has been adopted, utilising a self-report mail survey to collect information on attitudes to individual and organisational learning, the shared mental model derived in Phase One, and cognitive style across participating organisations. Other strategies were considered, a survey was adopted as it was felt that the advantages to be gained from the breadth this afforded in each of the study organisations, and the fact that this could be achieved through relatively low expenditure (both in time and resources) compared with any of the alternatives, outweighed any disadvantages. Despite this a lack of detail does ensue. This means the complexity of the model described in Chapter Six cannot be addressed. Only the key issues of individual and organisational learning at the adaptive and generative levels, the (organisation specific) shared mental model, and cognitive style are directly assessed. Details of the construction of the questionnaire and the design and selection of the measures used to assess these variables is covered in Chapter Nine. However, the approach adopted for one factor in particular needs to be explored.

Given the importance placed upon the mental models and their representations (cognitive maps), it should be recognised that the assessment of mental models through a survey is less straightforward than for the other elements of the questionnaire. Questionnaire methods can, however be adopted for the study of mental model issues (Roberts 1976b; Kleindl 1996; 1997; Ferguson, Kerrin and Patterson 1997), if the construction of the instrument is sound. This means that the concepts included in the questionnaire must be clearly identifiable as coming from the mental model from which it is derived and taken to represent. In this research, the shared mental model derived in

Phase One, is used in Phase Two as an 'expert' model, which is supposed to represent the 'organisation's' shared mental model of the issue under consideration. The implications of this approach will be considered in the final chapter.

## **7.7 PARTICIPATING ORGANISATIONS**

Named individuals in twelve organisations were approached by letter and asked if they would be interested in participating in the research, Appendix C encloses copies of the research proposal and supporting letters sent to these organisations. Second letters were sent after two weeks, and were followed up by phone calls a week after this. This process identified four organisations who expressed an interest in the research. After meetings with the researcher, two of these organisations agreed to participate. It was also decided to pilot the interview process used in Phase One within the University of Plymouth Business School, and the first set of mental models discussed below are the results of this exercise. Another organisation was recruited following a chance meeting between the researcher and a member of this company's management at a business event held at the University. Four organisations were therefore recruited, using an opportunistic sampling frame. The first of these (the University of Plymouth Business School) was expected to take part solely in Phase One, whilst the other three organisations were expected to participate in both phases of the research. Excepting the Business School (where the nature of the information elicited prevents this), participating organisations were promised anonymity, and as a consequence their names and some details of their business have been changed.

## **7.8 SUMMARY**

This chapter has outlined the research design. Specific research questions and hypotheses were outlined and described, which are addressed in two linked phases of research. Phase One consists of the elicitation and representation of individual and shared mental models at the senior management level in participating organisations. Phase Two is a questionnaire survey assessing the extent to which these shared mental models, individual and organisational learning and differing cognitive styles are evident within an organisation, and the relationships between them. The rationale adopted and the methodologies applied to each phase of the research were also discussed, detailed methods are described in the next chapter.

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## CHAPTER EIGHT

# Research Methods

### 8.1 INTRODUCTION

Two phases of research have been described above, the first addressing the mapping of individual and shared mental models, the second using questionnaire surveys to look at the relationships between individual and organisational learning, mental models and cognitive style across organisations. Methods adopted to operationalise these are looked at below. Whilst a generic model of the research methods is presented here, this was developed and applied in significantly different ways in each organisation. Specific details on changes and developments made are discussed in context throughout subsequent chapters.

### 8.2 PHASE 1: MAPPING MENTAL MODELS

The purpose of the initial phase of the research is to elicit, represent and describe the individual and shared mental models that exist in respect of a specific issue within each participating organisation, and in doing so address the research questions outlined above. A cognitive mapping approach has been adopted. The rationale for this was identified in the previous chapter whilst the differences between cognitive maps and the mental models they represent were addressed in Chapter Four. Cognitive mapping does not represent a single method or technique, there exists a range of alternative methods employed by researchers to obtain cognitive mapping representations, reviews of which are provided by Huff (1990) and Swan (1995). Indeed, the most significant advantage identified for cognitive mapping above is the range and strength of the techniques available for their elicitation and representation. This however can create difficulties in the selection of an approach, and whilst this decision will ultimately depend upon the preferences of the researcher, it should take into account the needs and circumstances of the research itself. As the primary goal of Phase One was the identification and characterisation of the mental models that exist within organisations, and as these have been identified as complex and often implicit constructs representing the knowledge and understanding held by

individuals, it was felt that as open an approach as possible would be most appropriate. For this reason, a semi-structured causal mapping process has been adopted.

### **8.2.1 Mental Model Elicitation and Representation: Semi-structured Causal Interviews**

The semi-structured approach adopted is used to obtain causal maps which represent individuals' (senior managers') mental models of specific issues identified as important by their organisation. 'Specific issues' were identified in partnership with participating organisations, and were focused on for two practical reasons. The first of these is to limit the scope and complexity of the mental model under consideration: by focusing upon one issue, the content of the mental model is limited to a more manageable size. The second is that by allowing organisations to identify an issue in which they have a particular interest, it was hoped that this would increase their desire to participate in the research, and improve the richness of the data obtained (compared with a generic business issue applied across a range of organisations). It was felt that these benefits outweighed the loss of comparability between organisations.

Semi-structured causal interviewing was adopted over alternative methodologies (repertory grids and triading) for a number of reasons. Firstly, the form of the maps obtained (causal) was chosen over the alternative available (see Fiol and Huff 1992, for a review of the different forms adopted for cognitive maps) because it was felt that the style and construction of these maps, aimed at identifying causal (that is to say explanatory) links between concepts, ideas, issues, events and actions was most appropriate to the nature of knowledge and understanding supposed here (Huff 1990). Secondly, both repertory grids and triading are recognised as being more time-consuming to enact, typically suffer from a lack of buy-in by participants, and are more complex in the presentation and analysis of data obtained (Brown 1992). Also, both repertory grids and triading typically limit the focus of a cognitive mapping event (Easterby-Smith et al. 1996), which may ignore or suppress important elements of individuals' understanding which may be volunteered through the more open process adopted here. Causal mapping is also perceived as having reliability, consistency and stability (Axelrod 1976; Huff 1990). Furthermore, causal semi-structured interviewing and the creation of cause maps is a process which has been explicitly linked to learning and change (Eden 1988).

More specifically, the particular methodology adopted is based upon methods designed for the elicitation of shared meaning from individuals (Scheper and Faber 1994), and represents a development of existing techniques which attempt to integrate best practice from established methodologies, and recognise and overcome some of the limitations identified for these. These include Eden Jones and Sims (1983), Jones (1985a: 1985b), Eden (1992; 1994), Brown (1992), Langfield-Smith (1992), Vennix and Gubbels (1992), and in particular Scheper and Faber's (1994) 'theoretically sound' procedure to represent and measure shared meaning. The interview process adopted is therefore representative of 'interactive interviewing' (Swan 1995), and allows an individual to construct a causal map of their knowledge and understanding in respect of the mental model under consideration in partnership with the researcher.

One-to-one interviews were undertaken between the researcher and volunteers from senior management in participating organisations, focused on the specific issue identified in each organisation. All the individual participants were assured of anonymity. In each organisation, interviews were undertaken within a two week period, in order that the chances of change in organisational conditions, the issues and hence mental models were reduced. It was felt that senior managers would have the most complete understanding of the issues identified, and hence the most complex mental models, as they would be actively involved in the discussion and construction of both the 'routines' of the issue under consideration, and the 'frameworks' that drive them. Consequently it was expected that senior managers would provide the most complete and data-rich maps.

The interviews began with the researcher asking the participants to describe what they thought were the key elements of the issue under discussion. What Scheper and Faber (1994) describe as 'concepts'. These were recorded without prejudice, by the interviewer on Post-It notes, using the individual's own terminology, with any relationships espoused between these concepts at this stage being ignored. Individuals were allowed to speak, with minimal interruptions from the interviewer until they 'dried-up' or indicated that they felt they had generated enough concepts to describe their understanding. Participants were then asked to identify those concepts they thought were related and to describe the nature of these relationships. This allowed the interviewer to define causal 'links' between the concepts which describe the lines of influence that exist between them. In practice, this was done by transferring Post-It notes to a sheet of paper, upon which a two-dimensional representation of an individual's understanding of the issue under study was built.

Participants were given a 'core' or 'seed' concept as a starting point for their model (representing the label for the issue under discussion), but it is made clear to participants that they were free to discard this or any other concept, if they felt it did not add to or fit the image they were building. During this construction process, participants frequently identified additional concepts. Finally, to complete the interview participants were asked to look again at each of their concepts and to further describe and explain them (the 'properties' of the concept; Scheper and Faber, 1994). This information, whilst not included in the individual maps is important for the construction of a shared map.

Interviews lasted on average between 45 minutes and an hour and a half and were conducted, where possible in the participant's own office or workplace, with the outcome of the interview consisting of a 'raw' cognitive map, made up of the Post-It note collage built by the participant, (aided by the interviewer). This was taken to represent that individual's mental model of the issue under discussion. Interviews were also recorded, with the tape obtained, being reviewed by the researcher to ensure that it concurred with the image and information obtained.

Following the interviews, the 'raw' cognitive maps were redrawn on computer using specialist cognitive mapping software: *Decision Explorer* (Version 3.0.6; 1997). This was adopted, because of its flexibility and accessibility, and because it is established and widely used (Ackermann, Eden and Cropper 1990; 1996; Eden 1992). The images obtained were returned to the interview participants for comment and validation, and any changes identified by the participant at this stage have been included in the final version of the cognitive maps. Completed maps typically contained around 20 concepts.

The process described above was designed to address as many of the common criticisms of cognitive mapping, as possible. Firstly, the use of participants own terminology recognises that cognitive maps/ mental models are personal and vary between individuals (Senge 1990a). The open and interactive nature of the interview, whereby participants see their map constructed in front of them should also minimise problems of individuals not buying into a mapping process (Swan 1995). The process described also goes some way to meeting the criticism that cognitive maps are often not fully understood by their 'owners' (Norman 1983), in that the two stage process adopted separating the generation of concepts from the identification of the causal links between them allows the participant to describe relationships which may not be evident to them initially (Scheper and Faber 1994). This opens up another potential criticism; the process of obtaining the

map changes the understanding you are trying to represent (Fiol and Huff 1992). This is, to some extent inevitable, but nevertheless should still be recognised. It should also be remembered that the use of cognitive maps to represent mental models places a deliberate degree of separation between the mental models and the images of them produced below.

Furthermore, the process is designed to maximise the reliability and validity of the maps produced, with the reviewing of maps against the recorded interviews and the returning of the resultant images to participants being undertaken to ensure that the map produced is as fair a representation as possible of that individuals understanding of the issue under consideration (Tomaskovic-Devey, Leiter and Thompson 1994). It must be recognised that this alone only provides face validity for the map produced. Establishing other forms of validity is difficult with qualitative research (Burnard 1991).

Cognitive mapping techniques have also been criticised for allowing researchers to exert undue influence on the mapping process (Brown 1992). This bias can be minimised if researchers are trained and practised in the techniques utilised. The researcher therefore undertook training in the cognitive mapping process, attending a workshop on cognitive mapping and the use of *Decision Explorer*, and used the pilot interviews undertaken in the University of Plymouth Business School to refine and practise the interview process. Influence can also be reduced through the design of a process that minimises the input of the researcher. This is the case here. Interviews can be undertaken by a researcher with no prior or expert knowledge in respect of the issue under consideration (and indeed this is preferred). This reduces the potential for 'selection' bias from the researcher, who, if they understood the issue and environment under discussion might only record concepts which confirmed their own point of view. In the interviews, the researcher acts as a facilitator, providing the structure for the interview and map rather than having any input into its content. Also, the fact that a single interviewer was used means the bias that could be introduced by differences in attitudes and interpretations between researchers is removed.

### 8.2.2 Shared Mental Model Development

Subsequent to the elicitation and representation of individual mental models, shared mental models were developed. Techniques available for shared mental model development were reviewed, as were the differing forms that these shared maps can take in Chapter Four. Because of the practical difficulties involved in getting a group together to

undertake a shared mapping exercise, and the recognised barriers to successfully obtaining shared images with a group in-situ, a post-hoc process of shared mental model development was chosen here. The type of shared map being developed would be described by Bougon (1992) as 'congregate', as it includes all the concepts identified by the participants in the individual mapping process, connected by those concepts identified as existing in common between one or more individuals. Congregate maps have been chosen in order to recognise that all the information incorporated in each individuals' mental model contributes to the shared model, which exists, like individual models in the minds of individuals within an organisation and facilitates transfer between them.

The generation of shared maps from individual maps requires researchers to merge concepts from maps which they assume 'with great care' to be sufficiently similar (Bougon 1992). Ultimately this process is essentially subjective, and depends on the opinion, skill and expertise of the researcher. In practice this requires the researcher to match concepts which have similar labels (i.e. those which have been described in the same way by participants) and/ or those which have similar influence (i.e. those that affect similar sets of concepts in the same way). Such a process is fraught with pitfalls in that identical labels and similar influence may still hide differing underlying meaning on the part of participants. Here, the collection of data on concept properties was done to provide the researcher with additional information on each individuals understanding of the concepts included in their models, and increase the likelihood that the subjective assessments made are appropriate. The concept merging process adopted here therefore uses three sources of information: the concepts' labels themselves; their influences (i.e. those concepts which link to or surround the concept under consideration); and each concept's properties. The first two of which are typically recognised and used in this process. In practise this was done by summarising the three pieces of information on a single record card for each concept, and then systematically comparing this with cards representing the other concepts identified by participants in an organisation. The generation of a shared map following this time-consuming merging process was facilitated by *Decision Explorer* which includes a function that allows concepts to be easily merged. Images thus produced were typically very complex, containing in excess of 100 concepts.

The resultant shared maps include all the concepts and links identified in the individual models, and were taken as representing the shared mental model of the senior managers interviewed as an 'expert user group' in respect of the issue under consideration.



In terms of its reliability and validity, the consistency (and hence reliability) of the shared maps is maximised through the systematic process adopted and high information provision for the merging decision, whilst face validity is provided by the acceptance of the shared map by the senior management group (Tomaskovic-Devey et al. 1994). The shared models are particularly important to this research, because as well as being a significant source of information (and subsequent analysis) in their own right, they also provide a proxy for an 'organisational' mental model and are used in Phase Two, which looks at the links between the assimilation of these shared mental models and the extent of learning in organisations.

### 8.2.3 Mental Model Characterisation and Analysis

One further advantage of the elicitation, representation and development techniques adopted above is that the logical and systematic process adopted produces models which lend themselves to statistical analysis. The techniques available for assisting in the characterisation and analysis of shared mental models were reviewed in Chapter Four.

At the concept level, concepts within the shared cognitive maps are categorised according to three measures. These are: (1) the degree to which they have been 'merged'; (2) the extent of their 'domain' (the number of concepts surrounding this one); and (3) a measure of 'centrality' (a weighted measure of domain extending to three levels of links surrounding the concept). These measures allow us to assess the importance of concepts within the shared model, both in terms of the number of people who have included that concept in their model ('merged') and in terms of the sphere of influence a concept exerts on the model in terms of the numbers of other concepts it relates to ('domain' and 'centrality'). The first measure is derived during the merging process, whilst scores for 'domain' and 'centrality' are obtained through *Decision Explorer* (Version 3.0.6; 1997).

For maps, two measures which describe their structure will be considered: 'complexity'; and 'density'. Complexity ( $\beta$ ) gives the mean number of links per concept in each map, and the higher the  $\beta$ -score the more complex the map (Johnson, Gregory, and Smith 1986; Eden, Ackermann, and Cropper 1992). Density ( $\gamma$ ) compares the actual number of links present in a map with the theoretical maximum number possible for the number of concepts the map contains, the closer  $\gamma$  approaches one, the more the map approaches optimal connectivity (Haggett and Chorley 1969; Klein and Cooper 1982;

Johnson, Gregory and Smith 1986; Daniels, Markoczy and DeCernatony 1994). The extent of the overlap ('similarity') between maps within an organisation will also be characterised, using a measure created by McKeithan, Reitman, Reuter and Hirtle (1981). This uses a natural log scale (utilised to remove the effects of sample size) to assess the number of concepts two maps have in common as a proportion of the total number of concepts across the two maps.

The measures adopted here to assess complexity, density and similarity have not previously been applied to models of the type created here. As a result there is an absence of appropriate norms. Consequently, the development of norms and the assessment of the application, effectiveness and appropriateness of these measures is something this research will address. Details of the derivation and calculation of all these measures (both concept and map) are provided in Appendix D.

#### **8.2.4 Pilot Study**

Piloting of the processes described above is important, not least because the skill and confidence of the researcher can have a significant impact upon the effectiveness of the process and the reliability of the images produced. Six pilot interviews were undertaken with volunteers from the academic and administrative staff of the University of Plymouth Business School. The results of these interviews, are discussed in detail in Chapter Nine. They did not identify any problems, providing data and models in sufficient depth.

### **8.3 PHASE 2: MENTAL MODELS, LEARNING LEVELS AND COGNITIVE STYLE SURVEYS**

The second phase of this research utilises a questionnaire survey approach to address the hypotheses outlined in Section 7.5.2, and to characterise the extent of shared mental model uptake, individual and organisational learning, and cognitive styles across organisations.

The reasons for adopting a survey approach were identified in the last chapter. Other strategies were considered, including the widening of interview procedures to address more individuals and the issues under consideration longitudinally. However, it was felt that the breadth afforded by a survey approach, combined with the fact that it allows relatively rapid assessment of potentially changing issues, alongside an assessment of learning and cognitive style represented the most comprehensive alternative available.

### 8.3.1 Questionnaire Design

There exists a wealth of literature discussing survey research and its best practice (e.g. Oppenheim 1992; Fowler 1993; Bailey 1994; Borque and Feilder 1995; Weisberg, Krosnick and Bowen 1996; May 1997). Recognising these, the four elements which contribute to the initial survey instrument are discussed below, as is the design of the complete questionnaire. The first three elements of the questionnaire collect information in respect of the three key issues identified above (individual and organisational learning; shared mental model assimilation; cognitive style), the fourth collates respondent details.

#### 8.3.1.1 Levels of Learning

Schmitt and Klimoski (1991) and Borque and Feilder (1995) advocate the use of pre-existing tools within questionnaire surveys. Advantages include the fact that they are likely to have already undergone testing and refinement, and may have reported reliability and validity. Consequently, a search was made of the literature to identify those instruments available for the assessment of learning in organisations. No instrument was found which adequately fulfilled the requirements of this research. However, one instrument assessing organisational learning was identified. This was the *Organisational Learning Orientation Scale*, as used by Sadler-Smith, Chaston and Spicer (1999). This consists of 30 items in three hypothesised scales based upon not learning (zero-loop), adaptive learning (single-loop), and generative learning (double-loop) in organisations, and has shown acceptable levels of temporal stability and internal reliability, as well as no evidence of social desirability within responses (Sadler-Smith, Chaston and Spicer 1999: 12). It was decided therefore to adapt this instrument for use in this research. This represents the next best strategy if no appropriate pre-existing measure can be found (Borque and Feilder 1995).

Initially the not learning (zero-loop) items were removed, the hypothetical nature of this construct was highlighted above and given this supposition, it was judged (as it was by Sadler-Smith, Chaston and Spicer 1999), that these items were redundant. The remaining items were reviewed by the researcher for redundancy or inappropriate items, and a final pool of 18 items were selected. Nine of these representing organisational adaptive learning (e.g. 'Employees are discouraged from experimenting with new and novel ways of working'), nine organisational generative learning (e.g. 'As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we

currently use’). These items were then extended, and 18 new items were added addressing learning at the individual level in the same way as it has been considered at the organisational level. Again, nine items represented adaptive learning (e.g. ‘I don’t normally look for feedback from employees, colleagues or customers about the way I work’), and nine generative learning (e.g. ‘I am often on the lookout for new ideas from any source’). This resulted in a pilot instrument, derived from a pre-existing measure, and grounded in an organisational perspective of learning which represents an attempt to identify propensity to engage in adaptive and generative learning at both the individual and organisational levels. This consisted in total of 36 items, and was labelled the *Organisational and Individual Learning Levels Questionnaire, Version One (OILLs-1)*. A five point Likert-type scale (strongly agree; agree; neutral - neither agree nor disagree; disagree; strongly disagree) was chosen, because of its speed and ease of use, high recognition, and tendency for good reliability (Oppenheim 1992), and items were ordered randomly within the instrument to avoid the creation of response sets within the four sub-constructs (organisational adaptive learning; organisational generative learning; individual adaptive learning; individual generative learning) (Bailey 1994). These developments result in a significantly different questionnaire which is best viewed as a new instrument.

In terms of the structure expected within the *OILLs*, whilst items have been grouped in four conceptual sets based on pre-existing theory, two bipolar constructs are expected from analysis, representing separate generative-adaptive dimensions of learning at the individual and organisational levels. This pattern is supposed because the workplace/behavioural nature of the assessment used treats adaptive and generative learning as quantitatively different approaches to the same pressures at work, rather than resulting from totally different workplace situations. Whilst respondents will differentiate between their and their organisation’s behaviour, they are less likely to see an equally fundamental difference in the approach they or their organisation adopt.

### 8.3.1.2 Shared Mental Models

The second element of the survey was constructed to assess assimilation of the shared mental model derived in Phase One. The term ‘assimilation’ is used to describe attitudes to the shared mental model across the organisation because, what is in effect being assessed is individual’s recognition or uptake of the ‘specific issue’ mental model identified by their

senior managers. The expectation is that if this model is representative of an 'organisational' shared mental model respondents will indicate its assimilation into their own understanding through a positive response.

The organisationally specific nature of the models derived in Phase One precludes the use of any pre-existing instruments. However techniques are available that allow for the construction of mental model questionnaires from previously elicited information (e.g. Roberts 1976b; Tomaskovic-Devey, Leiter and Thompson 1994; Ferguson, Kerrin and Patterson 1997; Kleindl 1997). These were used here to generate mental model questionnaires from the representations obtained through the cognitive mapping interviews. These are used here as a expert sample for 'construct generation' (Bougon, Weick, and Binkhorst 1977). Acceptance of, and support for the congregate cognitive map derived in Phase One by an organisation's senior managers is used here to indicate it is representative of their shared mental model. This is a potentially problematic approach, but as the fundamental construct the mental model represents cannot itself be elicited, this represents the next best option. Implications of this approach will form part of the discussion in the concluding chapter.

Concepts chosen for inclusion in the questionnaire were those identified as most significant within the shared mental model on the basis of three criteria: the degree to which they have been merged; their 'domain' (the number of concepts surrounding this one); and 'centrality' (a weighted measure of domain extending to three levels of links surrounding the concept). These are measures which were derived from the analysis of the shared mental models produced in Phase One, and were used in order that the concept sets could be systematically reduced to an appropriate size within the questionnaire. Those concepts selected from the shared model generated in each organisation were re-framed as attitude statements (Oppenheim 1992).

Whilst this survey approach does lead to loss of detail, it does allow relatively rapid organisation-wide assessment of the issues (Roberts 1976b; Ferguson et al. 1997). Speed of assessment is important because the potential for changes in the mental model increases over time. For this reason, questionnaires were mailed within one month of completing the interviews. Use of the models elicited in Phase One in this way follows closely the best practice for both elicitation of information on mental models required for questionnaire construction (Roberts 1976b; Tomaskovic-Devey, et al. 1994; Kleindl 1997), and for the development of attitude scales (Schwab 1980; Oppenheim 1992). Up to 30 items

representing differing aspects of the shared mental model were created in each organisation, representing a shared *Mental Model Questionnaire (MMQ)* of the issue under consideration. A five-point Likert-type scale was used (Oppenheim 1992), and items were again ordered randomly (Bailey 1994). Prior to piloting, these items were pre-tested with the interview participants, in order that they could confirm that the items generated were fair representations of their understanding (Borque and Fielder 1995). Further details on the specific nature of the question sets derived in each organisation are provided at the start of the appropriate results chapters. The section was concluded with an open question, asking respondents if they felt would like to add any further comments about their organisational issue under investigation, particularly if there were aspects of this issue not covered in the *MMQ*. This was included in an attempt to capture any information that may have been lost or missed through questionnaire construction.

Finally, it should be recognised that within these mental model instruments, unlike the *OILLs* no structure is presupposed. Nevertheless, analysis will be undertaken with these instruments to explore whether they do contain sub-constructs representing different and logically separate aspects of the mental model under consideration.

### 8.3.1.3 Cognitive Style

Cognitive style was assessed by through a self-report questionnaire: the *Cognitive Style Index (CSI)* developed by Allinson and Hayes (1996), which identifies an individual's position on an intuitive-analytical dimension of cognitive style was described in Chapter Three. The *CSI* was chosen over the alternatives available (*CSA* and *KAI*) because of its robustness, theoretical links with both learning and mental models, and availability (these reasons were identified in detail in Section 3.5). It consists of 38 items which are scored on a three point scale (true; uncertain; false). Of the 38 items, 21 are representative of an analyst viewpoint (e.g. 'I'm most effective when my work involves a clear sequence of tasks to be performed'), whilst the remaining 17 represent an intuitives's point of view (e.g. 'I am inclined to scan through written documents rather than read them in detail'). Items are ordered randomly on the final form (Allinson and Hayes 1996: 124). Analyst items are scored: true, 2; uncertain, 1; false, 0. Scoring for intuitive items is reversed (true, 0; uncertain, 1; false, 2). The instrument therefore has a theoretical maximum score of 76, and a minimum of 0. The higher the score, the more analytical a respondent's style. The

lower the score the more intuitive they are. Construct validity within the instrument has been demonstrated through confirmatory factor analysis and correlational studies (see Allinson and Hayes 1996). The *CSI* is constructed to measure value differentiation on a uni-dimensional (bi-polar scale), and is according to its authors a psychometrically sound measure. Its stability over time is demonstrated by high test-re-test reliability ( $r$  from 0.78 to 0.90; Allinson and Hayes 1996: 126; Armstrong Allison and Hayes 1997: 124). Because of this reliability and validity, and its suitability and ease of use the *CSI* was selected for this research. Feedback was offered in respect of cognitive style as it was felt that this may potentially improve response rates. Individuals who wanted this were asked to provide their name and address, with the confidentiality and anonymity of their response being reaffirmed at this point. Feedback was provided on a standardised form, (Appendix E).

#### *8.3.1.4 Respondent Details*

The fourth (and final) section of the questionnaire collected personal details on respondents. Five direct questions were asked, eliciting respondents gender, age (against five categories: under 31; 31-40; 41-50; 51-60; over 60), job level (five categories: senior manager; middle manager; first-line manager; staff; and others), length of service, and department/unit. No categories were provided for the last two of these as no prior expectations in respect of the distribution of responses could be supposed. Both these items were grouped during coding. These detailed respondent characteristics were collected in order that the influence of all these factors could be explored. Whilst it is recognised that the collection of detailed respondent data can reduce response rates, owing to the likelihood of individuals' identification (Futrell and Swan 1977), it was felt that the benefits to be gained through the information out-weighed difficulties in its collection. Additionally, the fact that individuals had already been asked to provide their names and addresses in order that they could obtain cognitive style feedback reduced the impact that any detailed respondent data may have. The section concluded with a final open question, incorporated to ensure that respondents had an opportunity to comment upon the questionnaire and their responses to it. This took the form: "Finally, if you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below."

### 8.3.1.5 Questionnaire Format

The four elements described were incorporated into a single questionnaire (Appendix F) in the order considered above. Questions have been retained within these ‘modules’ (i.e. learning levels, shared mental models and cognitive style) as they are concerned with different variables, and the order chosen for the modules has been selected to maximise the potential response, with questions moving from the most general in Section One to more specific and individual issues through the instrument (Oppenheim 1992). Closed question have been used predominately to maximise the ease and speed of completion by respondents (Easterby-Smith et al. 1991), although these could potentially omit significant issues (Henerson, Morris and Fitz-Gibbon 1987), and may be open to unknown biases (Schmitt and Klimoski 1991). In respect of those sections within which items have been created, care has been taken to ensure that these items follow the established guidelines for the creation of attitude statements (Judd, Smith and Kidder 1991; Oppenheim 1992; DeVaus 1996). Important in this is the avoidance of jargon and abstract terms (Borque and Fielder 1995), and whilst some specific terms have been adopted, these are derived directly from the organisations for which these instruments have been created.

Also considered were the problems of acquiescence and social desirability. Social desirability represents the tendency to reply ‘agree’ to items that respondents believe reflect socially desirable attitudes in order to show themselves in a better light, whilst acquiescence represents a general tendency towards assent rather than dissent (Oppenheim 1992). Social desirability in particular has received considerable attention (Robinson and Shaver 1973; Block 1990; Mazen 1990; Lautenschlager and Flaherty 1990; Booth-Kewley, Edwards and Rosenfeld 1992; Edwards and Edwards 1992; Joanson, Gips and Rich 1993; Blair, Jarvis and Petty 1996), and a number of measures exist for its assessment (Edwards 1957; Crowne and Marlowe 1960; Greenwald and Satow 1970; Merrill, Lux, Lorimer, Thornby and Vallbona 1995). However, no assessment of social desirability is included, partly because the additional items required would make the instrument over-long, but also because the design minimises the potential for social desirability bias: self-administered questionnaires “reduce the salience of social cues by isolating the subject” (Nederhof 1985: 272). This is a point of view supported by Sudman and Bradburn (1974), and further confirmed by evidence that mail surveys give less distortion than other methods of data collection (Wiseman 1972; Baumeister 1982; Paulhus 1984; Nederhof 1984).



Acquiescence is less widely studied, but can be minimised by careful questionnaire construction and selection of items (Oppenheim 1992).

Also considered were reliability and validity, which are particularly important with attitude and scale measures (Schmitt and Klimoski 1991; Bailey 1994). Reliability is a necessary precursor for validity (Nunnally 1978), and essentially means consistency, or in other words the extent to which a measure gives the same reading on two separate occasions (Oppenheim 1992). Reliability is never perfect, but to maximise it both the characteristics of an instrument and the conditions of its administration must be consistent. Reliability can also be maximised through careful construction of attitude statements, as well as the use of scales or pools of items over single items for assessment. A number of methods also exist for estimating reliability, based around the correlations and variances between different applications of an instrument, including measures of test-re-test reliability and internal consistency. Validity is more complex, indicating “the degree to which an instrument measures what it is supposed or intended to measure” (Oppenheim 1992: 160). This definition is somewhat vague, and to overcome this four more specific forms of validity are typically considered (Nunnally 1978; Rust and Golombok 1989; Bailey 1994), Oppenheim (1992: 162) summarises these thus:

1. *Content validity*, which seeks to establish that the items or questions are a well-balanced sample of the content domain to be measured;
2. *Concurrent validity*, which shows how well the test correlates with other well-validated measures of the same topic, administered at about the same time;
3. *Predictive validity*, which shows how well the test can forecast some future criterion such as job performance, recovery from illness or future examination attainment;
4. *Construct validity*, which shows how well the test links up with a set of theoretical assumptions about constructs such as intelligence, conservatism or neuroticism.

The relative importance of these differing forms of validity depends upon the nature and purpose of a study. Of particular importance to this research are content, construct and concurrent validity, predictive validity is less significant because none of the instruments used here are designed with the forecasting of future criteria in mind. Content validity can be assessed by a researcher questioning whether the instruments and items within them are capable of measuring the concepts they are intended to represent (Bailey 1994). Essentially this is a subjective assessment which relies upon the judgement and satisfaction of a

researcher (Bailey 1994; DeVaus 1996), and the best practice adopted here in respect of item and scale construction is aimed at maximising this form of content validity, called face validity. The extent of construct validation is also difficult to assess given the inherent internal subjectivity of attitudinal statements (Schmitt and Klimoski 1991), and whilst this can be difficult and time consuming to establish for new measures, it can be aided through the application of factor analysis (Oppenheim 1992; Hinkin 1995), and here by the comparison of the 'behavioural' outcomes of the new *OILLs* instrument with the established measure of cognitive aspects of an individual's personality represented by the *CSI*. Concurrent validity is also difficult to establish, but it is recognised that if an instrument does demonstrate concurrent validity, it should be capable of discriminating between groups which are supposed to differ in respect of the constructs which the instrument assesses (Allinson and Hayes 1996). As a result some indication of concurrent validity can be obtained through the examination of differences in response between different respondent groups (on the basis of gender, job, or age for example).

Despite their importance, neither reliability nor validity is consistently reported (Thompson 1994; Whittington 1998). However, both reliability and validity will be considered in subsequent analyses, through application of test-re-test reliability, item analyses (including assessment of internal consistency), factor analyses, comparison of results across instruments (*OILLs* and *CSI*), and examination of differences in respect of respondent characteristics. (Nunnally 1978; Rust and Golombok 1989).

More generally, care was taken with the design of the questionnaire in order to maximise user-friendliness (Oppenheim 1992; Borque and Fielder 1995). This is particularly important here given the relative length of the questionnaire, which at around 100 items and eight pages (presented as a double-sided A4 booklet) is at the absolute maximum recommended for mailed surveys (Erdos and Morgan 1970; Childers and Ferrell 1979). It was felt, however that the attractiveness of the format adopted, and the quantity of 'white space' it allows were potentially more important for ensuring a good return (Schmitt and Klimoski 1991; Oppenheim 1992; Borque and Fielder 1995). Also important is the nature of the letter supporting the questionnaire (Selitz, Jahoda, Deutsch and Cook 1959), critical within this are the identification of a credible researcher (Baumgartner and Heberlien 1984), support for the questionnaire (Borque and Fielder 1995) and recognition the researcher therefore undertook training in the cognitive mapping process, attending a workshop on cognitive mapping and the use of Decision Explorer, and used the pilot

University's and participant organisation's support for the research and gave an estimate (20 minutes) as to how long the questionnaire would take to complete. Freepost envelopes were also provided to aid the return of questionnaires.

The final issue that needs to be considered in respect of the design of the survey is the size and representativeness of the sample obtained (Oppenheim 1992) Sapsford and Jupp (1996) make the point that sample size is dependent upon the size of the population under consideration and the precision required within sample estimates. In the case of this research, the population for each survey has been identified by participant organisations, and can be defined as the 'user group' of the mental model issue under consideration. These entire populations have been surveyed to maximise the response.

### 8.3.2 Coding and Analysis

Questionnaires were coded and entered through *SPSS* (Statistics Package for Social Scientists; Version 8.0). The entry of responses into the computer was aided through the use of *SPSS-Pc Data Entry*, which is supplementary system designed to improve the efficiency of and reduce errors in data sets (Mangles 1993). The Likert-type items included in parts one and two of the instrument were pre-coded on the form with the five point scale ranging from 1 for strongly disagree through to 5 for strongly agree, and these values were used for data entry. The responses to the *CSI* were coded on entry as 1 for true, 2 for uncertain and 3 for false, and were subsequently transformed, to meet scoring requirements. Respondent details were using numerical scales for age, gender and job level categories, retaining the values given for length of service and entering departments as strings which were subsequently grouped and re-coded. Items were numbered according to their section and question number so that the first question in Section One was labelled 'q1.1', the first in Section Two as 'q2.1', and so on. Throughout, where data were omitted, the system missing default was used. The open questions were analysed separately.

### 8.3.3 Questionnaire Surveys: Pilot Studies

The need for piloting of mail surveys is widely cited (Fowler 1993; Bailey 1994; Borque and Feilder 1995; Weisberg, Krosnick and Bowen 1996; May 1997). It is necessary to ensure measures will "work with our population and will yield data we require"

(Oppenheim 1992: 47). Consequently, the questionnaire was piloted prior to its wider application in each organisation surveyed, with the format of the questionnaire described above, and included in Appendix F being piloted within *WBC* (Westcountry Borough Council), the first organisation to participate in Phase Two of the research. Twenty-five individuals were selected at random from the data set, and were sent the questionnaire, accompanied by a letter explaining the purpose of the pilot exercise (Appendix H), and a Freepost return envelope. All were returned, and analysis identified a number of changes.

The majority of the modifications made consisted of minor typographical changes within the instrument. These included correcting the omission of the word ‘management’ from Item 14 in Section One, the revising of the age ranges specified, as on the original form anyone aged 30 could not respond, and renumbering the questions in Section Four, as the original form had two Question Fives. Notes were added at the bottom of pages inviting respondents to move to the next section. No potential bias in response could be discerned within the *OILLs-I* and *CSI*, and none of the questionnaire’s items were systematically ignored or missed by respondents. However, high levels of agreement in respect of the *MMQ* items were evident. This suggested the potential for some degree of acquiescence in respect of these items, and as a result some of these were ‘reversed’ so that they represented the opposite viewpoint to that expressed in the shared mental model, in order that the potential for bias on the part of respondents who reply positively to the item set as a whole rather than each item individually is reduced (Oppenheim 1992). Twelve items out of the original 26 were reversed.

## 8.4 SUMMARY

Research methods have been outlined above. Phase One, which consists elicitation of individual mental models through structured interactive interviews. These were combined to produce congregate shared maps for the issues under consideration in participant organisations. Phase Two consists of questionnaire surveys addressing the extent of individual and organisational, adaptive and generative learning, shared mental model assimilation and cognitive style in participant organisations. The broad approaches adopted have been described above, specific details as to how these techniques have been applied will be provided at the start of the appropriate results chapters.

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## CHAPTER NINE

# Study 1: University of Plymouth Business School - Phase 1 Mapping Mental Models

### 9.1 INTRODUCTION

This chapter reports the results of the pilot cognitive mapping interviews undertaken in the University of Plymouth Business School (*UPBS*), which addressed the ‘role of the business school’ as an issue. These were undertaken in order to pilot the semi-structured causal interviewing process adopted here, and contribute to the evidence in respect of the research questions (Section 8.5.1). This chapter begins by providing brief background details on *UPBS*. The output of both the cognitive mapping interviews and subsequent shared mental model development are then described, analysed and discussed.

### 9.2 ORGANISATIONAL BACKGROUND

The business school is one of six faculties within the University of Plymouth. At the time of the research, it offered courses from HND through a range of taught undergraduate and postgraduate programs (including an MBA) up to and including doctoral degrees (Ph.D). *UPBS*’s mission is ‘to be a nationally recognised business school providing distinctive and high quality higher education to enhance the lifetime capability of its students’ (<http://pbs.plym.ac.uk/>). *UPBS* employees nearly 100 full time staff and services approximately 1,500 full-time equivalent students, of which nearly 250 are post-graduate/experience students. The business school is headed by a Dean and was organised at the time of the research in a matrix form. Within this six subject groups (Accountancy; Economics; Human Resource Studies; Law; Marketing, Operations and Strategy; Modern Languages) were headed by ‘Directors of Studies’ with responsibilities for both teaching and research. *UPBS* also offers a range of services to business including professional development, short courses, and consultancy undertaken by its staff.

### **9.2.1 The Role of the Business School**

In the pilot interviews described below, the ‘role of the business school’ was adopted as the issue to be addressed. This was chosen because it represents the broad type of question expected in subsequent organisations and because it was an issue with which any member of *UPBS* would identify. Six volunteers offered to participate in this exercise and it is their responses that are discussed below. Particular attention will be given to the suitability, reliability and validity of the interview process.

## **9.3 METHOD**

The rationale for the approach adopted below was outlined at the end of Chapter Seven, and methods were described in the last chapter.

## **9.4 DATA COLLECTION AND SAMPLE**

Six volunteers were obtained from the *UPBS* staff, three members of the academic staff and three administrators. Three respondents were female, three male. To ensure participants anonymity, no further respondent details are presented. Interviews took place during December 1997.

## **9.5 *UPBS*: MENTAL MODEL RESULTS**

Output, in terms of both the individual models and the shared mental model of the role of the business school is described below.

### **9.5.1 Individual Mental Models Results**

The causal cognitive maps representing individual mental models of the role of the business school are incorporated in Appendix J. They are numbered ‘1’ to ‘6’ to distinguish between respondents, and require some explanation. Concepts identified by each individual are numbered in the order they were espoused with each individual’s model’s concepts numbering beginning with a multiple of 100, corresponding with the order in which the models were obtained; Respondent One’s concepts are numbered 101 to 122 (Appendix J1), Respondent Two’s 201 to 214 (Appendix J2), and so on. The links and

relationships between the concepts are shown by the arrows between them, with causality of these relationships expressed by the direction of the arrows. For example an arrow from 'X' to 'Y', denotes that 'X' leads to, influences or affects 'Y', or 'Y' is dependent upon or follows 'X'. A double-headed arrow denotes co-dependence, where influence is shared or works both ways. The action of the influence in relationships is also expressed. A negative influence is shown by the inclusion of a minus sign ('-') next to the arrow, positive influence is shown by the lack of a sign.

### 9.5.2 Shared Mental Model Result

The shared mental model obtained through the merging of the individual models (Appendix J) is characterised in Appendix K. A complete list of the merged concepts and the concepts from the individual models that they incorporate has also been included in Appendix K. The shared model contains 51 concepts and 144 links, and whilst this represents an improvement on the 97 concepts and 182 links to be found in the individual models viewed separately, it is nevertheless still too complex to characterise as a single image in *Decision Explorer*. Appendix K therefore contains only one possible representation, and unseen links are retained in the software. This identifies four key elements. One concerned with teaching (Appendix K2), one with research (Appendix K3), one concerned with the business services provided by UPBS (Appendix K4), and the last detailing concepts relating to UPBS's regional economic role (Appendix K5). These are grouped around a 'Core' element (Appendix K1), on which the seed concept 'the role of the business school' is highlighted in bold. Other concepts included in the Core element are shown on all the elements in italics. Concepts are numbered using the lowest number pertaining to that concept from the individual concepts it includes. Between them these elements incorporate all the concepts that remain in the shared model but they do not show all the links. Appendix L represents an attempt to characterise the model in a way that will aid understanding and be of benefit for UPBS and this research. This is a point which applies for all the presentations of shared mental models provided in subsequent chapters.

## 9.6 UPBS: MENTAL MODELS ANALYSIS

A range of measures, discussed and outlined in Section 9.2.3, and Appendix D have been used below to describe the models obtained.

	'Academics'			'Administrators'			SMM
	R-1	R-2	R-3	R-4	R-5	R-6	
Concepts	22	14	14	21	14	12	51
Links	40	30	17	43	24	28	144
$\beta$	1.82	2.14	1.21	2.05	1.71	2.33	2.82
$\gamma$	0.087	0.165	0.093	0.102	0.132	0.212	0.056
Similarity							
R-1		0.653	0.572	0.648	0.460	0.578	0.794
R-2			0.673	0.522	0.564	0.513	0.685
R-3				0.572	0.621	0.580	0.685
R-4					0.522	0.532	0.782
R-5						0.341	0.685
R-6							0.649

**Table 9.1: UPBS Mental Models Summary (R= respondents; SMM = shared mental model)**

Maps may be characterised in terms of their complexity ( $\beta$ ), density ( $\gamma$ ), and the extent of their similarity (Table 9.1) (Johnson, Gregory, and Smith 1986; McKeithan, Reitman, Reuter and Hirtle 1981). Mental models are individual constructs and differences were expected between models in these respects. This is demonstrated in terms of the numbers of concepts and links models contain (Table 9.1). The number of concepts in individual maps ranged from 12 (Respondent Six) to 22 (Respondent One); links from 17 (Respondent Three) to 43 (Respondent Four). Complexity (measured as the ratio of links per concept), in the individual models ranged from 1.21 for Respondent Three to 2.33 for Respondent Six, all lower than the score for the shared mental model (2.82) (Table 9.1). Density (which assess the ratio of links in a model compared to its theoretical maximum number of links) scores range from 0.087 to 0.165, all higher than that for the shared model (0.056) (Table 9.1). Highest scores for similarity (which indices the extent of the commonality found on two maps) are found between the individual models and the shared model (0.649 to 0.794). The individual models all seem to show relatively high levels of similarity, with only Respondents One and Five, and Five and Six showing noticeably lower levels of similarity with each other (0.460 and 0.341 respectively).



<i>R</i>	<i>'Merged'</i>	<i>N</i>	<i>R</i>	<i>'Domain'</i>	<i>A</i>	<i>R</i>	<i>'Centrality'</i>	<i>S</i>
1	<b>Role of the Business School</b>	6	1	<i>Teaching</i>	22	1	<i>Teaching</i>	36
2=	<i>Regional economic role</i>	5	2	<i>Service to local business</i>	20	2	<i>Service to local business</i>	33
2=	<i>Research</i>	5	3	<i>Regional economic role</i>	19	3	<i>Regional economic role</i>	32
2=	<i>Teaching</i>	5	4	<i>Research</i>	17	4=	<i>Research</i>	31
5	Undergraduates	4	5	<b>Role of the Business School</b>	14	4=	<b>Role of the Business School</b>	31
6=	Develop place in market	3	6=	Fulfil students expectations	13	6	Fulfil students expectations	30
6=	Fulfil students expectations	3	6=	Quality & expertise of staff	13	7=	Quality & expertise of staff	29
6=	National government	3	8	National government	11	7=	National government	29
6=	Postgraduates (taught)	3	9=	Funding	10	7=	Undergraduates	29
6=	Quality & expertise of staff	3	9=	Undergraduates	10	10	Funding	27
6=	<i>Service to local business</i>	3	11=	Continuing education	9	11=	Continuing education	26
6=	Southwest (problems)	3	11=	Southwest (problems)	9	11=	Postgraduates (taught)	26
13=	Continuing education	2	13	Regional development	8	11=	Southwest (problems)	26
13=	Employment	2	14=	Career	7	14=	Career	25
13=	Funding	2	14=	Postgraduates (taught)	7	14=	Income & resources	25
13=	Income & resources	2	16=	Income & resources	5	14=	Skilled workforce	25
13=	National role	2	16=	Reputation of the B.S.	5	17=	Develop place in market	24
13=	Regional development	2	16=	Skilled workforce	5	17=	<i>Local community</i>	24
13=	Reputation of the B.S.	2	16=	Stakeholders	5	17=	Regional development	24
13=	Skilled workforce	2	20=	Develop place in market	4	20=	Benefit for the individual	23
-			20=	Employers	4	20=	Conduit for knowledge	23
-			20=	Employment	4	20=	Postgraduates (research)	23
-			20=	<i>Local community</i>	4	20=	National role	23
-			20=	MBA	4	20=	Reputation of the B.S.	23
-			20=	Students motivation	4	25=	Employers	22
-			20=	Students inculcate habits of lifetime learning and love of learning	4	25=	Existing knowledge	22
-						25=	Students motivation	22
-						25=	Underpins teaching	22

**Table 9.2: UPBS Shared Mental Model – ‘Most Important’ Concepts (R = Rank; N = number of individual models incorporating this concept; A = number of ‘first-level’ concepts around this concept; S = weighted score for three levels of concepts around this concept)**

Three measures have been adopted to assess the influence of concepts, both in terms of the number of people who have include that concept in their model (‘merged’) and in terms of the sphere of influence a concept exerts on the model (‘domain’ and ‘centrality’). The basis of these three measures has been described in Section 9.2.3 and Appendix D, and they are summarised for UPBS in Table 9.2. Concepts are shown in the form that corresponds to the form they take in the shared mental model (i.e. the ‘seed’ concept is shown in bold and concepts included in the Core model are shown in italics). A number of these concepts have been shortened from their original form.

## 9.7 UPBS: MENTAL MODELS DISCUSSION

Two sets of issues are considered below. The first is the pilot exercise these results represent, which provides some assessment of the effectiveness of these interviews and the mapping process for this research. The second is the results themselves, and what these tell us about the mental model of the 'role of the business school' in *UPBS*.

No significant problems were identified with the mapping process during these pilot interviews. Interviews were not time consuming, and did not seem to suffer from a lack of 'buy-in' by participants (Swan 1995). Initially, two alternative approaches were adopted, one whereby respondents recorded their own concepts on Post-Its, the second where the interviewer acts as a scribe, recording concepts as participants talked. It was felt that the latter strategy was more effective, as writing resulted in respondents initially identifying smaller concept sets. The two respondents that were interviewed under the initial strategy, subsequently identified (in discussion with the researcher) that they were pre-selecting concepts as they wrote, avoiding more contentious and emotive issues. The researcher can avoid this, recording all concepts without judging them for 'suitability'.

Importantly, the models (Appendix J) suggest that the elicitation and causal map representations adopted do identify complex and implicit constructs representing individuals' knowledge and understanding in respect of the 'role of the business school' (Norman 1983; Scheper and Faber 1994). This is at least partially supported by feedback from respondents who commented that their model provided them with information that they had not previously recognised explicitly, and who did not make additions or changes on validation. This also suggests that these representations are 'fair' (Tomaskovic-Devey, Leiter and Thompson 1994), as they have been taken-up by respondents, and have not been unduly influenced by the researcher (Brown 1992).

The systematic development of the shared map (Appendix K) described above was also effective, although time-consuming, with the addition of 'property' information on concepts (Scheper and Faber 1994) improving the confidence of the merging process (Bougon 1992), and facilitating decisions in respect of similar, but not identical concepts.

Two significant limitations still remain. Firstly, these mental model representations are limited in their scope, identifying concepts and links in respect of a limited issue (the role of the business school), and are representative of a particular point in time. This means that their applications and effective shelf-lives are equally limited. Also,

respondents have identified through the mapping process elements of their mental models which they had not identified explicitly before. This means that the issue of elicitation and representation changing mental models remains (Fiol and Huff 1992).

Turning to the results, two sets of issues can be identified. The first is the nature of the mental models themselves, the second is their content.

Comparison of the mental models in terms of their complexity ( $\beta$ ) (Table 9.1) is difficult without norms, but the fact that no ratios of links per concept exceeds 2.5 across the set of individual models appears indicative of relatively low levels of complexity in network terms. This assertion is supported by the density scores ( $\gamma$ ) for the individual models which are all significantly below the theoretical maximum score of 1. This may suggest the models elicited relatively simplistic. This may result from the limitations of the two-dimensional mapping process or the relative in-experience (at this stage) of the researcher, than any lack of in-depth understanding. Furthermore, a highly complex or dense model that linked every concept to every other concept within it is equally likely to be indicative of a lack understanding of the issue it contains. In any environment it is highly unlikely that every issue identified relates directly to every other issue. Consequently caution should be taken with any analysis of these measures. For example, the shared mental model (which incorporates all the individual models) has a higher complexity ( $\beta$ ) than any of the individual models but a lower density ( $\gamma$ ). Whilst the lower density suggests that a much larger potential number of links do exist in the model, the increase in complexity equally indicates that more links have been made, and that the shared mental model identifies connections between concepts which are not evident in the individual models. As no links have been added in the merging process, this suggests one key benefit of the shared mental model that is represented in the map produced. Namely, that by linking their understanding, individuals working together are likely to identify causal relationships that none of them would identify alone. Specifically in the case of *UPBS*, there were no significant differences in terms of complexity and density between the academics and administrators included in the sample. For the most part similarity between the individual models obtained is relatively consistent. The nature of this measure, being based upon the natural log in order to remove size effects means that absolute comparisons of complexity is difficult. Nevertheless, two pairs of models have been identified as having lower similarities when compared with the rest of *UPBS*. These are Respondents One and Five, and Five and Six (Appendix J). Examination of these

models suggests this may be because the maps obtained with Respondents One and Six contain significant elements not included by Respondent Five. Respondent Five's model focuses on internal aspects of the business school and outcomes in terms of students. Respondents One and Six's models are wider in scope, identifying regional and business roles.

In the shared mental model (Appendix K), the three 'most important' concepts on merging (excepting the 'seed' concept: 'the role of the business school'), were 'regional economic role', 'research' and 'teaching' (ranked second equal; mentioned by five out of six respondents) (Table 9.2). The latter two represent the central tenets of the business school's academic operation, and in the models where frequently show as linked, with research leading/ contributing to teaching, a point of view which represents the accepted thinking and current best practice espoused across academia. Examination of the rankings of Domain and Centrality for concepts in the shared mental model (Table 9.2) suggest the addition of a fourth 'most important' concept, namely 'service to local business', as this ranks above 'regional economic role', 'research' for both these measures. The high scores obtained suggest that this concept, whilst not being included by as many individuals, nevertheless still has significant influence within the shared model. Consequently, the four sub-models derived from the shared mental model, attempt to characterise the complexities surrounding these concepts (Appendix K).

The desire to 'fulfil students expectations and needs' can be seen as key within teaching (Appendix K2), with an array of concepts broadly concerned with funding and influences upon teaching around it. Research (Appendix K3) has the smallest sphere of influence, with the concepts this contains being concerned primarily with the outputs and uses for the research. The influences surrounding services to local businesses (Appendix K4) and the regional economic role (Appendix K5) are less clear cut and show considerable overlap. In this context, the recognition of the Southwest as a special case ('Southwest region (problems)'), is an arguably important concept, identified as having significant influence over the ways in which the business school can develop its role.

The potential of the data collected as a source of information on the understanding of the role of the business school evidenced in the mental models of the participants in these pilot interviews should be recognised. No recommendations are made on the basis of the data, but the potential for further analysis exists. However, the most important outcome of this data is the successful piloting of the semi-structure causal interviewing process.

## 9.8 *UPBS*: MENTAL MODEL PROBLEMS AND LIMITATIONS

The three key limitations were highlighted above, namely the narrow scope of the issue identified (the role of the business school), and the time sensitivity of models, and the fact that the elicitation process has inevitably led to changes in the mental models studied. These problems limit the applicability of the results presented here outside this study. Additionally the small sample size adopted (six individuals) and the ad hoc and voluntary nature of their recruitment means that these results may be open to response bias and the analyses must be interpreted with caution.

## 9.9 SUMMARY

Results from pilot interviews undertaken within *UPBS* have been presented above. No significant problems were identified with this approach, and the interview procedure adopted here is applied in other organisations in subsequent chapters. Consideration was also given to the results themselves. These results will, in part be returned to when the evidence in respect of the research questions is considered below (Chapter Fifteen).

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## CHAPTER TEN

# Study 2: Westcountry Borough Council - Phase 1 Mapping Mental Models

### 10.1 INTRODUCTION

This chapter reports the results of Phase One within Westcountry Borough Council (*WBC*). In which in-depth interviews have been used to obtain a representation of participants individual mental models of a specific issue: ‘the service planning process’, and addresses the research questions identified above (Section 7.5.1). The shared model generated will be used for questionnaire development in Phase Two. This chapter begins by looking at the background of the organisation under study. The data collection regime and sample used are then described, outcomes are discussed, and problems and limitations identified.

### 10.2 ORGANISATIONAL BACKGROUND

*WBC* is a borough council in the south-west of the UK, responsible for providing local services to a rural community of approximately 75,000 individuals, funded predominantly through local taxation. This council’s name has been changed to preserve its requested anonymity. As a local council, *WBC* is ultimately controlled by an elected council. In *WBC*’s case there is no ruling group. Councillors are organised into committees which oversee and provide policy for all the council’s areas of responsibility. However, the day-to-day running and management of the council’s operations, is under the control of a board of directors headed by a chief executive. These directors have specific functional responsibilities, managing one or more service units. Service units are linked to the councils committees and cover all the areas of *WBC*’s responsibility. This research does not concern itself with the political aspects of *WBC* directly. No contact was made between the researcher and the councillors. All the research was undertaken inside the managerial and operational aspects of the organisation.

### **10.2.1 The Service Planning Process**

This phase of research focuses upon a specific issue identified as relevant and important by each study organisation. In *WBC*, the issue identified for consideration by the chief executive was: 'the service planning process'. Service planning is akin to business planning, and at the time of the research, this process had been in place in *WBC* less than 12 months. This had required both a fundamental shift in ways of working within *WBC*, and some restructuring of the council's departments. Consequently, *WBC* were keen to gain an insight into the understanding of and knowledge about the service planning process taken up by individuals across the organisation.

## **10.3 METHOD**

The rationale for the approach adopted here was discussed in Section 7.6.1. Methods were outlined in Chapter Eight.

## **10.4 DATA COLLECTION AND SAMPLE**

Interviews were conducted with eight senior managers during a two week period in January 1998. Participants had volunteered and were given the assurance that their input would be anonymous. All the respondents were male, and ranged in age from 40 to 51 years. They had all been employed by *WBC* for considerable period of time (3½ years to 23 years), but had been in position for much shorter periods (7 months to 6 years).

## **10.5 *WBC*: MENTAL MODEL RESULTS**

The results of the interviews and subsequent modelling process are considered below.

### **10.5.1 Individual Mental Models Results**

Causal cognitive maps representing the individual mental models of the service planning process in *WBC* are shown in Appendix L. They are numbered '1' to '8' to distinguish between respondents. The numbering and structure of these figures follows the logic described in Chapter Nine, and these models will be discussed below.

### 10.5.2 Shared Mental Model Result

The shared mental model obtained through the merging of the individual models by the researcher is characterised in Appendix M, which also includes a complete list of the merged concepts and the concepts from the individual models that they incorporate. This is not the actual model. The model itself contains 71 concepts and 253 links, an improvement on the 152 concepts and 325 links to be found in all the individual models viewed separately, but still too complex to characterise as a single figure. Appendix M contains one representation of the shared model which seek to identify some key elements within it. Six key overlapping elements have been identified, labelled: Restructuring (Appendix M2); Process (Appendix M3); Review (Appendix M4); Values (Appendix M5); Outcomes (Appendix M6); and Stakeholders (Appendix M7). These are grouped around a Core element (Appendix M1). On the Core element of the shared mental model the seed concept ‘the service planning process’ is highlighted in bold. Other concepts included in the Core element are shown on all the elements in italics. Those concepts which are boxed have been incorporated in the mental model questionnaire used in Phase Two.

## 10.6 *WBC*: MENTAL MODELS ANALYSIS

Table 10.1 summarises each model in terms of the number of concepts and links it contains, included are measures of complexity ( $\beta$ ), density ( $\gamma$ ), and similarity. The mathematical basis of these measures has been discussed previously (Section 9.2.3, and Appendix D). Table 10.1 highlights the variety obtained in the content of the individual models, they incorporate between 14 to 33 concepts, and between 20 to 43 links. In terms of complexity, individual models range from a low of 1.15 links per concept to a high of 2.87, all considerably lower than the score for the shared mental model (3.56). Despite this, the shared mental model still has a relatively low density (0.051), scores for the individual models in this respect range from 0.036 to 0.205. Scores for similarity range from 0.000 for Respondents One and Three (indicating that these two models have no common elements), through to scores in the range 0.633 to 0.825 for the respondents’ models with the shared mental model (where higher scores would be expect given that the shared mental model incorporates all the elements of the individual mental models).



Table 10.2 summaries the ‘most important’ concepts in the shared model in terms of three criteria: their degree merged; their domain; and their centrality. Again the basis of the measures has been described previously (Section 9.2.3 and Appendix D). All the merged concepts are included in Table 10.2, alongside at the ‘top 25’ concepts from the shared mental model in terms of ‘domain’ and ‘centrality’. Concepts are shown in the form that corresponds to the form they take in the shared mental model (i.e. the ‘seed’ concept is shown in bold and concepts included in the Core model are shown in italics). Some concepts have been shortened from their original form to ensure that Table 10.2 stays on a single page. The measures shown in Table 10.2 will be discussed further below. They have also been used to identify concepts for inclusion in a mental model used in Phase Two. Concepts incorporated in this questionnaire are indicated with an asterisk (\*).

	<i>R-1</i>	<i>R-2</i>	<i>R-3</i>	<i>R-4</i>	<i>R-5</i>	<i>R-6</i>	<i>R-7</i>	<i>R-8</i>	<i>SMM</i>
Concepts	15	20	14	16	17	22	15	33	71
Links	43	39	20	38	32	36	37	38	253
$\beta$	2.87	1.95	1.43	2.38	1.88	1.64	2.47	1.15	3.56
$\gamma$	0.205	0.103	0.110	0.158	0.118	0.078	0.176	0.036	0.051
Similarity									
R-1		0.195	0.000	0.483	0.200	0.307	0.416	0.285	0.648
R-2			0.400	0.460	0.512	0.439	0.464	0.460	0.712
R-3				0.550	0.483	0.517	0.494	0.364	0.633
R-4					0.317	0.453	0.597	0.420	0.662
R-5						0.671	0.408	0.616	0.676
R-6							0.512	0.702	0.733
R-7								0.473	0.648
R-8									0.825

**Table 10.1: *WBC* Mental Models Summary (R = respondents; SMM = shared mental model)**

<i>R</i>	<i>'Merged'</i>	<i>N</i>	<i>R</i>	<i>'Domain'</i>	<i>A</i>	<i>R</i>	<i>'Centrality'</i>	<i>S</i>
1=	Service Planning Process	6	1	Service Planning Process	30	1	Service Planning Process	49
1=	The workforce*	6	2	The workforce*	21	2	The workforce*	42
3	Delayed organisation*	5	3=	Service plans*	18	3=	Service plans*	41
4=	Commitment & involvement*	4	3=	Values & principles*	18	3=	Values & principles*	41
4=	Communication & feedback*	4	5=	Testing direction*	15	5	Commitment & involvement*	40
4=	Performance management*	4	5=	The community at large*	15	6	Testing direction*	39
4=	Service plans*	4	7=	Commitment & involvement*	14	7=	Communication & feedback*	38
4=	Service units*	4	7=	Communication & feedback*	14	7=	The community at large*	38
9=	Best value*	3	9	Delayed organisation*	13	9=	Delayed organisation*	37
9=	Clear aims & objectives*	3	10=	Requires support*	12	9=	Performance management*	37
9=	Council (members)*	3	10=	Stakeholders*	12	9=	Stakeholders*	37
9=	Executive (directors)*	3	12=	Performance management*	11	12=	Consultation & compromise*	36
9=	Influence of local politics*	3	12=	Service units*	11	12=	Service units*	36
9=	Learning*	3	14=	Changed working practices*	10	14=	Best value*	35
9=	Maximise efficiency*	3	14=	Shared resources*	10	14=	Changed working practices*	35
9=	Procedures & mechanisms*	3	16=	Benefits*	9	14=	Learning*	35
9=	Shared resources*	3	16=	Best value*	9	14=	Requires support*	35
18=	Adoption of mission*	2	16=	Learning*	9	14=	Responsive*	35
18=	Benefits*	2	16=	Ownership*	9	19=	Benefits*	34
18=	Change*	2	16=	Procedures & mechanisms*	9	19=	Executive (directors)	34
18=	Changed working practices*	2	16=	Responsive*	9	19=	Influence of local politics*	34
18=	Consultation & compromise*	2	22=	Building awareness	8	19=	Ownership*	34
18=	Cultural change	2	22=	Clear aims & objectives*	8	19=	Procedures & mechanisms*	34
18=	Customers	2	22=	External partners	8	19=	Shared resources*	34
18=	Departments restructured*	2	22=	Influence of local politics*	8	25=	Maximise efficiency*	33
18=	Requires support*	2	22=	Maximise efficiency*	8	25=	Trust	33
18=	Employment contracts	2	22=	Shared purpose*	8	-		
18=	Empowerment & autonomy	2	-			-		
18=	External partners	2	-			-		
18=	Implementation	2	-			-		
18=	No fixed boundaries	2	-			-		
18=	Ongoing development*	2	-			-		
18=	Openness	2	-			-		
18=	Ownership*	2	-			-		
18=	Planning	2	-			-		
18=	Responsive*	2	-			-		
18=	Shared purpose*	2	-			-		
18=	Stakeholders*	2	-			-		
18=	Strategic direction	2	-			-		
18=	The community at large*	2	-			-		
18=	Testing direction*	2	-			-		

**Table 10.2: WBC Shared Mental Model – ‘Most Important’ Concepts (R = Rank; N = number of individual models incorporating this concept; A = number of ‘first-level’ concepts around this concept; S = weighted score for three levels of concepts around this concept; \* = concept in questionnaire)**

## 10.7 *WBC*: MENTAL MODELS DISCUSSION

Appendix L shows representations of the mental models of the eight participants in respect of the service planning process. Only one respondent (Six) offered any changes to their map on validation. This consisted of the addition of a single link. Furthermore the majority of respondents felt the models to be fair and accurate representations of their understanding of the service planning process. The support for and recognition of these images appears to suggest that the individual maps meet the initial aim of this research, providing effective representations of the knowledge and understanding held in respondent's mental models of the service planning process (Norman 1983; Scheper and Faber 1994; Tomaskovic-Devey, Leiter and Thompson 1994). However, it should be recognised that accepting participant's support and take-up of their model as indicative of that model's representativeness of the individual's fundamental underlying mental model is of limited value.

The systematic development of the congregate map representing the shared mental model of the service planning process of this senior management group also appears effective. On presentation of this model to the management board of *WBC*, its members (including some who had not participated in the interviews) commented that they felt it to be a complex, yet comprehensive and effective representation of their understanding of the service planning process, although the limitation of accepting support as indicating representativeness must be remembered. 'Property' information collected on concepts was again important in ensuring the effectiveness and confidence of the merging process (Bougon 1992), but within *WBC* a secondary use of this data was identified. A limited number of respondents included concepts in their models for which, even a 'face meaning' was not evident to the researcher. This is one of the pitfalls of the grounded approach adopted, that individuals may use phrases and terminology that are part of an organisational vocabulary and whose meaning is not evident to an outsider. One example of this is the term 'best value' included in the models of Respondents Three, Six, and Seven (Appendix L). This was a term with a particular meaning in a public sector organisation such as *WBC* (linked to the contrasting pressures on resources and service delivery provided by national government) whose meaning would not have been evident to this researcher (who had not come across the term prior to this research) without the additional explanation elicited through the collection of concept properties.

More generally, these individual models (Appendix L) seem to show slightly higher levels of complexity ( $\beta$ ; Table 10.1) compared with the pilot organisation (*UPBS*; Chapter Nine), although all but one of these models still have values of  $\beta$  below the 2.5. Density scores ( $\gamma$ ; Table 10.1) also show a similar pattern to that observed previously (Table 9.1), with scores between 0.036 and 0.205, all considerably below the theoretical maximum of one. Care must be taken in these comparisons however, as no norms are in existence in respect of the use of these measures with causal models, and it was suggested in the last chapter that the maximum score for density is unlikely to be obtained with causal models such as these. Comparisons between these individual models, are best evidenced by looking at the two models which occupy the extremes of the complexity and density scales for *WBC*. These are those of Respondent One, which scores highest for both complexity and density ( $\beta = 2.87$ ;  $\gamma = 0.205$ ), and Respondent Eight which scores lowest for both ( $\beta = 1.15$ ;  $\gamma = 0.036$ ). Despite their differing complexity and density, on the page the presentation of these two models is similar, with both showing a high degree of crossing amongst their links. This is in contrast with other models, such as those for Respondents Two and Three which have been drawn without any crossing of links. Given that simplicity of image was striven for in the mapping of all the models elicited, a reasonable supposition would be that the least ‘complex’ and ‘dense’ map would provide the cleanest and simplest image. This is not the case, and this difference arises because the measures adopted here assess relative rather than absolute complexity and density. Respondent Eight’s model, whilst being the least complex (in terms of the ratio of its links to concepts), and having lowest density (i.e. the greatest gap between its actual number of links and its theoretical maximum), nevertheless contains a larger number of concepts than any other model obtained in *WBC*, giving it the highest *absolute* complexity and density (in concept terms). Respondent One’s model (Figure 10.1h), on the other hand contains the highest *absolute* number of links and the second lowest number of concepts, which accounts for its high relative density and complexity. This suggests that when making comparisons between such models, the absolute size of the model is still important.

Similarity for the individual models ranges from zero between Respondents One and Three to 0.702 between Respondents Six and Eight. It should be remembered however that this measure is based on the natural logarithmic scale (in order to minimise the effects of varying size between models) and consequently comparisons need to be made with caution. Zero similarity between Respondents One and Three indicates that these two

models have *no* concepts in common, being concerned with wholly differing aspects of the service planning process. Respondent One's model is concerned with values and the extent of participation in the service planning process throughout the organisation, whilst Respondent Three's mental model is concerned with more tangible aspects of the process such as political and financial pressures to reduce public expenditure. These differences in perspective are likely to result from these two individuals' roles. Respondent One has an over-reaching role in *WBC*, working in support of its chief executive, and tasked specifically with ensuring that service planning is taken onboard across the whole organisation. Respondent Three has responsibility for a particular unit in the council and consequently sees the service planning process in terms of its effects upon that unit. Yet despite these differences, these models are still connected through common concepts that both share with others in the organisation. The high degree of similarity between Respondents Six and Eight's models, results from 13 concepts identified through the merging process as common between these two models. These included issues such as the need for 'clear objectives' and 'position statements', as well as core issues such as the 'service plans' themselves. Further examination of these models does reveal some subtle differences however. For example, Respondent Six sees clear objectives as something that results from the development of service plans, whilst Respondent Eight has these ideas the other way round, with clear objectives contributing to service plan development, highlighting the complexity of the issues represented.

The shared mental model (Appendix M) again has a higher complexity than any of the individual models (Table 10.1), suggesting that the linking of individual ideas and understanding results in the development of causal relationships which are not evident to individuals alone. The model also has a lower density than all but one of the individual models (Table 10.1), highlighting that a higher number of potential links again exists in the shared model. The exception is Respondent Eight's model, which has already been highlighted as containing noticeably more concepts than those of other respondents. It should also be recognised that the higher potential for links in the shared mental model does not necessitate that these links are logical or desirable, and the limitations of the density measure, identified in Chapter Nine should be remembered. The extent of the similarity between the shared mental model and the individual models highlights the relative contribution of each individual model to the shared model, as those models which

contain the greatest numbers of concepts will score most highly for similarity with the shared model and make up a greater portion of it.

The representation of the shared mental model incorporated in Appendix M was created to ensure a clear, logical and comprehensive representation was constructed which met the espoused needs of *WBC*'s senior management. The representation included therefore contains six linked elements, surrounding the central 'Core' model (Appendix M1) which summarises the content of the other sub-models: Restructuring; Process; Review; Values; Outcomes; and Stakeholders. Each of these is briefly described below.

Restructuring (Appendix M2) is concerned with the reorganisation of *WBC* which was identified as an integral part of the service planning process, whereby departments were restructured into service units, and highlights the key knock-on effects identified as being linked to this change. Seen as critical within this (by five of the eight participants) is the layering that occurred in *WBC* alongside this restructuring.

Process (Appendix M3) incorporates those concepts that are identified as being concerned with the procedures for the service planning process. Identified as important within this (by half the respondents) are the concepts of service units and service plans and the need for commitment and involvement across the organisation. Of these it is the service plans which have the highest apparent influence (ranked third equal for both domain and centrality; Table 10.2), and identified as being both a major output of the service planning process, as well as influencing that process themselves. The service units themselves have a lower importance in domain and centrality terms (ranked twelfth equal for both), despite their equal recognition by participants.

Review (Appendix M4) identifies those concepts surrounding the need for performance management and review as part of the service planning process. Identified in four of the eight individual models (Table 10.2), this is seen as being reliant upon commitment and involvement and is important because it represents a significant linking point or bottleneck in the shared mental model, being needed to maximise efficiency and effectiveness in order that ultimately needs are met and problems are tackled.

Values and principles (Appendix M5) is an important concept because it has a high degree of influence in both domain and centrality terms (ranked third equal for both). This groups together the guiding principles underlying the service planning process, and

includes loyalty, ownership, trust, openness, flexibility and honesty, which contribute to increased learning, consultation and compromise, and commitment and communication.

The last two sub-models were created in response to specific requests from *WBC*. They are included here to ensure that all the concepts incorporated in the shared mental model are evidenced in Appendix M. The first of these ‘Outcomes’ (Appendix M6) identifies some of the perceived consequences of *WBC* taking up the service planning process. The final element (Appendix M7) describes the ‘Stakeholders’ identified as contributing to the service planning process.

Also important in the shared model is the workforce, which is ranked first equal for degree merged, and second for both domain and centrality (Table 10.2). This appears to be in recognition of the importance of *WBC*’s staff in ensuring the implementation and effectiveness of the service planning process. The community, identified as a stakeholder in the service planning process above is also important (ranked fifth equal for domain and seventh equal for centrality; Table 10.2), as it is this which the council and the service planning process are seen as responding. Finally, also of interest in the context of this study is the inclusion by three individuals of ‘learning’ as a concept in their models.

Considerably more information is incorporated in the individual and shared mental model which has not been discussed here, and in the case of the shared mental model is hidden in the representations presented (Appendix M). As the content of this model is of subordinate interest to this research, no further direct discussion of this data will be made here. However the models provide considerable data on the attitudes and understanding of the service planning process evidenced in the senior management group in *WBC*, and the potential for further investigation should be recognised. The degree of similarity between the individual mental models identified, and the feedback of senior managers in respect of the shared model suggest that the model is an effective representation of the shared mental model of the service planning process in *WBC*, at least at the senior management level. This model has therefore been used in Phase Two of this research to explore the recognition and uptake of this model across the organisation as a whole. Results presented here also contribute to the evidence in respect of the research questions (Chapter Fifteen).

## **10.8 *WBC*: MENTAL MODEL PROBLEMS AND LIMITATIONS**

Problems with the models presented in terms of the scope of the issues they represent, their time sensitivity, and their inevitable change and development through the mapping process still exist. These limit the comparability of these results with other investigations, as well as the application of this data outside the current study. The limited sample size (eight interview participants) may also limit the applicability of the study, although the extent of similarity between the models obtained, and the fact that these individuals represent the majority of a small, but well defined group (namely *WBC*'s management board members), means that if these aspects of the sample are recognised, its use is not precluded. However, the fact that respondents volunteered and were hence self-selecting and that a small number of senior managers within *WBC* opted not to participate means that the results may be open to some bias. Consequently, these analyses and the subsequent use and analysis of this data must advance with caution. It should also be recognised that the issue of the representativeness of the mental models still remains.

## **10.9 SUMMARY**

The outcomes from the semi-structured causal interviews undertaken in *WBC* were presented above. Whilst some consideration was given to the content of the maps and models presented, the real importance of this phase of the research is the generation of a shared mental model of the service planning process which is used in Phase Two of this research. One representation of this is included in Appendix M, feedback from participants and *WBC*'s senior management board suggests that this is a fair and effective representation of the attitudes and understanding held in respect of this issue in *WBC*.



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## CHAPTER ELEVEN

# Study 3: Southwest County Council - Phase 1 Mapping Mental Models

### 11.1 INTRODUCTION

The outcomes of the interviews undertaken in the third survey organisation are presented below. The issue identified for consideration here is a county council's 'budget setting process', and this chapter provides further evidence in respect of the research questions (Section 7.5.1). The background to this organisation, methods adopted, and the data collection regime are briefly described below. Results are then presented and discussed. The chapter concludes by identifying problems and limitations.

### 11.2 ORGANISATIONAL BACKGROUND

The third organisation studied, named *Southwest County Council (SWCC)* to preserve its anonymity, is a county council providing services for a population of nearly half a million people. The region it covers is predominately rural and is perceived as being peripheral within the UK. Funding for services is mainly through local taxation. *SWCC* is organised departmentally, with functional heads of department responsible with the chief executive for the day-to-day management and running of the councils operations and services. A political structure exists above these managers, and at the time of the research *SWCC* was operating under a 'hung' council with no ruling group. No direct contact was made with the political aspects of the council.

#### 11.2.1 The Budget Setting Process

The specific issue identified by *SWCC* was its 'budget setting process'. This is a long standing operational aspect of the organisation, whereby the funds available within the council are divided. *SWCC* were consequently keen to gain insight into the understanding of this key and sometimes taken for granted process across the organisation.

### 11.3 METHOD

The reasons for adopting a cognitive mapping approach were discussed in Section 7.6.1. Methods were described in Chapter Eight.

### 11.4 DATA COLLECTION AND SAMPLE

Eight senior managers, representing different departments within *SWCC* volunteered to take part in the research. Interviews took place between March 22<sup>nd</sup> and April 5<sup>th</sup> 1998. Participants were aged between 44 and 50 years, and were all male. Length of service within *SWCC* ranged from 7 to 27 years, with tenure in current positions being between 1 month (as head of department, with 4 years as deputy prior to this), and 9 years.

### 11.5 *SWCC*: MENTAL MODEL RESULTS

Results of the interviews and subsequent modelling process are considered below.

#### 11.5.1 Individual Mental Models Results

Causal cognitive maps representing the individual mental models of the budget setting process in *SWCC* are shown in Appendix N. They are numbered '1' to '8' to distinguish between respondents. The numbering and structure of these figures follows the logic described in Chapter Nine.

#### 11.5.2 Shared Mental Model Result

A representation of the shared mental model obtained through the merging of the individual models is shown in Appendix O, which also includes a list of the merged concepts and the concepts from the individual models that they incorporate. Appendix O does not contain the actual model. The model contains 93 concepts and 290 links, which is too complex to characterise as a single image through *Decision Explorer*. Appendix O therefore contains one representation of the shared model which identifies six key elements within it. Two concerned with the spending budget itself, one identifying the inputs (Appendix O2), the other outputs (Appendix O3), and two concerned with more open service issues, one identifying general issues (Appendix O4), the second issues linked

to specific departments and units (Appendix O5). The remaining two elements identify concepts in respect of 'internal units' (Appendix O6), and its Stakeholders (Appendix O7) respectively. These six elements of the shared model are grouped around a Core element (Appendix O1). Those concepts which are boxed have been incorporated in the mental model questionnaire used in Phase Two of this research.

## 11.6 SWCC: MENTAL MODEL ANALYSIS

The models obtained have been characterised in terms of their complexity ( $\beta$ ), density ( $\gamma$ ), and the extent of their similarity (Table 11.1). The mathematical basis of these measures is discussed in Section 8.2.3, and Appendix D. As expected there was considerable difference between individual models in terms of the numbers of concepts and links they contain. Concept numbers ranged from 15 (Respondent Five) to 29 (Respondent Eight). Respondent Four identified the least number of links (25), and Respondent Seven, the most (58). Complexity, in the individual models ranged from 1.70 links per concept (Respondent Eight) to 2.64 (Respondent Seven), all lower than the score for the shared mental model (3.12). Density scores for the individual models range from 0.060 to 0.138, all higher than that for the shared model (0.034). Highest scores for similarity are found, as expected between the individual models and the shared model (0.610 to 0.749). Between individual models, Respondent Four's shows low levels of similarity with the models of Respondents Six and Seven (0.188 and 0.191 respectively), whilst the highest scores were found between Respondent Three and Respondents Five and Eight (both 0.624).

The importance of concepts within the shared model has been identified on the basis of three criteria: their degree merged; their domain; and their centrality (Table 11.2). The basis of the measures has been described in Section 9.2.3 and Appendix D. Some concepts have been shortened to keep Table 11.2 on a single page. As well as being discussed below, these measures have been used to identify concepts for inclusion in the mental model questionnaire, these concepts are indicated with an asterisk (\*).

	<i>R-1</i>	<i>R-2</i>	<i>R-3</i>	<i>R-4</i>	<i>R-5</i>	<i>R-6</i>	<i>R-7</i>	<i>R-8</i>	<i>SMM</i>
Concepts	22	21	19	16	15	24	22	29	93
Links	46	47	44	25	29	42	58	49	290
$\beta$	2.09	2.24	2.32	1.56	1.93	1.75	2.64	1.70	3.12
$\gamma$	0.100	0.112	0.129	0.104	0.138	0.076	0.126	0.060	0.034
Similarity									
R-1		0.489	0.543	0.307	0.512	0.428	0.296	0.508	0.690
R-2			0.547	0.307	0.517	0.528	0.436	0.553	0.680
R-3				0.522	0.624	0.531	0.378	0.624	0.659
R-4					0.372	0.188	0.191	0.290	0.624
R-5						0.552	0.456	0.531	0.610
R-6							0.479	0.574	0.708
R-7								0.581	0.690
R-8									0.749

Table 11.1: SWCC Mental Models Summary

### 11.7 SWCC: MENTAL MODEL DISCUSSION

The results obtained for the individual models (Appendix N) exhibit an expected level of variety (Table 11.1), representing as they do the attitudes of individuals representing specific departments, to the budget setting process. Further exploration of these models suggests a degree of congruence between them. This similarity is demonstrated by the extent to which concepts have been merged in the creation of the shared mental model. Of the original concepts included in the individual models, almost half (91 out of 184) have been aggregated in the shared model. This suggests that attitudes to and perceptions of the budget setting process amongst the senior management group surveyed are in broad agreement. However, the assessment of similarity included in Table 11.1 shows a more complex pattern, with scores for similarity ranging from 0.624 (between Respondent Three and both Respondents Five and Eight) and 0.188 (between Respondents Four and Six).

The extent of the match observed between Respondents Three and Five results from a shared concern with respect to the political aspects of the council, and its impact upon the budget setting process. Respondent Eight also identifies this political impact, but not the same extent as Respondents Three and Five, the link here with Respondent Three's model derives in part from this, but more from the inclusion by both these individuals of concepts describing the 'mechanisms' of the budget setting process in their models.

<i>R</i>	<i>'Merged'</i>	<i>N</i>	<i>R</i>	<i>'Domain'</i>	<i>A</i>	<i>R</i>	<i>'Centrality'</i>	<i>S</i>
1	<i>Maintain effective service delivery*</i>	7	1	<b>Budget Setting Process</b>	37	1	<b>Budget Setting Process</b>	62
2=	<b>Budget Setting Process</b>	5	2	<i>Spending budget*</i>	26	2	<i>Spending budget*</i>	54
2=	Council officers*	5	3	Members & committees*	17	3=	Members & committees*	49
2=	Local government*	5	4	Three year timescale*	16	3=	<i>Maintain effective service delivery*</i>	49
2=	Members & committees*	5	5=	Distribution & allocation of funds*	15	5=	Distribution & allocation of funds*	46
2=	National government*	5	5=	<i>Maintain effective service delivery*</i>	15	5=	National government*	46
2=	<i>Spending budget*</i>	5	5=	<i>Stakeholders*</i>	15	5=	<i>Stakeholders*</i>	46
2=	Three year timescale*	5	8=	<i>Internal business units*</i>	14	5=	Three year timescale*	46
9=	<i>Communication*</i>	4	8=	National government*	14	9=	<i>Communication*</i>	45
9=	Council tax payers*	4	8=	<i>Units &amp; departments*</i>	14	9=	<i>Units &amp; departments*</i>	45
9=	Southwest county (special case)*	4	11=	<i>Communication*</i>	13	11=	<i>Internal business units*</i>	44
9=	<i>Widening financial gap between resources &amp; needs*</i>	4	11=	<i>Widening financial gap between resources &amp; needs*</i>	13	11=	Local government*	44
13=	County treasurer*	3	13=	County treasurer*	12	11=	<i>Widening financial gap between resources &amp; needs*</i>	44
13=	Distribution & allocation of funds*	3	13=	Politics	12	14=	Council officers*	43
13=	Negotiation & compromise*	3	15=	Council officers*	11	14=	County treasurer*	43
13=	Politics	3	15=	Local government*	11	14=	Politics	43
13=	Revenue & funds from national government	3	17=	Economic development directorate	10	17	Spending targets*	42
13=	Spending targets*	3	17=	Planning directorate	10	18=	Negotiation & compromise*	41
19=	Best value*	2	17=	Revenue & funds from national government	10	18=	Services not explicitly recognised by public*	41
19=	Budget strategy	2	20=	Council tax payers*	9	18=	Services expected by public*	41
19=	Corporate exercise	2	20=	Department X budget*	9	18=	Revenue & funds from national government	41
19=	Cost of inflation*	2	20=	Senior management board*	9	22=	Budget guidelines	40
19=	Delivering statutory services	2	20=	The public*	9	22=	Council tax payers*	40
19=	Not enough money	2	24=	Budget strategy	8	22=	Deliver statutory service	40
19=	Ownership*	2	24=	Internal strategy	8	22=	Department X budget*	40
19=	Senior management board*	2	24=	Negotiation & compromise*	8	22=	Senior management board*	40
19=	Service issues for traditional manages/ departments	2	-			22=	Service issues for traditional manages/ departments	40
19=	Standard Spending Assessment*	2	-			22=	Standard Spending Assessment*	40
-			-			22=	The public*	40

**Table 11.2: SWCC Shared Mental Model – ‘Most Important’ Concepts (R = Rank; N = number of individual models incorporating this concept; A = number of ‘first-level’ concepts around this concept; S = weighted score for three levels of concepts around this concept)**

Respondent Four demonstrates lower levels of similarity (0.307 and below) with all but one of the individual models. This appears to be a result of Respondent Four's model incorporating a number of concepts which reflect this manager's concerns over the impact that the budget setting process has on his department, whereas the other respondents have not concentrated on their own departments in the same way. The higher similarity observed between Respondents Three and Four, occurs because both have included similar concepts surrounding the 'budget strategy' in their models. It should be remembered that some difference is to be expected, as individuals are bound to have varying perspectives on the issue, coloured by their own responsibilities and working environment, particularly in respect of an issue like budget setting, which has clear functional impacts.

The individual models obtained exhibit values for their complexity ( $\beta$ ) and density ( $\gamma$ ) which are broadly in line with those previously observed. All but one of the individual models have scores for complexity below 2.5. The exception is Respondent Seven ( $\beta = 2.64$ ), who's model contains the highest number of links. Density scores are in the range 0.060 to 0.183, with the lowest resulting from the model with the most concepts, and the highest from that with the least. This further highlights that when making comparisons between these models, the absolute size of the model is important.

A representation of the shared mental model derived from these individual models is incorporated in Appendix O. This consists of six overlapping elements (Spending Budget (in); Spending Budget (out); Service Issues (general); Service Issues (specific); Internal Units; Stakeholders) constructed to describe the content of the shared mental model in logical sets, all linked to and grouped around a central 'Core' model (Appendix O1). In terms of its complexity and density, the shared mental model also follows the pattern observed in previous chapters, having a higher complexity ( $\beta = 3.12$ ), yet lower density ( $\gamma = 0.034$ ) than any of the individual models.

The first two elements of the shared mental model identified are concerned with those concepts and issues identified as interacting with the Spending Budget itself. The concept Spending Budget is identified as being of central importance within the shared mental model, as it scored second highest for both domain and centrality, only being exceeded by the 'seed' concept.

Appendix O2 identifies concepts seen as having a direct influence on the Spending Budget. The majority of these are financial and within these, there is the recognition that

the Spending Budget does not exist in isolation, being controlled through the financial management and budget strategy of the council. It is here that the influence of local politics is felt. One recognised outcome of this is the new three year time-scale for the budgets. A second group is the issues surrounding the lack of increases in funding which affects the distribution and allocation of funds, and have led to the widening financial gap between resources and needs. The third subset, highlights the recognition of participants of the varied sources of funding available to the council and for the budget as a whole. The final group is concerned with the direct and indirect influences of National Government. All the specific concepts identified are highly ranked in Table 11.2.

The influences extending out from the Spending Budget (Appendix O3) are potentially more complex. The Spending Budget itself is identified as directly impacting upon only three concepts. These three however all have considerable spheres of influence (Table 11.2). It is recognised that ongoing communication of the Spending Budget is important, not only creating feedback from stakeholders, but also leading to ownership of budgets across the council. Members and committees are also identified as being directly influenced by the Spending Budget. However, the most important output of the Spending Budget is the recognition that it is this which ultimately affects the ability of *SWCC* to maintain effective service delivery.

The next two elements of the shared mental model (Appendix O) are concerned with more open ‘service issues’.

The general service issues identified (Appendix O4) show some overlap with the issues already identified under the Spending Budget above, with further influences in respect of the need to maintain effective service delivery and fair distribution and allocation of funds in response to the widening financial gap between resources and needs being identified. This overlap highlights the inter-connectedness of the elements of the shared mental model described here and the inherent complexity that is simplified for representation in Appendix O. This element of the shared mental model also incorporates the recognition that many of the services provided by the council are not explicitly recognised by the public, but are still as important as those which are expected.

Specific service issues identified within the shared mental model (Appendix O5) came for the most part from the inclusion of departmental issues in individual maps by participants. These include recognition of individual departmental concerns with respect to

the budget, suggestions that ‘their’ department had a different budget strategy compared to the rest of *SWCC* and identification of the ‘special case’ status afford to departments which affected funding across the council as a whole.

The penultimate element identified (Appendix O6) is concerned with the internal business units within *SWCC* which were identified as interacting with the budget setting process in a significantly different way. Whilst only one respondent included the internal business units as an explicit concept in their model, others did see a split between traditional and non-traditional departments, and identify that *SWCC* provides services which are not explicitly recognised by the public. One key difference here is the recognition that these business units operate in an internal market and consequently can be a funding resource and at worst are usually only cost-neutral to the council. Confusion as to the effects of these units on the council and the budget was identified as a problem.

The final element of the shared model (Appendix O7) describes the stakeholders identified as influencing and being influenced by the budget setting process. Most important of these, in terms of their influence (Table 11.2) is members and committees, recognising that the council is ultimately politically controlled.

Again, it should be remembered that the models contain considerably more information which could be of benefit to *SWCC*, and further examination of these models by individuals who are more aware of both the process itself and the environment in which it operates may identify a number of additional issues.

In terms of this research, this mapping process has been a success. According to the criteria adopted above (Chapter Ten), the models appear to effectively represent understanding of the budget setting process in the senior management group interviewed (Norman 1983; Scheper and Faber 1994; Tomaskovic-Devey, Leiter and Thompson 1994). Feedback from participants was again positive, and only two interview participants suggested changes should be made to the representations of their mental models drawn by the researcher. Respondent One added one link to their model. Respondent Six added a single concept. Ultimately, there is no reason to suppose that the shared mental model derived is not representative of the understanding of the budget setting process amongst *SWCC*’s senior managers, and it has consequently been used in Phase Two of this research, to explore the recognition and take-up of this model across *SWCC*. It should be recognised that these results also contribute to evidence in respect of the research questions.



## 11.8 *SWCC*: MENTAL MODEL PROBLEMS AND LIMITATIONS

Problems previously identified in respect of these models still exist. The nature of the elicitation and representation process, the issue identified, and the models produced, all mean that these maps are inevitably limited in their scope, are time sensitive and are changed and developed through the mapping process. This means that the comparability of models outside the current study is limited. The relatively small sample adopted (eight individuals) may also limit the applicability of the study, although, like *WBC*, the fact that these individuals are representative of a clearly defined group (the senior management team), and the similarity observed between their models mitigates against the potential for bias introduced by sample size. However, as participation was voluntary and some senior managers within *SWCC* opted not to participate, these results may be open to some bias. The limitations of using managers acceptance of the maps produced to indicate that they are representative also remain. Consequently, both these results be viewed with caution and their subsequent use and analysis of this data must therefore proceed with care.

## 11.9 SUMMARY

Maps representing senior manager's individual mental models of the budget setting process in *SWCC* and the shared mental model derived from these have been presented, analysed and discussed above. *The content of these models was briefly described, but their primary roles within this research are to address the research questions set in Chapter Seven and provide an input, through the shared mental model to Phase Two.*

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## CHAPTER TWELVE

# Study 4: Training & Development Southwest - Phase 1 Mapping Mental Models

### 12.1 INTRODUCTION

Results of the cognitive mapping interviews undertaken in the final organisation which provide further evidence in respect of the research questions (Section 7.5.1) are presented below. The organisation's background, methods applied, data collection regime and sample used are identified. Results are described and discussed and limitations identified.

### 12.2 ORGANISATIONAL BACKGROUND

Training and Development Southwest (*TDSW*: again this organisation's name has been altered to preserve its anonymity) is a relatively new company, created by the merger of two organisations around a year previously. Its aim, taken from its annual report is to 'generate sustainable economic growth and prosperity for the area', promoting the learning, partnership, employment, education and competitiveness of both individuals and businesses. Its region is primarily rural, although it does contain a number of larger towns, a (declining) manufacturing sector, and a population of over 1.5 million. *TDSW* operates by providing both direct (e.g. training and development) and indirect (through grants and sponsorship) support for individuals and businesses. Its primary source of funding is National Government, but it also actively seeks alternative sources of funds.

The two organisations from which *TDSW* has been created had historically different, but linked roles. These are broadly represented by the individual and business supporting elements of the new company's operation. In practice at the time of the research, these two organisations were still operating as separate entities, responsible to a single management board. In subsequent discussion the old company responsible for the individual aspects of *TDSW*'s operations will be known as the 'Training Company' (*TC*), the business element as 'Business Support' (*BS*).

### **12.2.1 *TDSW*'s Organisational Culture**

Recognising the changes that are occurring within the new organisation and in response to their own desire to assess the extent to which the two old organisations are coming together, the issue chosen by *TDSW*'s board was their organisation's culture. It was recognised that this was under flux (at the time of the research *TDSW* had existed for just over a year), and would be defined as much by the old aspects of the organisation as any new corporate identity. Nevertheless, this was an issue which was identified as important by *TDSW* and one which could have significant links to its learning process.

## **12.3 METHOD**

Detailed methods were described in Chapter Eight, and the rationale for this approach was considered in Chapter Seven.

## **12.4 DATA COLLECTION AND SAMPLE**

Six senior managers volunteered to participate in the research and were again promised anonymity. Interviews occurred during November 1998. Two participants were female, the remainder male, all were aged between 35 and 52 years. Length of service ranged from 16 months to 8 years, respondents they had occupied their current positions for between 6 months and 5 years. Only one participant had not worked for either of *TDSW*'s previous companies, three individuals had previous been members of the *TC*, the other two *BS*.

## **12.5 *TDSW*: MENTAL MODEL RESULTS**

The results of the interviews and subsequent modelling process are considered below.

### **12.5.1 Individual Mental Models Results**

Cognitive map representations of the individual mental models of *TDSW*'s senior managers are shown in Appendix P. They are labelled '1' to '6' to distinguish between respondents. Numbering and structure follows the logic described in Chapter Nine. These models will be discussed below.

### 12.5.2 Shared Mental Model Result

Merging of the individual models was used to create a congregate cognitive map as a representation of the shared mental model of *TDSW*'s culture. A complete list of the merged concepts and the concepts from the individual models that they incorporate has been included in Appendix Q, which also includes a representation of the shared model. This is not the actual model. The model contains 104 concepts and 203 links, and is too complex to characterise as a single image in *Decision Explorer*. Appendix Q contains a representation of the shared model which identifies key elements within it. One containing concepts relating to *TC* (Appendix Q2), and one to *BS* (Appendix Q3). The next deals with the existing culture in *TDSW* (Appendix Q4), whilst the next identifies the concepts linked to the impact of *TDSW*'s new CEO (Appendix Q5). Appendix Q6 identifies concepts concerned with *TDSW*'s partnerships and public accountability. Appendix Q7 identifies in what ways *TDSW* is customer focused. Appendix Q8 is concerned with the attitudes and abilities of individuals within the company, whilst the final element of the shared map identifies the outcomes linked to *TDSW*'s culture (Appendix Q9). These eight elements of the shared model are grouped around a 'Core' element (Appendix Q1), on which the seed concept '*TDSW*'s developing culture' is highlighted in bold. So they can be distinguished, other concepts included in the Core element are shown on all the elements in italics.

## 12.6 *TDSW*: MENTAL MODEL ANALYSIS

Models have been characterised in terms of their complexity ( $\beta$ ), density ( $\gamma$ ), and the extent of their similarity (Table 12.1). The mathematical basis of these measures is discussed in Section 8.2.3, and Appendix D. Numbers of concepts ranged from 18 to 36, the number of links from 33 to 48. Complexity ranged from 1.19 links per concept for Respondent Four to 1.83 for Respondent Two, whilst the score for the shared mental model is 1.95. Density scores for the individual models range from 0.040 to 0.108, all higher than that for the shared model (0.019). The highest scores for similarity were again found between the individual models and the shared model (values in the range 0.633 to 0.776). For the individual models, lowest similarity is observed between Respondents Three and Five (0.279), the highest between Respondents Four and Five (0.556).

	<i>R-1</i>	<i>R-2</i>	<i>R-3</i>	<i>R-4</i>	<i>R-5</i>	<i>R-6</i>	<i>SMM</i>
Concepts	32	18	29	36	23	25	104
Links	40	33	48	43	37	35	203
$\beta$	1.25	1.83	1.66	1.19	1.61	1.40	1.95
$\gamma$	0.040	0.108	0.059	0.034	0.073	0.058	0.019
Similarity							
R-1		0.511	0.443	0.537	0.349	0.492	0.751
R-2			0.476	0.460	0.496	0.293	0.633
R-3				0.510	0.279	0.409	0.731
R-4					0.556	0.519	0.776
R-5						0.362	0.683
R-6							0.700

**Table 12.1: *TDSW* Mental Models Summary**

The relative importance of concepts within the shared model has been identified, based on: their degree merged; their domain; and their centrality. All the merged concepts are included in Table 12.2, alongside at the ‘top 25’ concepts from the shared mental model in terms of ‘domain’ and ‘centrality’.

## 12.7 *TDSW*: MENTAL MODEL DISCUSSION

The mental models obtained at the individual level are represented in Appendix P. In comparison with other models produced here (Chapters Nine to Eleven), the individual mental models generated in respect of *TDSW*’s culture contain a generally greater number of both concepts and links. This suggests that individual’s understanding of this issue is complex and is perhaps still developing itself. Their content also appears to suggest they are in flux. Respondents have identified three broad sets of issues. The first two of these are the distinct, independent cultures of the two organisations (*TC* and *BS*) which have been merged to form *TDSW*. The third describes the culture of the new company. This is typically described in terms of the ideals and attitudes it represents, and is evidenced in relation to the historical and distinct cultures of *TC* and *BS* companies, rather than as a distinct entity itself.

<i>R</i>	<i>'Merged'</i>	<i>N</i>	<i>R</i>	<i>'Domain'</i>	<i>A</i>	<i>R</i>	<i>'Centrality'</i>	<i>S</i>
1	<i>TDSW Developing Culture</i>	6	1	<i>TDSW Developing Culture</i>	42	1	<i>TDSW Developing Culture</i>	68
2=	<i>Business Support</i>	4	2	<i>New CEO - different style, vision &amp; attitudes</i>	18	2	<i>Current/ existing culture</i>	52
2=	<i>Customer focused</i>	4	3	<i>Training Company</i>	17	3	<i>New CEO - different style, vision &amp; attitudes</i>	50
2=	<i>Environment - government funded</i>	4	4	<i>Current/ existing culture</i>	16	4	<i>Separate backgrounds</i>	49
2=	<i>New CEO - different style, vision &amp; attitudes</i>	4	5	<i>Business Support</i>	14	5	<i>Changing</i>	48
2=	<i>Separate backgrounds</i>	4	6=	<i>Customer focused</i>	12	6	<i>Different styles of individuals</i>	47
2=	<i>Training Company</i>	4	6=	<i>Different styles of individuals</i>	12	7=	<i>Customer focused</i>	46
8=	<i>Cost effective operation</i>	3	8	<i>Doing governments bidding</i>	11	7=	<i>Requires balance</i>	46
8=	<i>Current/ existing culture</i>	3	9=	<i>Changing</i>	9	9=	<i>Culture gap</i>	45
8=	<i>Partnerships for economic development</i>	3	9=	<i>Partnerships for economic development</i>	9	9=	<i>Doing governments bidding</i>	45
8=	<i>Government shift</i>	3	11	<i>More commercial operations</i>	8	9=	<i>Structured</i>	45
8=	<i>Unhappy individuals</i>	3	12=	<i>At the leading edge of our business</i>	7	12	<i>70's/80's 'male' management culture</i>	44
13=	<i>2-3 years old</i>	2	12=	<i>Culture gap</i>	7	13	<i>Cost effective operation</i>	43
13=	<i>70's/80's 'male' management culture</i>	2	12=	<i>Development (those that stay or go)</i>	7	14=	<i>First CEO (cautious)</i>	42
13=	<i>At the leading edge of our business</i>	2	12=	<i>Separate backgrounds</i>	7	14=	<i>Partnerships for economic development</i>	42
13=	<i>Benefits (yet to be seen)</i>	2	12=	<i>Environmental factors</i>	7	16=	<i>Benefits (yet to be seen)</i>	41
13=	<i>Changing</i>	2	12=	<i>Team approach</i>	7	16=	<i>Business Support</i>	41
13=	<i>Civil servants</i>	2	18=	<i>70's/80's 'male' management culture</i>	6	16=	<i>Government agency 'think'</i>	41
13=	<i>Commercial</i>	2	18=	<i>Cost effective operation</i>	6	16=	<i>Training Company</i>	41
13=	<i>Culture gap</i>	2	20=	<i>First CEO (cautious)</i>	5	20=	<i>Entrepreneurial/ takes risks</i>	40
13=	<i>Different perceptions of new culture</i>	2	20=	<i>Functional approach</i>	5	20=	<i>Environmental factors</i>	40
13=	<i>Entrepreneurial/ takes risks</i>	2	20=	<i>Need to explain new culture</i>	5	20=	<i>Functional approach</i>	40
13=	<i>Makes change difficult</i>	2	20=	<i>Open honest &amp; internally</i>	5	20=	<i>More commercial operations</i>	40
13=	<i>Semi- &amp; fully-commercial operations</i>	2	20=	<i>Shift in political environment</i>	5	20=	<i>Private Sector</i>	40
13=	<i>Open and honest internally</i>	2	20=	<i>Staff</i>	5	25=	<i>Open &amp; honest internally</i>	39
13=	<i>People issues in company</i>	2	-			25=	<i>Shift in political environment</i>	39
13=	<i>Over 5 years old</i>	2	-			-		
13=	<i>Preferred by first CEO</i>	2	-			-		
13=	<i>Private Sector</i>	2	-			-		
13=	<i>Not transmitted well</i>	2	-			-		

**Table 12.2: TDSW Shared Mental Model – ‘Most Important’ Concepts (R = Rank; N = number of individual models incorporating this concept; A = number of ‘first-level’ concepts around this concept; S = weighted score for three levels of concepts around this concept)**

Measures of complexity ( $\beta$ ) and density ( $\gamma$ ) (Table 12.1) are lower than have been observed for other models in earlier chapters. This result is likely to be an archetype of the generally greater size of the individual models obtained in *TDSW*, highlighting that the absolute size (in terms of the actual number of concepts and links) of a model must be remembered when making comparisons. This observation is supported by the fact that the smallest (for both concepts and links) individual model obtained in *TDSW* (Respondent Two; Appendix P) scores most highly for both complexity and density ( $\beta = 1.83$ ;  $\gamma = 0.108$ ).

In terms of the similarities calculated between the individual models, no particularly high or low scores have been obtained (Table 12.1). Greatest similarity was observed between Respondents Four and Five (0.556). This appears to result from shared recognition of the impact of the new CEO, and understanding of how *TDSW*'s culture interacts with the individuals within the company. Respondents Two and Six exhibit the lowest observed similarity (0.293), and examination of their models identifies a number of issues that they do not share in common. However, despite being the lowest result here, this nevertheless suggests that the two models do have a number of concepts in common.

The shared mental model is shown in Appendix Q. Like the other models produced above this consists of overlapping elements, all linked to and grouped around a central 'Core' model. The elements which are outlined below are concerned with: the Training Company; Business Support; the current culture; the influence of the new CEO; relationships with government and other partners; customer focus; attitudes of individuals with *TDSW*; and outcomes. The quantity of sub-models defined highlights the size of the shared model, despite the fact that in excess of one third of the concepts (59 from 163) obtained in the individual models have been aggregated through the merging process, this model still contains 104 concepts and 203 links. In terms of its complexity and density, this model follows the pattern observed in previous studies, again having a higher complexity ( $\beta = 1.95$ ), and lower density ( $\gamma = 0.019$ ) than any of the individual models.

It should be recognised that in the shared model, the 'seed' concept is labelled: '*TDSW*'s **developing** culture' (Appendix Q1). This qualification was added to recognise the way individuals had chosen to describe this issue in their models. The culture of this new company was, as yet not seen as being consistent and was still undergoing change, and is therefore more accurately described as developing, in recognition of the changes that the organisation's culture is undergoing.

The first two elements drawn from the shared mental model distinguish the concepts identified as describing the two parts of *TDSW*: *TC* (Appendix Q2) and *BS* (Appendix Q3). Domain scores (Table 12.2) identify 17 concepts surrounding *TC*, and 14 surrounding *BS*, highlighting the importance of the ‘old’ organisations (*TC* and *BS*) in describing the new one (*TDSW*). This description centres around the recognition (by four of the six respondents) that *TDSW* is still made up of two disparate organisations.

The separate backgrounds identified for *TC* and *BS* are seen as feeding into the current/ existing culture at *TDSW* (Appendix Q4). The identification of a current culture which is different from that which existed in *TC* and *BS*, but does not yet meet the culture desired for *TDSW* was made by three respondents, and it ranks second for centrality and fourth for domain in the shared model (Table 12.2). This highlights that *TDSW*’s culture is indeed developing, and hence not easily defined. Described as representational, intellectual, and even laid-back, the current culture is seen as being a result of private and public sector tension, shifts in the national political environment, and a range of other environmental factors, as well as the separate backgrounds of *TC* and *BS*. It is seen as changing to be more open and honest internally, as developing a team approach, and contributing to more commercial operations and a corporate approach.

The fifth element describes the impact of *TDSW*’s new CEO (Appendix Q5), which is demonstrated by his ranking second for domain and third for centrality, with four of the six respondents identifying his different style, vision and attitudes as a major driving force behind the developing culture, and the desire for *TDSW* to become more customer focused, and be recognised for being at the leading edge of it’s business. In fact this new CEO was a participant in the mapping interviews (Appendix P1), and his model is perhaps the most forward looking, containing more concepts with respect to what *TDSW*’s culture should be, and less concerned with the historical aspects of this culture than those of his colleagues (it was this individual who had not previously worked for the *TC* or the *BS*). The fact that other board members do, and identify the developing culture with the CEO rather than the organisation as a whole, may suggest that the buy-in for the new culture is superficial, in that managers are seeing the developments as things they need to foster in response to their boss, rather than owning them and supporting them themselves.

The next element identifies the relationships that exist between *TDSW* and other organisations (Appendix Q6). Critical within this is the relationship the company has with national government. Much of the *TDSW*’s income for its operations comes from grants



and funding which is ultimately controlled by national government. This led to the old view in the organisation that the government was *TDSW*'s customer and hence their primary accountability related to doing government's bidding. This is demonstrated by high scores for domain and centrality (eighth and ninth equal respectively). This change, which partly results from the change of government and consequent shift in the political environment, has already been mentioned, but is also linked to a recognition that *TDSW* is required to be more commercial, and work in partnership with other organisations.

Changes in the nature of *TDSW*'s customer have already been identified, and the desire to be customer focused was identified by four of the six interview participants and ranks sixth and seventh equal for domain and centrality respectively. Issues relating to this concept are shown in Appendix Q7, with a customer focus identified as something which *TDSW* is moving towards but has not yet achieved. To do this, *TDSW* is identified as needing to assess who their real customer is.

Within the shared mental model there is also the recognition that the developing culture is affected by the differing styles, attitudes and abilities of individuals (ranked sixth for both domain and centrality) (Appendix Q8). These differences result from different backgrounds (i.e. *TC* versus *BS*) leading to different perceptions of the new/ developing culture, and mean that some individuals feel threatened by the changes being made and equally make those changes difficult and suppress the rate of change as well as its likely success. There is also the recognition that this will lead to development of some individuals, but also to the loss of others who are at odds with the 'new' organisation.

The final sub-model (Appendix Q9) identifies the outcomes identified as coming from *TDSW*'s developing culture. These included the desires to be at the leading edge of their business, to become more commercial and be customer focused. There is also the recognition that *TDSW*'s culture should lead to more cost effective/ efficient operations and benefits for the region (which have yet to be seen). Also shown is the idea that *TDSW*'s developing culture is something that must be promoted and publicised.

Both individual models (Appendix P) and the shared model derived from them (Appendix Q) have been discussed above, and despite the detail described these contain more information which could benefit *TDSW*. Whilst the aims of this research do not allow for the further consideration of these models, they represent a data source from which additional analyses could be made. The importance of these model for this research was

two-fold to identify the extent to which the shared mental model exists and can be represented at the senior management level, and to provide an important input to Phase Two of this research. These are discussed below.

In the other organisations studied (Chapters Nine to Eleven), feedback in respect of the individual and shared mental models was broadly encouraging, and this was used to suggest that the images produced were fair and accurate representations of individual and shared understanding of the issues identified (Norman 1983; Scheper and Faber 1994; Tomaskovic-Devey, Leiter and Thompson 1994). Here, positive feedback has been less forthcoming. Whilst four of the six individual maps produced by the researcher were returned by their respondents without changes, indicating their acceptance, two individuals did not respond to this validation exercise, even following reminders. Ultimately, the reasons for these failures are unknown, and whilst other commitments may have prevented the participants from returning their models, the fact that this failure is at odds with the responses received elsewhere, suggests that it may be a result from these individuals failing to buy into their models. Furthermore, when the researcher presented the shared mental model back to the *TDSW*'s senior management board following the interviews and shared mental model development, considerable resistance to the model was evident. Feedback in this meeting identified that senior managers were 'concerned' and 'uncomfortable' with some of the issues that the model identified. These concerns were focused on the potentially negative impacts identified in respect of the organisation's developing culture, which were seen as being at odds with what they were trying to achieve. Discussion on the part of the researcher tried to point out that the identification of these issues was beneficial as it allowed *TDSW* to engage with the potential problems identified, but *TDSW*'s managers did not support this approach.

It should also be recognised that much of the content of the models is concerned with 'old' aspects of *TDSW*, with issues such as the need to 'do governments bidding' being identified as important. This suggests that in explaining their understanding and knowledge in respect of *TDSW*'s culture, respondents still see this in terms of its historical rather than its developing characteristics. The distinction of *TDSW*'s culture in terms of the differences between *TC* and *BS* supports this assertion; respondents consistently defined the organisation in terms of these two distinct entities, rather than as a single firm.

The patterns identified in the contents of mental models, and the lack of support from senior managers for the shared mental model suggest the issue identified by the

organisation, i.e. it's own culture is at least not yet fixed, and at worst is not evident as a shared model within the senior management group or the organisation as a whole. The result of the discussions with *TDSW*'s management was that they withdrew their support for Phase Two of this research. This also suggests that they were unable to recognise and support their shared mental model. The reason given was that the management board felt that any identification across the organisation of the problems identified within the culture would be divisive at this stage in it's development. Consequently, Phase Two which was planned within *TDSW* did not take place.

### **12.8 *TDSW*: MENTAL MODEL PROBLEMS AND LIMITATIONS**

Issues identified in the previous mapping chapters remain. These mean that the maps produced are limited in their scope, are time sensitive and are inevitably changed and developed through the mapping process. Consequently their application and comparability is limited. Equally, the points made in previous mapping chapters with respect to the size and voluntary nature of the sample hold for *TDSW*. Here six members of the management board chose to participate in the research, and this sample may be subject to bias. Consideration and any subsequent use of this data must therefore proceed with caution.

The lack of support from the senior management group represents a more fundamental problem, not just because it caused *TDSW* to withdraw their support for Phase Two. The models obtained here at the individual and organisational levels have been elicited and represented in the same ways as the models obtained in all the other organisations. Support for and recognition of these models has been used to uphold the assertion that they are fair and accurate representations of understanding. Here no support for the shared model was forthcoming, and the point was made above that this rejection by the senior management board may suggest that the image produced may not represent their shared mental model. By inference this reduces confidence in the other representations obtained. However, the reason for rejection here appears to result not from a fundamental disagreement with the content of the model itself, but more from a concern over its nature. At no point did any of the senior management board suggest that the content was wrong, their concern was over how the negative aspects of their shared mental model may be received by the organisation as a whole. This could suggest that they are not confident that their shared model will be recognised by the rest of the organisation, but could also suggest

that they are all too aware of how it will be recognised, but are equally unwilling to have these problematic attitudes surfaced within the organisation. Given that support is required from senior management for the research, not only is their uptake of model important, but also their confidence with it. The evidence suggests that managers are unwilling to accept or explore models they believe to be contentious or problematic. This has implications in terms of both the nature of the models produced, and the methodology adopted, discussed in Chapter Fifteen.

## 12.9 SUMMARY

Results of the interviews and shared mental model development in *TDSW* have been described above, and the understanding of *TDSW*'s developing culture these represent has been discussed. However, their role primary role within this research is to contribute evidence in respect of the research questions set in Chapter Seven. It was also expected that *TDSW* would participate in Phase Two of this research. However, problems identified by *TDSW*'s senior management board in respect of the shared mental model content caused them to remove support for an organisation wide assessment of this model.

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## CHAPTER THIRTEEN

# Study 2: Westcountry Borough Council - Phase 2 Questionnaire Survey

### 13.1 INTRODUCTION

The second phase of the research consisted of a questionnaire survey, the results of which for *WBC* are considered here. The questionnaire addressed three issues: learning levels, shared mental model assimilation and cognitive style.

This chapter begins by outlining the aims of this phase, before describing the specific details of the research methods used in *WBC*. The data collection and sample are also described. Results from the questionnaire are then analysed and presented at the item and scale levels, and multiple regression is used to look at the relationships between shared mental model assimilation, levels of learning, cognitive style and respondent characteristics. The problems and limitations of this survey are also outlined.

### 13.2 AIMS

Aims and objectives of the research were described in Chapter Seven. The survey data analysed below seeks to address the core aim of the research and investigate the relationships between the shared mental model obtained in Phase One (Chapter Ten), cognitive style and individual and organisational learning. It also provides evidence in respect of most of the hypotheses outlined above (Section 7.5.2). The exceptions are those hypotheses which deal with the issues of learning climate and learning systems. These scales were only added to the survey following its application in *WBC*.

### 13.3 METHOD

The content and structure of the research questionnaire is outlined below. Complete details on the methods employed have been included in the Chapter Eight.

### 13.3.1 Learning Levels

Information on individual and organisational learning was collected through the *Organisational and Individual Learning Levels* questionnaire; Version One (*OILLs-1*).

### 13.3.2 Shared Mental Model

A *Shared Mental Model Questionnaire of the Service Planning Process (MMQ-SPP)* was constructed to assess assimilation of the senior managers' shared mental model derived in Phase One. This was a 'one-off' organisation specific tool. Items in the *MMQ-SPP* were taken from the shared mental model derived from the cognitive mapping interviews undertaken in Phase One (Chapter Ten). Concepts have been taken from the shared model and reframed as agree/disagree statements. Boxes around concepts in the shared model (Appendix M) indicates items included in the questionnaire. Selection of concepts was not at random. Concepts used were identified as significant within the shared mental model on the basis of three criteria: (1) the degree to which they have been merged; (2) the extent of their domain; and (3) their centrality. Details on how these measures are derived are described in Appendix D, and they have been summarised in Table 10.2, concepts marked with an asterisk (\*) in this table have been included in the *MMQ-SPP* question set.

Twenty-six items were created, representing 36 concepts. The concepts and relationships between concepts which each item represents are summarised in Appendix R. The items were initially reviewed by the individuals who participated in the mapping exercise before being included in the pilot questionnaire (Appendix F).

### 13.3.3 Cognitive Style

The *Cognitive Style Index (CSI)* (Allinson & Hayes 1996) was used to assess cognitive style.

### 13.3.4 Questionnaire Format

The elements described above were combined into a single self-report questionnaire. Data were also collected on respondent characteristics (gender, age, length of service with *WBC*, department, and job level). The form contained the four elements in the order: *OILLs-1*; *MMQ-SPP*; *CSI*; and respondent characteristics (Appendix F).

### 13.4 PILOT STUDY

The instrument was piloted with a small sample (25 individuals) in *WBC* prior to its use in the survey described below. All the pilot questionnaires were returned. Results did not suggest any major problems, although a number of minor typographical changes were made to the instrument (Section 8.3.3). The most significant change was made to the *MMQ-SPP*. In the pilot responses, high levels of agreement with the *MMQ-SPP* items were evident, and the decision was taken to ‘reverse’ some of the items so that they represented the opposite viewpoint to that expressed in the shared mental model. This was done to reduce the potential for bias on the part of respondents by replying positively to the item set as a whole rather than each item individually (Oppenheim 1992; Garg 1996). Twelve out of the 26 items were reversed. The final instrument is shown in Appendix I.

### 13.5 DATA COLLECTION

The questionnaire (Appendix I) was administered in a postal survey during February 1998. Members of the target sample were informed of the research project and questionnaire by E-mail from *WBC*'s chief executive's office on the day prior to which surveys were expected and reminded, in the same way to complete and return questionnaires after two weeks had elapsed. No second mailing was planned as support for this was not given by *WBC*. A covering letter, attached to the instrument which outlined the questionnaire, explained that it was supported by *WBC*, and asked for respondents help (Appendix G). The questionnaire asked respondents to indicate the extent to which the *OILLS-1*, *MMQ-SPP*, and *CSI* statements applied to themselves, and where appropriate, their organisation. It was stressed that there were no right or wrong answers and that individuals should respond with their immediate reaction, giving the answer that corresponded most closely with their opinion. The questionnaire also offered respondents the opportunity to gain feedback on their cognitive style. This was done on receipt by means of a standardised form (Appendix E). A freepost envelope was provided for respondents returns.

### 13.6 SAMPLE

A sample of 251 individuals, made up of the central office staff of the council, and was identified by *WBC*'s chief executive as representing the appropriate interest group for the

shared mental model utilised in the survey (i.e. the service planning process). 112 usable responses were obtained (returns missing items from the first three sections were excluded), representing a response rate of 44.6%, better than might be expected for a survey of this type (Heberlein and Baumgartner 1978). Both the support of the questionnaire by E-mail and availability of cognitive style feedback may have improved this. 45.5% of respondents (51 individuals) requested cognitive style feedback. Participation was voluntary, and responses remained entirely confidential.

		<i>n</i>	<i>Percent</i>
<b>Gender</b>	Male	58	51.8
	Female	53	47.3
	Missing	1	0.9
<b>Age</b>	<31	23	20.5
	31-40	29	25.9
	41-50	40	35.7
	51-60	15	13.4
	>60	3	2.7
	Missing	2	1.8
<b>Length of Service</b>	<6	30	26.8
	6-10	42	37.5
	11-15	16	14.3
	16-20	12	10.7
	>20	7	6.2
	Missing	5	4.5
<b>Job Level</b>	Senior manager	13	11.6
	Middle manager	13	11.6
	First line manager	17	15.2
	Staff	58	51.8
	Others (own description)	6	5.4
	Missing	5	4.4
<b>Department /Unit</b>	Executive Office	12	10.7
	Leisure	17	15.2
	Housing	22	19.6
	Finance	32	28.6
	Environment & Planning	18	16.1
	Missing	11	9.8

**Table 13.1: WBC Characteristics of the Sample (*n* =112)**



The characteristics of the sample are summarised in Table 13.1. The sample consisted of 58 (51.8%) males and 53 (47.3%) females (with a single non-response for gender). Participants were asked to indicate their age group and job levels against five point scales (<31 years; 31-40 years; 41-50 years; 51-60 years; >60 years for age, and senior manager; middle manager; first line manager; staff; others - own description for job level), shown in Table 13.1. For job level, the 'others' category included individuals whose jobs could best be described as 'professional specialists' such as in-house solicitors, and represents 5.4 % of the sample (six individuals). Individuals indicated the number of years they had worked for *WBC*, this was aggregated into five groups (<6 years; 6-10 years; 11-15 years; 16-20 years; >20 years) (Table 13.1). Data were also collected on the departments represented in the sample, five were identified (Executive Office; Leisure; Housing; Finance; Environment and Planning). This item generated 11 non-responses.

### **13.7 *WBC* SURVEY RESULTS**

Results from the survey are presented and analysed below.

#### **13.7.1 Learning Levels: Results**

Results from the *OILLs-1*, which attempts to assess individuals' attitudes to both their own and the organisation's adaptive and generative learning are presented below. Item results are described first, then results based upon the hypothesised structure of the instrument are presented. Scale reliability and inter-item correlations are presented, as are the results of exploratory factor analysis. Construct and concurrent validity are also considered.

##### *13.7.1.1 Learning Levels: Item Results*

The *OILLs-1* consists of 36 items: nine individual adaptive; nine individual generative; nine organisational adaptive; and nine organisational generative. These item sets are summarised in Tables 13.2a-d, and are described in their four hypothesised groups below.

Results for those items representing individual adaptive learning are included in Table 13.2a, this incorporates item frequencies, (percentages of the total response for each point on the five-point Likert-type scale used), mean scores and standard deviations for these items. Item frequencies show no significantly strong responses for 'agree/ strongly

agree', with eight of the nine items recording over 50% 'disagree/ strongly disagree'. Only item q1.2 produced a different response; with 42% of the sample responding 'neither agree nor disagree'. Across the nine items mean scores range from 2.03 to 2.77. These suggest that across *WBC* individuals are exhibiting a low propensity for adaptive learning.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.2	My own ways of working are efficient and do not need changing.	4	13	42	38	3	2.77	0.85
q1.8	I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	1	6	14	59	20	2.10	0.82
q1.10	I only feel able to put my ideas forward if they don't challenge the views and values of senior managers.	6	18	16	42	18	2.53	1.16
q1.14	I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	2	6	12	59	21	2.09	0.86
q1.16	I dislike experimenting with new and novel ways of working.	1	4	12	62	21	2.03	0.77
q1.17	I don't normally look for feedback from employees, colleagues or customers about the way I work.	3	9	13	57	18	2.21	0.93
q1.30	I rarely need to change my plans once I've made them.	3	14	29	50	4	2.62	0.88
q1.31	My working practices are fixed and I rarely have any need to change them.	2	13	18	58	9	2.41	0.90
q1.32	My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	0	4	26	54	16	2.19	0.75

**Table 13.2a: *OILLS-I* Item Summaries: Individual Adaptive Learning (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; *n*=112)**

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.4	I share as much information as possible with my colleagues.	38	54	8	0	0	4.31	0.60
q1.5	I am often on the lookout for new ideas from any source.	32	51	14	3	0	4.13	0.75
q1.13	I am often looking to improve my working practices in order to increase my efficiency and effectiveness.	13	72	10	4	1	3.94	0.68
q1.24	I put forward ideas about policy, even if they challenge senior managers' views.	7	51	28	12	2	3.51	0.86
q1.25	I try to communicate my decisions and their outcomes throughout the organisation	7	43	41	7	2	3.46	0.81
q1.27	I work to a set regime, but I'm willing to change my ways of working when necessary, particularly if it leads to efficiency gains.	22	55	14	7	2	3.88	0.90
q1.29	I talk to my employees, colleagues and customers and encourage them to tell me about things I do wrong and let me know how I can improve.	8	55	26	11	0	3.61	0.79
q1.33	I continuously challenge the organisation's mission, values and assumptions.	4	22	40	32	2	2.94	0.87
q1.35	I regularly experiment with new ways of working.	5	32	41	20	2	3.20	0.88

**Table 13.2b: *OILLS-I* Item Summaries: Individual Generative Learning (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; *n*=112)**

Frequency results for items representing individual generative learning show a positive response, with values for ‘agree’ ranging from 43 to 72% and values for ‘strongly agree’ ranging from 8 to 38% for seven of the nine items (Table 13.2b). The remaining two items (q1.33; q1.35) exhibit more neutral responses, and have noticeably lower means than the rest of the individual generative learning items (2.94 and 3.20 respectively). Other items means are between 3.46 and 4.31, and suggest a positive response for individual generative learning.

Item frequencies for the organisational adaptive items, show a somewhat mixed response (Table 13.2c). Five of the nine items (q1.1; q1.7; q1.9; q1.18; q1.22) have a response skewed towards disagreement, with values for ‘disagree’ ranging from 41 to 57% and for ‘strongly disagree’ from 5 to 32%. The other four (q1.6; q1.15; q1.23; q1.26) exhibit a more neutral response, with the response set centred around ‘neither agree nor disagree’. Mean scores are in the range 1.91 to 3.04, and confirm this pattern, responses ranging from relatively high disagreement to a broadly neutral response.

<i>Q.No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.1	We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	2	21	27	41	9	2.66	0.97
q1.6	This organisation's strategy and policy are prescribed by senior managers. No one else really can have a say.	10	26	26	30	8	2.99	1.14
q1.7	This organisation doesn't encourage or use feedback from employees or customers on how well it works.	10	13	18	47	12	2.61	1.15
q1.9	This organisation doesn't need to get new ideas from elsewhere - we find our own tried and tested ways of working are usually right for us.	2	4	12	50	32	1.91	0.87
q1.15	This organisation has a limited range of very efficient working practices that it sticks to.	0	13	47	32	8	2.67	0.80
q1.18	Employees are discouraged from experimenting with new and novel ways of working.	0	7	43	45	5	2.52	0.71
q1.22	The organisation's working practices are basically fixed - we never have any need to change them.	0	4	23	57	16	2.14	0.72
q1.23	Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	8	24	33	33	2	3.04	0.99
q1.26	The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	1	30	42	25	2	3.04	0.82

**Table 13.2c: OILLS-I Item Summaries: Organisational Adaptive Learning (%; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; sd = standard deviation; n=112)**

Item frequencies for the organisational generative items suggest differing responses across the nine items (Table 13.2d). Two items, q1.12 and q1.19, are marginally slanted towards ‘disagree’ (35 and 38% respectively), two exhibit more neutral responses (q1.20;

q1.36), whilst the rest indicate levels of agreement ranging from 42% to 76%. Mean scores are between 2.56 and 3.77, and follow the pattern observed from the item frequencies.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.3	As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	11	44	25	17	3	3.44	0.98
q1.11	This is an open organisation and as much information as possible is made available to employees.	9	37	28	21	5	3.24	1.05
q1.12	Risk taking and experimentation is encouraged by the organisation and sometimes rewarded.	0	13	41	35	11	2.56	0.85
q1.19	Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	2	23	32	38	5	2.79	0.92
q1.20	There is two way communication between employees of all levels about what this organisation's doing and where it's going.	9	33	29	25	4	3.17	1.05
q1.21	This organisation is often on the lookout for new ideas from suppliers, customers and competitors.	4	38	39	18	1	3.27	0.84
q1.28	As an organisation we actively encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	9	56	21	13	1	3.60	0.85
q1.34	As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	6	70	19	5	0	3.77	0.64
q1.36	This organisation allows its broad strategy to be continuously challenged and re-interpreted.	4	23	54	16	3	3.09	0.80

**Table 13.2d: *OILLs-I* Item Summaries: Organisational Generative Learning (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; *n*=112)**

Looking at the *OILLs-I* overall, scores for the individual items (Tables 13.2a and 13.2b) are mostly higher than those for the organisational items (Tables 13.2c and 13.2d). Whilst the generative items (Tables 13.2b and 13.2d) have received a positive response compared with adaptive items (Tables 13.2a and 13.2c).

### *13.7.1.2 Learning Levels: Hypothesised Structure – Item Analysis*

The hypothesised structure of the *OILLs-I* was described in Chapter Eight, the 18 items hypothesised as individual and the 18 items hypothesised as organisational were conceived as separate bipolar scales, the extremes of which represent adaptive and generative learning. Descriptive statistics for these scales are shown in Table 13.3. To compute mean scores, generative items have been treated as positive, adaptive items as negative, thus scores for adaptive items were reversed, and scores for each of the scales were summed

and divided by 18. This gave, for each hypothesised scale, a score between 1 and 5, with the higher that score, the greater the propensity for generative learning, and the lower the score, the greater the propensity for adaptive learning.

	<i>Mean</i>	<i>sd</i>	<i>a</i>	<i>Median</i>	<i>Range</i>
Organisational Learning (hypothesised scale)	3.30	0.52	0.88	3.33	2.11-4.50
Individual Learning (hypothesised scale)	3.67	0.38	0.77	3.72	2.72-4.44

**Table 13.3: OILLS-1 Descriptive Statistics - Hypothesised Structure**

The internal (scale) reliabilities of the organisational learning and individual learning hypothesised scales were assessed (Cronbach  $\alpha$ ). Whilst both of these are acceptable ( $\alpha > 0.7$ ; Guilford 1956), examination of the results in terms of alpha if item deleted and item-total correlation suggests that a number of the items may be problematic.

<i>Q. No.</i>	<i>Type</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>	<i>Q. No.</i>	<i>Type</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>
q1.2	Adaptive	0.20	0.77	q1.1	Adaptive	0.50	0.87
q1.8	Adaptive	0.29	0.77	q1.6	Adaptive	0.65	0.87
q1.10	Adaptive	0.20	0.78	q1.7	Adaptive	0.45	0.87
q1.14	Adaptive	0.26	0.77	q1.9	Adaptive	0.04	0.89
q1.16	Adaptive	0.49	0.75	q1.15	Adaptive	0.38	0.88
q1.17	Adaptive	0.26	0.77	q1.18	Adaptive	0.63	0.87
q1.30	Adaptive	0.41	0.76	q1.22	Adaptive	0.29	0.87
q1.31	Adaptive	0.47	0.75	q1.23	Adaptive	0.59	0.87
q1.32	Adaptive	0.58	0.75	q1.26	Adaptive	0.36	0.88
q1.4	Generative	0.23	0.77	q1.3	Generative	0.55	0.87
q1.5	Generative	0.46	0.75	q1.11	Generative	0.70	0.86
q1.13	Generative	0.46	0.76	q1.12	Generative	0.59	0.87
q1.24	Generative	0.52	0.75	q1.19	Generative	0.71	0.86
q1.25	Generative	0.52	0.75	q1.20	Generative	0.58	0.87
q1.27	Generative	-0.18	0.80	q1.21	Generative	0.47	0.87
q1.29	Generative	0.29	0.76	q1.28	Generative	0.61	0.87
q1.33	Generative	0.41	0.76	q1.34	Generative	0.38	0.88
q1.35	Generative	0.42	0.76	q1.36	Generative	0.43	0.87

(a): Individual Learning Hypothesised Scale

(b): Organisational Learning Hypothesised Scale

**Table 13.4: OILLS-1 Reliability Analysis**

For item-total correlations, a result greater than 0.3 is considered acceptable (Nunnally 1978; Rust and Golombok 1989). In the individual learning hypothesised scale, (Table 13.4a), five of the nine ‘individual adaptive’ items fail this criteria (q1.2; q1.8; q1.10; q1.14; and q1.17), as do three of the ‘individual generative’ items (q1.4; q1.27; and q1.29). For the organisational learning hypothesised scale (Table 13.4b), two (adaptive) items out of the 18 fail in this respect (q1.9; and q1.22). ‘Alpha if item deleted’ gives the internal scale reliability (Cronbach  $\alpha$ ) if the item in question were removed. On the individual learning scale (Table 13.4a), removal of two items could improve the scale reliability (q1.27 and q1.10), whilst on the organisational learning scale (Table 13.4b) only one problematic item appears (q1.9). This suggests that the reliability of the *OILLs-1* could be improved by dropping items highlighted above, and will be used alongside the exploratory factor analysis to refine scales for subsequent analysis.

#### *13.7.1.3 Learning Levels: Exploratory Factor Analysis*

Exploratory factor analysis, using principal components analysis of items has been undertaken on the 36 items of the *OILLs-1*. This statistical technique allows a researcher to systematically examine a set of variables in order to discover whether latent variables exist which are relatively independent of each other (Tabachnick and Fidell 1996; Child 1990). Exploratory factor analysis describes and summarises data by grouping variables that are correlated. Principal components analysis of items mathematically produces several linear combinations of variables (factors), which summarise the patterns of correlations between these variables independently, and as a result can be used (with varying success) to reproduce the observed variables. The reduced number of factors compared with variables increases parsimony and provides scores which are often more reliable than scores on individual observed variables (Tabachnick and Fidell 1996). Here, exploratory factor analysis is being used to examine the extent to which the data from *WBC* matches the hypothesised structure of the *OILLs-1*.

An initial (unrotated) solution identified 11 factors with eigenvalues over one, accounting for 72.1% of the variance in the *WBC* data (Table 13.5). The scree plot did not indicate a clear break-point for the number of factors: suggesting solutions of between three and seven factor structures. As the ‘eigenvalues over one’ criteria may overestimate the number of factors (Tabachnick and Fidell 1996: 672), and the scree plot is

inconclusive, an alternative strategy has been adopted. Tabachnick and Fidell (1996: 673) suggest that if the established estimators of factor structure do not concur or suggest unsuitable structures, one appropriate way to proceed is through the examination of a number of alternative structure solutions. This is particularly suitable here as we are exploring a new instrument, whose hypothesised structure may be obscured by a limited number of spurious or inappropriate items. It was therefore decided that a number of potential (and increasingly complex) factor solutions would be generated, to see what patterns (if any) emerged.

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	7.91	21.98	21.98
2	3.75	10.43	32.41
3	2.48	6.89	39.30
4	2.05	5.68	44.98
5	1.83	5.07	50.05
6	1.74	4.82	54.87
7	1.46	4.05	58.92
8	1.36	3.77	62.69
9	1.21	3.36	66.05
10	1.13	3.13	69.18
11	1.06	2.93	72.11

**Table 13.5: *OILLs-I* Initial Unrotated Solution (11 factors)**

Two, three and four factor solutions were generated before the iterative process was concluded. The two factor solution provided the simplest and clearest explanation of the data set. As ‘simple’ structure is the aim with factor analysis, in line with the ‘law of parsimony’ (the solution selected should be the one which provides the simplest explanation of the facts; Kline 1994: 64), the two-factor solution has been retained. This also represents an attempt to reconstruct the hypothesised structure of the instrument, which Newstead (1992) identifies as an appropriate approach in exploratory research.

The outcome of the two factor solution, following orthogonal (varimax) rotation is shown in Table 13.6. Factors 1 and 2 had eigenvalues of 6.85 and 4.82 respectively, together they account for 32.4% of the variance in the data set. Further extraction using oblique rotation was not attempted in order to retain a consistency in approach and simplicity of reporting across the factor analyses undertaken in this research (Tabachnick and Fidell 1996: 674). Factor loadings for the two factor solution are shown in Table 13.7.

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	6.85	19.03	19.03
2	4.82	13.37	32.40

**Table 13.6: *OILLs-1* Two factor Solution Following Varimax Rotation**

All 36 items from the *OILLs-1* are included in Table 13.7. Items have been labelled in the second column according to type as follows: individual adaptive ('IA'); individual generative ('IG'); organisational adaptive ('OA'); organisational generative ('OG') learning. A value of 0.32 was taken as the criterion of salient loading (Tabachnick and Fidell 1996: 677), and loadings of 0.32 and over are shown in bold. 19 items loaded significantly onto Factor 1 (Table 13.7). These included all nine 'organisational generative' items which loaded positively, and eight of the nine 'organisational adaptive' items. These loaded negatively. Factor 1 also contained two individual items, one hypothesised as adaptive (q1.12), which loaded negatively and one as generative (q1.29), which loaded positively. Factor 2 consists of 14 items. These include six 'individual adaptive' items with positive loadings, and seven 'individual generative' items with negative. Also on Factor 2 is one positively loaded 'organisational adaptive' item (q1.22). Five items failed to load significantly on either factor (Table 13.7). Two of these were 'individual adaptive' items (q1.2 and q1.17), two were 'individual generative' (q1.4 and q1.27), and the other was 'organisational adaptive' (q1.9). There were two factors which loaded significantly on both factors, one 'organisational adaptive' (q1.22), and one 'individual generative' (q1.29). All these items had already been identified as problematic through their item-total correlations.

The outcome of this exploratory factor analysis is encouraging for a new instrument. It confirms the hypothesised structure of the *OILLs-1* with Factor 1 corresponding to organisational learning and Factor 2 to individual learning. Significantly, no cross loading occurred between adaptive and generative items. Discarding those items which failed to load, or load inappropriately leaves us with 28 items across the two factors. These correspond with a 16 item scale for organisational learning (made up of nine generative and seven adaptive items), and a 12 item scale for individual learning (made up of six generative and six adaptive items).



<i>No.</i>	<i>Code</i>	<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
q1.1	OA	We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	<b>-0.54</b>	0.26
q1.2	IA	My own ways of working are efficient and do not need changing.	0.00	0.26
q1.3	OG	As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	<b>0.60</b>	-0.20
q1.4	IG	I share as much information as possible with my colleagues.	0.31	-0.27
q1.5	IG	I am often on the lookout for new ideas from any source.	0.12	<b>-0.56</b>
q1.6	OA	This organisation's strategy and policy are prescribed by senior managers. No one else really can have a say.	<b>-0.72</b>	0.02
q1.7	OA	This organisation doesn't encourage or use feedback from employees or customers on how well it works.	<b>-0.58</b>	-0.06
q1.8	IA	I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	0.02	<b>0.47</b>
q1.9	OA	This organisation doesn't need to get new ideas from elsewhere - we find our own tried and tested ways of working are usually right for us.	-0.07	-0.02
q1.10	IA	I only feel able to put my ideas forward if they don't challenge the views and values of senior managers.	<b>-0.64</b>	0.09
q1.11	OG	This is an open organisation and as much information as possible is made available to employees.	<b>0.76</b>	-0.05
q1.12	OG	Risk taking and experimentation is encouraged by the organisation and sometimes rewarded.	<b>0.64</b>	-0.22
q1.13	IG	I am often looking to improve my working practices in order to increase my efficiency and effectiveness.	0.14	<b>-0.48</b>
q1.14	IA	I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	0.07	<b>0.36</b>
q1.15	OA	This organisation has a limited range of very efficient working practices that it sticks to.	<b>-0.37</b>	0.29
q1.16	IA	I dislike experimenting with new and novel ways of working.	-0.10	<b>0.51</b>
q1.17	IA	I don't normally look for feedback from employees, colleagues or customers about the way I work.	-0.12	0.23
q1.18	OA	Employees are discouraged from experimenting with new and novel ways of working.	<b>-0.68</b>	0.14
q1.19	OG	Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	<b>0.78</b>	-0.10
q1.20	OG	There is two way communication between employees of all levels about what this organisation's doing and where it's going.	<b>0.66</b>	0.07
q1.21	OG	This organisation is often on the lookout for new ideas from suppliers, customers and competitors.	<b>0.52</b>	-0.03
q1.22	OA	The organisation's working practices are basically fixed - we never have any need to change them.	<b>-0.34</b>	<b>0.45</b>
q1.23	OA	Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	<b>-0.64</b>	0.14
q1.24	IG	I put forward ideas about policy, even if they challenge senior managers' views.	0.14	<b>-0.60</b>
q1.25	IG	I try to communicate my decisions and their outcomes throughout the organisation.	0.22	<b>-0.48</b>
q1.26	OA	The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	<b>-0.34</b>	0.28
q1.27	IG	I work to a set regime, but I'm willing to change my ways of working when necessary, particularly if it leads to efficiency gains.	0.15	0.30
q1.28	OG	As an organisation we actively encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	<b>0.71</b>	-0.00
q1.29	IG	I talk to my employees, colleagues and customers and encourage them to tell me about things I do wrong and let me know how I can improve.	<b>0.43</b>	<b>-0.47</b>
q1.30	IA	I rarely need to change my plans once I've made them.	-0.04	<b>0.53</b>
q1.31	IA	My working practices are fixed and I rarely have any need to change them.	0.03	<b>0.60</b>
q1.32	IA	My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	-0.13	<b>0.70</b>
q1.33	IG	I continuously challenge the organisation's mission, values and assumptions.	-0.02	<b>-0.59</b>
q1.34	OG	As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	<b>0.48</b>	0.10
q1.35	IG	I regularly experiment with new ways of working.	0.03	<b>-0.59</b>
q1.36	OG	This organisation allows its broad strategy to be continuously challenged and re-interpreted	<b>0.44</b>	-0.16

Table 13.7: *OILLS-I*: factor loadings (loadings of 0.32 and over in bold)

#### 13.7.1.4 *Learning Levels: Descriptive Statistics*

Scales for individual learning and organisational learning which have been refined on the basis of item analysis (item-total correlations and alpha if item deleted) and exploratory factor analysis (principle components analysis of items) are presented in Table 13.8. This includes a 16 item scale for organisational learning consisting of seven adaptive items and nine generative items, and a 12 item scale for individual learning made up of six adaptive and six generative items which correspond to the two factors derived from the exploratory factor analysis. The scores in Table 13.8 were arrived at by treating generative items as positive and adaptive items as negative, summing and dividing by 16 and 12 respectively. This gave, for each hypothesised scale, a score between 1 and 5, with the higher that score, the greater the propensity for generative learning on both scales (i.e. organisational learning and individual learning), and the lower the score, the greater the propensity for adaptive learning. These results suggest that for *WBC*, whilst propensity for both individual and organisational learning is biased towards the generative end of the scale, individuals in *WBC* perceive themselves to be more generative (mean = 3.65; median = 3.67) than the organisation as a whole (mean = 3.21; median = 3.25), this assertion is confirmed by a paired sample t-test, which suggests that they are significantly different at the 99.9% level ( $t = -7.319$ ,  $df = 111$   $p < 0.001$ ). Individual and organisational learning are also significantly correlated ( $r = 0.23$ ,  $p < 0.05$ ), suggesting that the higher a respondent's propensity for individual generative learning, the higher their propensity for organisational generative learning. The internal (scale) reliability of both scales is acceptable ( $\alpha > 0.7$ ). Histograms of these variables show both to be normally distributed.

	<i>Mean</i>	<i>sd</i>	<i>a</i>	<i>Median</i>	<i>Range</i>
Organisational Learning (hypothesised scale)	3.21	0.56	0.89	3.25	1.81-4.44
Individual Learning (hypothesised scale)	3.65	0.46	0.80	3.67	2.42-4.58

**Table 13.8: *OILLs-1* Descriptive Statistics - Resultant Structure**

### 13.7.1.5 Learning Levels: Construct Validity

Establishment of construct validity can be aided by the comparison of new measures with established instruments. Consequently, some assessment of the construct validity of the *OILLs-1* can be obtained by considering the extent of the relationship between the *OILLs-1* and cognitive style as measured by the *CSI*. *CSI* results are scored on an additive scale with a theoretical minimum of 0 and a maximum of 76. The higher an individual's score, the more analytical their style, the lower the more intuitive. The mean *CSI* score for *WBC* was 44.79 (sd = 12.06), the median 44 and values ranged from 14 to 73. These scores are normally distributed. The results are consistent with the data obtained by Allinson and Hayes (1996), and demonstrate an acceptable level of internal (scale) reliability ( $\alpha > 0.7$ ), also in line with previously published results (Allinson and Hayes 1996; Armstrong, Allinson and Hayes 1997; Sadler-Smith, Spicer and Tsang 1999).

The expectation is that significant correlations would be observed between the *CSI* and organisational learning and individual learning scales. Whilst there is a small degree of correlation ( $r = 0.05$ ) between *CSI* and organisational learning, this is not significant ( $p > 0.05$ ). However, a significant correlation was obtained between individual learning and the *CSI* result ( $r = -0.40$ ;  $p < 0.001$ ). This indicates an inverse relationship between individual learning and cognitive style as measured by the *CSI*. In other words the more generative an individual's learning the more intuitive their cognitive style, the more adaptive their learning the more analytical their style.

### 13.7.1.6 Learning Levels: Concurrent Validity

If the *OILLs-1* has concurrent validity, it should be capable of discriminating between groups which are presumed to differ in their perceptions of individual and organisational learning. It might be supposed therefore that differences in age, gender or job level would result in differing attitudes, and effects of respondent characteristics on individual and organisational learning are described, in order that the concurrent validity can be assessed.

Influence of gender, age, length of service and job level was assessed using simple factorial analysis of variance ( $n$ -way Anova). To ensure that appropriate cell sizes were maintained some aggregation of the respondent variables from their original categories (Table 13.1) were undertaken. Age was reduced from five categories to four (<31; 31-40; 41-50; >50 years), length of service from five to three (<6; 6-10; >10 years), and job level

from five to two (managers; and staff). Department is dealt with separately below. Results are summarised in Table 13.9, main effects and 2-way interactions are shown, no higher order interactions exist. These have been suppressed by *SPSS* in response to empty cells or a singular matrix. Significant effects ( $p < 0.05$ ) are shown in Table 13.9 in bold. Examining these, it can be seen that no significant effects on organisational learning were identified. For individual learning, the only significant main effect is of job level, whilst two-way interactions are identified for gender and age, and for length of service and job level (service-by-job). These effects are discussed briefly below.

Source of Variation	Organisational Learning			Individual Learning	
	df	F	p	F	p
Main Effects					
Gender	1	0.226	0.636	0.378	0.540
Age	3	0.536	0.659	2.230	0.091
Length of Service	2	0.165	0.848	0.261	0.771
Job Level	1	0.004	0.952	<b>7.639</b>	<b>0.007</b>
2-Way Interactions					
Gender-by-Age	3	0.298	0.827	<b>2.889</b>	<b>0.041</b>
Gender-by-Service	2	0.277	0.759	1.906	0.155
Gender-by-Job	1	0.027	0.869	0.093	0.761
Age-by-Service	6	0.561	0.760	1.132	0.351
Age-by-Job	3	0.488	0.692	1.095	0.356
Service-by-Job	2	0.189	0.828	<b>3.839</b>	<b>0.026</b>

**Table 13.9: OILLs-1 Effect of Respondent Characteristics ( $p < 0.05$  shown in bold)**

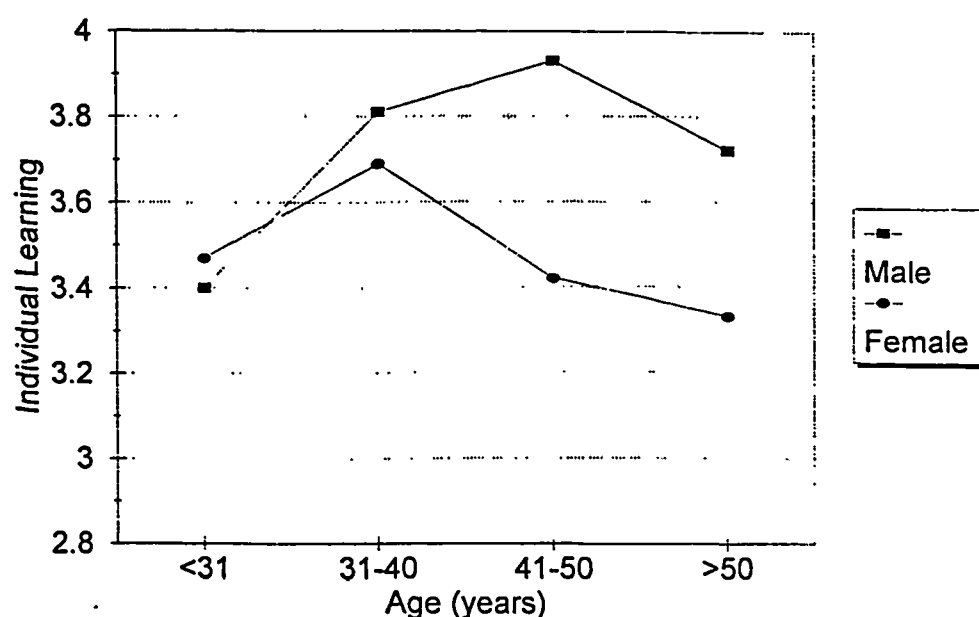
*Job Level:* Examination of the data in respect of effect of job level on individual learning ( $F = 7.64$ ;  $df = 1$ ;  $p < 0.05$ ) indicates that the managers (and ‘professional specialists’; also included in this group) have a significantly higher mean for individual learning (3.90) than the rest of the staff (3.45). This suggests that the managers are more generative in their approach to their own learning than other employees.

*Gender and Age:* Means for the effects of gender and age on individual learning are summarised in Table 13.10, and Figure 13.1. From these it can be seen that the significant

difference ( $F = 2.89$ ;  $df = 3$ ;  $p < 0.05$ ) occurs the between older males and females in the sample, with the men aged over forty reporting a noticeably higher mean individual learning than women of equivalent age. This suggests that the older men in *WBC* have a more generative attitude to their learning than the older women. Despite differences in the absolute level of individual learning for the younger (less than forty) members of the sample, no significant gender difference is observed.

Age	Individual Learning	
	Male	Female
<31	3.41	3.47
31-40	3.81	3.69
41-50	3.93	3.42
>50	3.72	3.33

**Table 13.10: *OILLs-1* Means for Two-Way Interaction, Effect of 'Gender-by-Age'**



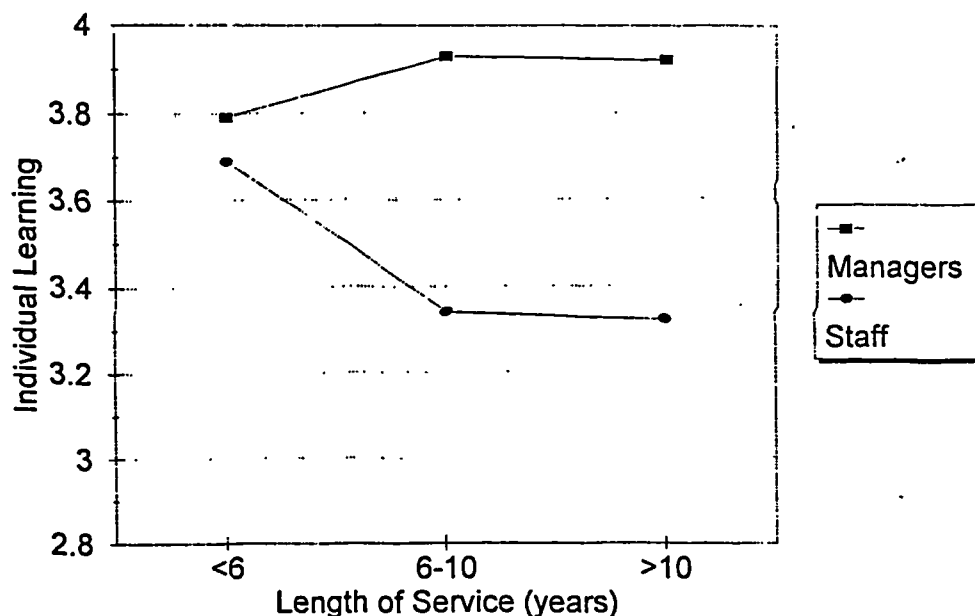
**Figure 13.1: *OILLs-1* Effect of Gender-by-Age on Individual Learning**

*Length of Service and Job Level:* Included in Table 13.11 are means for the significant effect of length of service and job level on individual learning ( $F = 3.84$ ;  $df = 2$ ;  $p < 0.05$ ). These are also shown in Figure 13.2, which indicates that whilst there is no major difference in respect of attitudes to individual learning between managers and staff who

have worked for WBC for less than six years, managers with six years service or more have significantly higher mean scores (i.e. more generative) for individual learning than staff with similar periods of service.

<i>Length of Service</i>	<i>Individual Learning</i>	
	<i>Managers</i>	<i>Staff</i>
<6	3.79	3.69
6-10	3.93	3.34
>10	3.92	3.32

**Table 13.11: OILLs-1 Means for Two-Way Interaction, Effect of 'Service-by-Job'**



**Figure 13.2: OILLs-1 Effect of Service-by-Job on Individual Learning**

*Department:* As a nominal variable, department contravenes the assumptions of anova and requires a non-parametric test. Effect of department was therefore assessed using chi-squared comparison of medians (Kinnear and Gray 1994), which tests whether two or more samples are drawn from populations with the same median. No effect on individual learning was identified. However, a significant effect of department on organisational learning was identified ( $\chi^2 = 11.804$ ,  $df = 4$ ,  $p < 0.05$ ). Examination of the data suggests this is due to the executive office at WBC having a significantly higher (more generative) response than the other departments, with a majority of its responses above the median.

### 13.7.2 Shared Mental Model: Results

The second element of the questionnaire was the organisation-specific instrument (the *MMQ-SPP*) looking at *WBC*'s 'service planning process'. Again item results are described, as is an exploratory factor analysis of the instrument. As this instrument was constructed for this single use only, no pre-supposed structure exists, and consequently no consideration is given to any hypothetical structure, nor is any made in respect of its construct and concurrent validity.

#### 13.7.2.1 Shared Mental Model: Item Results

Table 13.12 includes item results for the *MMQ-SPP*, and incorporates frequency, mean and standard deviations for all 26 items in the order they appeared in the questionnaire. Twelve items from the *MMQ-SPP* were reversed in order to reduce the potential effects of respondent bias (highlighted with an asterisk, e.g. q2.2\*). These items represent the opposite view to that expressed in the shared mental model, and their recognition is demonstrated by disagreement rather than agreement.

Item frequencies (Table 13.12) show that the majority of the *MMQ-SPP* items have distributions which are close to normal. No positively phrased items show significantly high levels of disagreement, and no reversed statements show evidence of a strong 'agree' response. However, six items do stand out in terms of the strength of their response. Five of these are positively phrased: (q2.7; q2.8; q2.9; q2.15; q2.25), and have values for 'agree' over 50%, and 12% and over for 'strongly agree'. The other (q2.3) is phrased negatively and has 64% of the sample responding 'disagree', and 13% 'strongly disagree'. No other items showed aggregate results for 'agree' or 'disagree' over 50%. Item means broadly confirm this pattern: 17 items have means between 2.50 and 3.50, with the same five positively phrased items showing more positive responses (means >3.50). However, the means show more reversed items with responses bias towards 'disagree': items q2.3; q2.6; q2.13; and q2.26 having means in the range 2.12-2.33.

#### 13.7.2.2 Shared Mental Model: Exploratory Factor Analysis

Exploratory factor analysis (principal components analysis of items) was undertaken in order to examine the latent structure of the shared mental model items. The initial

unrotated solution produced seven factors with eigenvalues over one, explaining 66.7% of the variance (Table 13.13). The scree plot, was inconclusive, suggesting two or three factor solutions, explaining 41.9% and 47.9% of the variance respectively.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q2.1	The service planning process has simplified the council's structure.	5	29	16	35	15	2.74	1.18
q2.2*	Service planning has not helped improve the council's effectiveness.	11	21	30	32	6	2.99	1.10
q2.3*	Restructuring the council into service units has not led to changes in working practices.	2	12	9	64	13	2.25	0.89
q2.4	The service planning process has improved communications throughout the council.	4	31	28	29	8	2.96	1.05
q2.5*	Service planning has not helped the council create of mechanisms for performance management.	1	18	42	35	4	2.78	0.81
q2.6*	The service planning process does not requires commitment from all those involved in the process.	0	11	18	43	28	2.12	0.24
q2.7	Service plans result in the development of clear aims and objectives for service units.	17	54	23	4	2	3.80	0.84
q2.8	Commitment to the service planning process relies, in part, on the feedback provided by service units to the council.	10	70	16	2	2	3.84	0.69
q2.9	The service planning process has required the council to draw up mission statements/ key principles/ position statements.	22	65	7	6	0	4.03	0.74
q2.10	Commitment to service planning is demonstrated by the uptake of mission statements/ key principles/ position statements.	11	49	23	13	4	3.50	0.98
q2.11*	The service planning process has not resulted in a higher quality of service provision.	10	23	32	28	7	3.01	1.10
q2.12	The service planning process has led to performance reviews which help to maximise efficiency.	3	33	44	15	5	3.13	0.89
q2.13*	The service planning process does not require support from everyone throughout the council.	0	12	15	48	25	2.13	0.93
q2.14	Service planning has created shared resources which give the council the flexibility it requires to meet needs.	4	13	42	26	15	2.64	1.01
q2.15	A key part of the service planning process is the monitoring and evaluation of targets.	20	68	11	1	0	4.07	0.58
q2.16*	Creation of a shared purpose within the council is not a key element of the service planning process.	1	12	37	40	10	2.52	0.87
q2.17	The service planning process is 'owned' by all members of the council.	7	24	43	23	3	3.10	0.93
q2.18	Important principles (such as openness and honesty) are recognised by everyone in the service planning process.	4	26	31	32	7	2.87	1.00
q2.19*	The service planning process does not require all the interested parties (both within and beyond the council) to be consulted about a particular issue.	2	20	27	44	7	2.63	0.95
q2.20*	The service planning process has not made the council more responsive to change.	5	11	34	38	12	2.61	1.02
q2.21	In terms of its outcomes, the benefits of the service planning process outweigh any problems or difficulties.	10	34	38	15	3	3.33	0.94
q2.22	One of the key benefits of the service planning process is that it has fostered learning throughout the council.	10	39	33	15	3	3.38	0.95
q2.23*	Service planning has not improved my own working environment.	6	22	25	36	11	2.77	1.11
q2.24*	Politics within the council have not had a significant influence on the service planning process.	4	20	50	16	10	2.90	0.95
q2.25	Service planning is aimed at ensuring the council maximises benefits for all members of the community.	15	54	25	5	1	3.77	0.81
q2.26*	Pressure to provide 'Best Value' is not an important driver of the service planning process.	4	6	27	44	19	2.33	0.98

**Table 13.12 MMQ-SPP Item Summaries (%; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; \* = item reversed; sd = standard deviation; n=112)**



<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	8.79	33.81	33.81
2	2.10	8.08	41.89
3	1.57	6.05	47.94
4	1.38	5.29	53.23
5	1.29	4.97	58.20
6	1.17	4.51	62.71
7	1.03	3.98	66.69

**Table 13.13: MMQ-SPP Initial Unrotated Solution (7 factors)**

In line with the approach adopted for the *OILLs-1*, (following Tabachnick and Fidell 1996: 673) the decision was made to extract and examine both the two and three factor solutions. Rotation to simple structure using orthogonal (varimax) rotation was undertaken for both solutions. Detailed examination of the alternative solutions suggested that the two factor solution provided the most powerful explanation of the data and is summarised in Table 13.14. Factor 1 has an eigenvalue of 6.90, Factor 2 one of 3.99, and between them they account for 41.9% of the variance in the data-set.

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	6.90	26.53	26.53
2	3.99	15.36	41.89

**Table 13.14: MMQ-SPP Two factor Solution Following Varimax Rotation**

Table 13.15 contains the two factor solution for the *MMQ-SPP* following orthogonal (varimax) rotation, 0.32 was taken as the criterion of salient loading (Tabachnick and Fidell 1996: 677), values of 0.32 and above are therefore shown in bold. There were two items which failed to load significantly on either factor (q2.17; q2.24). There were also two items which loaded significantly on both factors (q2.20; q2.22). All the other items loaded singly. There was also no inconsistency in loadings on either factor, with the sign ('+/-') of factors' loadings being consistent with their original phrasings.

Excluding the two items identified as problematic by loading on both factors, Factor 1 (Table 13.15) comprises 11 items. Seven of these were constructed in their positive form, the remainder were reversed and have negative loadings. Examining these items in detail, they all appear to be concerned with the results or outcomes of the service planning process, and as a result this factor was labelled 'service planning outcomes'.

<i>Q. No.</i>	<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
q2.1	The service planning process has simplified the council's structure.	<b>0.66</b>	-0.01
q2.2*	Service planning has not helped improve the council's effectiveness.	<b>-0.78</b>	0.05
q2.3*	Restructuring the council into service units has not led to changes in working practices.	-0.29	<b>0.34</b>
q2.4	The service planning process has improved communications throughout the council.	<b>0.75</b>	-0.31
q2.5*	Service planning has not helped the council create of mechanisms for performance management.	<b>-0.67</b>	0.19
q2.6*	The service planning process does not requires commitment from all those involved in the process.	-0.22	<b>0.63</b>
q2.7	Service plans result in the development of clear aims and objectives for service units.	<b>0.66</b>	-0.26
q2.8	Commitment to the service planning process relies, in part, on the feedback provided by service units to the council.	0.30	<b>-0.52</b>
q2.9	The service planning process has required the council to draw up mission statements/ key principles/ position statements.	-0.06	<b>-0.50</b>
q2.10	Commitment to service planning is demonstrated by the uptake of mission statements/ key principles/ position statements.	0.21	<b>-0.44</b>
q2.11*	The service planning process has not resulted in a higher quality of service provision.	<b>-0.81</b>	0.15
q2.12	The service planning process has led to performance reviews which help to maximise efficiency.	<b>0.65</b>	-0.19
q2.13*	The service planning process does not require support from everyone throughout the council.	-0.07	<b>0.70</b>
q2.14	Service planning has created shared resources which give the council the flexibility it requires to meet needs.	<b>0.62</b>	-0.16
q2.15	A key part of the service planning process is the monitoring and evaluation of targets.	0.26	<b>-0.35</b>
q2.16*	Creation of a shared purpose within the council is not a key element of the service planning process.	-0.16	<b>0.72</b>
q2.17	The service planning process is 'owned' by all members of the council.	0.25	-0.15
q2.18	Important principles (such as openness and honesty) are recognised by everyone in the service planning process.	<b>0.70</b>	-0.18
q2.19*	The service planning process does not require all the interested parties (both within and beyond the council) to be consulted about a particular issue.	-0.07	<b>0.59</b>
q2.20*	The service planning process has not made the council more responsive to change.	<b>-0.67</b>	<b>0.51</b>
q2.21	In terms of its outcomes, the benefits of the service planning process outweigh any problems or difficulties.	<b>0.74</b>	-0.24
q2.22	One of the key benefits of the service planning process is that it has fostered learning throughout the council.	<b>0.66</b>	<b>-0.34</b>
q2.23*	Service planning has not improved my own working environment.	<b>-0.63</b>	0.20
q2.24*	Politics within the council have not had a significant influence on the service planning process.	0.21	-0.19
q2.25	Service planning is aimed at ensuring the council maximises benefits for all members of the community.	0.21	<b>-0.42</b>
q2.26*	Pressure to provide 'Best Value' is not an important driver of the service planning process.	0.29	<b>0.48</b>

**Table 13.15: MMQ-SPP: factor loadings (loadings of 0.32 and over in bold; \* = item reversed)**

Factor 2 is also made up of 11 items (table 13.15; excluding those items which load on both). Here five were items which were framed positively, whilst six were items whose meaning was reversed. Examination of this set of items suggested that they may be representative of a different element of the shared model, namely the extent to which there is commitment to, participation in and support for the service planning process in *WBC*. This factor was labelled ‘service planning commitment’.

### 13.7.2.3 Shared Mental Model: Descriptive Statistics

Results for the *MMQ-SPP* in Table 13.16 are split according to the two categories which emerged from the exploratory factor analysis, labelled as representing service planning outcomes and commitment. Scores for these scales were obtained by reversing the scoring for any negatively phrased items they contained, summing and dividing by 11. This results in a score between 1 and 5, with the larger the score, the greater that individual’s assimilation of that aspect of the shared mental model. The results obtained suggest that overall, assimilation of the mental model in terms of commitment is higher (mean = 3.75; median = 3.77) than in terms of outcomes (mean = 3.08; median = 3.18). Confirmed by a paired sample t-test, which indicates that assimilation of commitment in and outcomes from the service planning process across *WBC* are significantly different at the 99.9% level ( $t = -11.366$ ,  $df = 111$ ,  $p < 0.001$ ). These two variables are also significantly correlated ( $r = 0.51$ ,  $p < 0.001$ ), suggesting that attitudes in respect of commitment and outcomes are linked. Both these scales exhibit acceptable levels of internal (scale) reliability ( $\alpha > 0.7$ ), as would be expected given that this structure is derived directly from the exploratory factor analysis, and their histograms reveal them both to be approximately normally distributed. Examination of ‘item-total correlation’ and ‘alpha if item deleted’ results did not indicate that these could be further improved through the removal of items from either scale.

	<i>Mean</i>	<i>sd</i>	<i>a</i>	<i>Median</i>	<i>Range</i>
Service Planning Outcomes	3.08	0.73	0.91	3.18	1.09-5.00
Service Planning Commitment	3.75	0.48	0.78	3.77	2.36-5.00

**Table 13.16: *MMQ-SPP* Descriptive Statistics ( $n=112$ )**

#### 13.7.2.4 Shared Mental Model: Respondents Comments

The *MMQ-SPP* instrument also contained an open question: ‘If you would like to make any further comments about the service planning process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.’ Nine individuals (8% of the respondents) responded. Five gave further explanation or justification for responses to certain questions. For example: “*In terms of question 11 (The service planning process has not resulted in a higher quality of service provision) - this has yet to be measured/ time is needed.*” The others made reference to particular aspects of the service planning process in more detail. These were: communication; staff attitudes and a lack of definition in terms; the relationship between service planning at the strategic level and the operational level; and the benefits and dangers of the service planning process. A full record of the comments made is included in Appendix S.

#### 13.7.3 Cognitive Style : Results

As it has demonstrated both construct validity through confirmatory factor analysis and correlational studies (Allinson and Hayes 1996), and temporal stability through test-re-test reliability (Allinson and Hayes 1996; Armstrong, Allinson and Hayes 1997; Sadler-Smith, Spicer and Tsang 1999), no item analysis or factor analysis for the *CSI* is presented here. Its results have already been considered above in relation to the construct validity of the *OILLs-1* and will be further used in the regression analysis presented below.

### 13.8 WBC MULTIPLE REGRESSION ANALYSIS

Multiple regression aims to assess the total proportion of variance in a dependent variable (DV) which can be explained by a set of independent variables (IVs) (Tabachnick and Fidell 1996; Sapsford and Jupp 1996). Regression looks for the best fitting linear model that predicts the observed data, based upon minimising the sum of squared errors between predicted and observed variables. It is classically expressed as an equation:

$$Y' = A + B_1X_1 + B_2X_2 + \dots + B_kX_k$$

where  $Y'$  is the predicted value on the DV,  $A$  is the  $Y$  intercept (the value of  $Y$  when all the  $X$  values, i.e. IVs are zero), the  $X$ s represent the various IVs (of which there are  $k$ ), and  $B$ s are the unstandardised regression coefficients assigned to each of the IVs during regression

(representing the slope of the regression line for each IV). The key output of regression is therefore a set of  $B$  values for the IVs, which minimise the sum of squared deviations between predicted and obtained  $Y$  values and optimise the correlation between predicted and obtained  $Y$  values for the data set (Tabachnick and Fidell 1996). Also reported are the standardised regression coefficients ( $\beta$ ) which give the regression coefficient that would apply if IVs were standardised (and identifies the relative rather than absolute slope of the regression line for each IV). The predictive power of the regression model is identified through  $R$ , the multiple correlation between the obtained and predicted  $Y$  values, and  $R^2$ , the squared multiple correlation, which represents the proportion of sum of squares for regression in the total sum of squares for  $Y$  (in effect the percentage of variance in the DV explained by the model).

Regression is used here as an exploratory rather than predictive tool in order to assess objectively the degree and character of the relationships between mental model assimilation and the other variables identified, and in particular identify the importance of the IVs in explaining mental model assimilation as well as explore the nature of the relationships amongst the IVs as predictors of the mental model variables. As mental model assimilation is treated here as the DV, two regression models have been produced, one for service planning commitment and one for outcomes.

In order to undertake the analyses and ensure that the regression model's assumptions are not violated, some transformation and adaptation of the variables has been undertaken. Variables identified for inclusion in the regression model are mental model assimilation (service planning commitment and outcomes) as DVs, and organisational learning, individual learning, cognitive style ( $CSI$ ), age, length of service, gender, job level and department as IVs. Mental model assimilation, organisational learning, individual learning, cognitive style ( $CSI$ ), gender and age have all been used in the form described above. Length of service has been used in its un-aggregated form (giving each respondents' actual length of service in years). Job level has been aggregated to two levels representing managers (including professional specialists) or staff, and department into two levels representing the 'executive office' or the rest. The department variable was created in recognition of its effect on organisational learning, and because chi-squared comparison of medians for service planning outcomes identifies a similar effect ( $\chi^2 = 17.077$ ,  $df = 4$ ,  $p < 0.01$ ), no influence was observed for service planning commitment.

Not all these variables represent ratio or interval data (for which regression is designed), however Sapsford and Jupp (1996) and Cramer (1994) follow Lord (1953) in suggesting that regression can also (for essentially pragmatic reasons) be undertaken with ordinal variables. Additionally, it should be recognised that gender, job level and department all represent dichotomous dummy variables, the latter two having been aggregated in this way to allow their inclusion in the regression model. (Griffiths, Hill and Judge 1993). Means and standard deviations for the revised variables used in the regression are included in Table 13.17. Means for dichotomous variables represent the ratio of cases which have been coded thus: gender as 1 = male, 2 = female; job level as 1 = managers, 2 = staff; department as 1 = executive office, 2 = the 'rest'. Mean for age is based on values identified for each of the categories included in Table 13.1 (1 = <31; 2 = 31-40; 3 = 41-50; 4 = 51-60; 5 = >60).

	<i>Mean (Ratio)</i>	<i>Sd</i>
<i>SPP-Commitment</i>	3.78	0.45
<i>SPP-Outcomes</i>	3.13	0.70
Organisational Learning	3.23	0.54
Individual Learning	3.65	0.46
CSI	44.76	12.21
Length of Service	9.73	6.49
Gender	1.47	0.50
Age	2.20	0.99
Job Level	1.53	0.50
Department	1.88	0.32

**Table 13.17 WBC Regression Variables: Descriptive Statistics ( $n = 98$ )**

Following the changes to the variables described above, and the removal of missing cases, eight IVs and 98 cases have been identified. This means that the sample size is appropriate for testing the multiple correlation ( $n \geq 50 + 8\text{IVs}$ ), but not for testing the individual predictors ( $n \geq 104 + \text{IVs}$ ) (Tabachnick and Fidell 1996: 132). It is, however acceptable according to less stringent requirements, for example Biddle (1995) suggests a ratio of 20:1 (cases to IVs), and Tabachnick and Fidell (1989) have suggested elsewhere that a bare minimum is five cases for each IV. As the purpose here is explanation rather than prediction, the decision was taken to proceed with the analyses.

Correlations (Pearson's product moment) between the DVs and IVs are summarised in Table 13.18. From these it can be seen that there are highly significant relationships between organisational learning and both service planning outcomes and service planning commitment ( $r = 0.61$  and  $0.45$  respectively,  $p < 0.001$ ). These indicate that the greater the propensity for generative learning in the organisation, the higher that individual's assimilation of the shared mental model. Both DVs are also correlated with the department variable ( $r = -0.28$ ,  $p < 0.01$  for commitment, and  $r = -0.38$ ,  $p < 0.001$  for outcomes), indicating that attitudes in respect of both aspects of the mental model are more positive in the chief executive's office, compared with the rest of the organisation. Significant correlation is also observed between individual learning and service planning outcomes ( $r = 0.23$ ,  $p > 0.05$ ), suggesting that the greater an individual's propensity for generative learning, the higher their assimilation of the service planning outcomes. In terms of the DVs, no other significant correlations were observed.

	Organisational Learning	Individual Learning	CSI	Length of Service	Gender	Age	Job Level	Department
SP-Commitment	0.50***	0.11	0.16	0.13	0.11	-0.03	-0.02	-0.28**
SP-Outcomes	0.63***	0.21*	-0.06	0.00	-0.05	-0.04	-0.10	-0.38***
Organisational Learning		0.23*	0.05	0.02	-0.04	0.17	-0.08	-0.38***
Individual Learning			-0.47***	-0.08	-0.26**	-0.11	-0.48***	-0.10
CSI				0.05	0.28**	-0.16	0.25**	-0.02
Length of Service					-0.01	0.34***	-0.16	-0.24**
Gender						-0.18*	0.43***	0.10
Age							-0.26	-0.10
Job Level								0.02*

**Table 13.18: WBC Regression Variables: Zero Order Correlations ( $n = 98$ ; \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$ )**

Prior to the regression analyses, screening of the data was undertaken. Examination of the scatterplots of DVs and the IVs did not suggest the existence of any marked skewness, heteroscedascity, and no significant violations of the assumptions of normality and linearity were identified, nor were any significant outliers (Wright 1997; Tabachnick and Fidell 1996). Examination of correlations (Table 13.18) does not suggest any problems with multicollinearity amongst IVs ( $r < 0.9$ ; Tabachnick and Fidell 1996: 86; Tacq 1997).

<i>Variables</i>	<i>SP-Commitment</i>		<i>SP-Outcomes</i>	
	<i>B</i>	$\beta$	<i>B</i>	$\beta$
Organisational Learning	0.394 <sup>#</sup>	0.47	0.767 <sup>#</sup>	0.60
Individual Learning	0.009	0.09	-0.031	-0.02
Cognitive Style	0.000	0.12	-0.001	-0.12
Length of Service	0.001	0.15	0.007	0.01
Gender	0.106	0.12	0.029	0.02
Age	-0.007	-0.15	-0.133 <sup>#</sup>	-0.19
Job Level	-0.002	-0.03	-0.116	-0.08
Department	-0.111	-0.08	-0.376 <sup>#</sup>	-0.18
Intercept =	2.150 <sup>#</sup>		2.233 <sup>#</sup>	
	$R^2 = 0.33$		$R^2 = 0.46$	
	Adjusted $R^2 = 0.26$		Adjusted $R^2 = 0.41$	
	$R = 0.57^{***}$		$R = 0.68^{***}$	

**Table 13.19: WBC Standard Multiple Regressions: Service Planning Commitment and Outcomes ( $n = 98$ ; <sup>#</sup> =  $p < 0.1$ ; \*\*\* =  $p < 0.001$ )**

Standard (simultaneous) regression was chosen over the alternative (stepwise) methods available as it allows the researcher to retain control over the inclusion and exclusion of variables in the model, whereas with stepwise regression, these decision are made by the computer on the basis of an (arbitrary) statistical measure. Additionally, the computer may not find the best combination of variables, its output can be difficult to interpret (Wright 1997; Cramer 1994), and Tabachnick and Fidell (1996) suggest that standard multiple regression is the method of choice for exploratory research of this type.

Unstandardised regression coefficients ( $B$ ) and intercepts, the standardised regression coefficients ( $\beta$ ), and  $R$ ,  $R^2$  and adjusted  $R^2$  for both models are shown in Table 13.19. Following these analyses, examination of the residual and partial regression plots confirmed that no significant violations of the assumptions of the regression model were evident. Equally, examination of the collinearity diagnostics showed that multicollinearity was unlikely to be evident (Tabachnick and Fidell 1996: 104), and the Malhalanobis Distance ( $p=0.001$ ; Tabachnick and Fidell 1996: 178), Cook's Distance ( $<1$ ; Tabachnick and Fidell 1996: 134; Wright 1997:107), and studentised residuals ( $>2$ ; Wright 1997: 107) criteria were used to confirm that no multivariate outliers and hence no cases with a



disproportionate influence were evident in the models. In both models  $R$  for the regressions was significantly different from zero:  $F = 5.36$ ,  $df = 8, 89$ ,  $p < 0.001$  for service planning commitment; and  $F = 9.45$ ,  $df = 8, 89$ ,  $p < 0.001$  for service planning outcomes. These models explain 33% (26% adjusted), and 46% (41% adjusted) of the variability in their DVs respectively. However, in the service planning commitment model, the only IV which contributed significantly to the explanation of mental model assimilation was organisational learning, and in the service planning outcomes regression, only three of the eight IVs (organisational learning, age and department) were identified as contributing significantly to the explanation observed, even at the 90% level (Table 13.19). Consequently, in line with the strategy suggested by Wright (1997), these regressions have been re-run with more parsimonious models (incorporating only those IVs identified as significant above). The 90% confidence limit ( $p < 0.1$ ) is used to select variables here in an attempt to maximise the explanation observed (in fact no decrease in explanation is obtained at the 0.05 level, as all those variables identified as significant at the 0.1 level above are also significant at the 0.05 level) and in recognition of the exploratory nature of this research. The output from these revised models is summarised in Table 13.20.

<i>Variables</i>	<i>SP-Commitment</i>		<i>SP-Outcomes</i>		
	<i>B</i>	$\beta$	<i>B</i>	$\beta$	$sr^2$
Organisational Learning	0.395**	0.46	0.752***	0.59	0.29
Age	-	-	-0.108*	-0.15	0.02
Department	-	-	-0.375*	-0.18	0.03
Intercept =	2.477***		1.670**		
	$R^2 = 0.21$		$R^2 = 0.45$		
	Adjusted $R^2 = 0.20$		Adjusted $R^2 = 0.43$		
	$R = 0.46***$		$R = 0.67***$		

**Table 13.20: WBC Revised Standard Multiple Regressions: Service Planning Commitment and Outcomes ( $n = 98$ ; \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$ )**

As would be expected, in both revised models  $R$  for the regressions was significantly different from zero, ( $F = 29.39$ ,  $df = 1, 110$ ,  $p < 0.001$  for service planning commitment; and  $F = 25.84$ ,  $df = 3, 96$ ,  $p < 0.001$  for service planning outcomes). The increases in  $F$  suggest that the new models are more robust predictors of the mental model

variables. 21% (20% adjusted) of the variation in service planning commitment assimilation is explained by its revised model which includes only organisational learning as an IV (Table 13.20). For service planning outcomes, the revised model, incorporating three significant IVs, explains 45% of the variance (43% adjusted) (Table 13.20). Also included in Table 13.20 for service planning outcomes are the semi-partial correlations ( $sr^2$ ) for the IVs incorporated in the model. From these it can be seen that organisational learning contributes the majority of the explanation of shared variation ( $sr^2 = 0.29$ ), whilst the contributions of the other two IVs (age and department) is much smaller ( $sr^2 = 0.02$  and  $0.03$  respectively). Residual variability ( $sr^2 = 0.11$ ) is explained by the IVs together.

Results for the regressions suggest organisational learning has a major role in explaining variance in mental model assimilation in terms of both commitment and outcomes, although it must be remembered that the relationships observed do not necessarily imply causation (Wright 1997). Indeed, for service planning commitment, organisational learning was the only IV the model identified as significant, this is despite the fact that department also correlates significantly with service planning commitment ( $r = -0.28$ ,  $p > 0.01$ ). This suggests that the relationship between department and service planning commitment is mediated by the relationship between organisational learning and service planning commitment. For service planning outcomes, department (i.e. the effect of the chief executive's office compared with the rest) is identified as having a significant contribution to the explanation of observed variability (Table 13.20), but individual learning is not. This was identified as being significantly correlated with service planning outcomes above. Here it appears that the combined explanation provided by organisational learning, department and the third IV identified as significant, age is mediating upon the relationship between individual learning and service planning outcomes.

### 13.9 *WBC* RESPONDENTS COMMENTS

The questionnaire concluded with an open question: 'Finally, if you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.' 12 individuals chose to respond to this item (11% of the sample), and a full record of these responses is included in Appendix S. The majority of these comments (7 of the 12) were directed at some detailed aspect of the questionnaire, other respondents commented on aspects of *WBC*. For example, one was

concerned that there was a “...*lack of respect within the authority which is divisive and on an individual level - reduces my self esteem and the confidence required to get on and improve the function of the business in which I work.*” This individual went on to question whether others in the organisation feel the same way. Other respondents were more concerned with the service planning process itself, one offering opinions that “...*the organisation is not customer client orientated...(and)...in danger of accepting every new management technique*”, whilst another highlighted that “*the service planning process has yet to demonstrate its true worth. A strong effective Executive Core demonstrating leadership and real commitment to the underlying principles of the Service Planning Process is vital to ensure a corporate sense of direction.*” A third respondent drew attention to staff attitudes in respect of the service planning process: “*In view of the Service Planning Process...the staff did wish to be involved in planning and “owning” the business service plan and all are taking a very proactive role in this respect.*”

### 13.10 WBC SURVEY DISCUSSION

The responses to the questionnaire have been analysed above and the results generated identify a number of issues. These are discussed below, beginning with an assessment of the three instruments (*OILLs-1*; *MMQ-SPP*; *CSI*) included in the questionnaire, before considering the relationships observed between the variables obtained.

*CSI* results are in line with those previously published (Allinson and Hayes 1996), and suggest that the distribution of cognitive styles in *WBC* is as might be expected.

The results from the *MMQ-SPP* show relatively high assimilation of the shared mental model identified at the senior management level (Chapter Ten) across *WBC* (Table 13.13). Within this, however there is some variation, and two elements were identified within the shared mental model (service planning commitment and outcomes) through exploratory factor analysis. Whilst care must be taken not to apply too much meaning to the elements identified through this factor analysis, these do appear to represent different (but linked) aspects of attitudes in respect of the service planning process across *WBC*. The significance of this difference is confirmed by the paired sample t-test undertaken on the means in respect of the commitment (3.75), and outcomes (3.08) aspects of the shared mental model, whilst their link is confirmed by the fact that service planning commitment and outcomes are significantly correlated with each other ( $r = 0.51$ ;  $p < 0.001$ ), exhibiting

some 26.0% in shared variation. This all suggests that the assimilation of the shared mental model is not as straightforward as may be supposed, and that even within the (relatively) simple issue focused upon here, differing aspects and attitudes can be identified. These are evidenced through the differential assimilation of the aspects identified. The results suggest that, amongst the respondents, there is significantly more commitment to, or at least understanding of the need for commitment to the service planning process, than there is recognition of its outcomes. This differentiation was also identified in the respondents comments, for example: *“The service planning process has yet to demonstrate its true worth”*, and *“I agree with the ideals & principles of the S.P. (service planning) process. However, I don’t think our performance has been monitored or considered by members”* (Appendix S). The second comment suggests one possible explanation for this difference, in that this respondent feels that whilst he/she has committed to the service planning process, the success or failure of his/her performance (i.e. outcomes) is neither recognised nor seen as important by those above him/her in WBC, consequently they identify less with the outcomes. Nevertheless, the fact that scores for commitment and outcomes are significantly and positively correlated suggests that despite the differences evident between the aspects of the shared mental model identified, there is an underlying fundamental dimension to assimilation, with individuals who report higher levels of commitment tending to also report higher recognition of the outcomes of the service planning process.

Results for the *OILLs-1* are also encouraging, suggesting that this provides an appraisal of learning in line with its design, providing an assessment of attitudes in respect of the extent of learning (on a bipolar generative-adaptive scale), at both the individual and organisational levels, evidenced in terms of workplace behaviour. Item ( $\alpha$  if item deleted and item total correlations) and exploratory factor analyses broadly confirm this structure, despite identifying a number of problematic and/or redundant items which will be dropped in subsequent developments of this instrument. These results suggest that the *OILLs-1* has a degree of internal consistency, and some construct validity (Oppenheim 1992; Hinkin 1995). Correlations between individual learning and organisation learning and cognitive style (as measured by the *CSI*) were also obtained as evidence of construct validity. Individual learning correlates significantly with cognitive style ( $r = -0.40$ ;  $p < 0.001$ ), with generative learners tending to exhibit an intuitive cognitive style, and individual learners who are more adaptive reporting their style as more analytical, this suggests that a logical link can be made between the behavioural measure of learning and the cognitive

assessment of style that points towards construct validity. No significant relationship was observed for organisational learning, and no support for its construct validity can be made. This lack of a relationship, may however result from the fact that cognitive style is an individual characteristic, for which a link with an organisational scale is unlikely.

Concurrent validity was also assessed for the *OILLs*-1, on the basis of the ability of the organisational and individual learning scales to differentiate between respondent groups. Results for this are somewhat mixed, the significant effects of job level alone, and of job level and length of service, and of gender and age on individual learning identified through *n*-way Anova (Table 13.9), and the effect of department on organisational learning identified through chi-squared comparison of medians, all suggest a degree on concurrent validity, but the fact that differences are not more widely identified indicates that support for this must be considered as limited. These significant effects are identified below.

The main effect of job-level on individual learning (Table 13.9) results from *WBC*'s managers seeing themselves as more generative compared to the staff. This may be expected, as a managers role is likely to require them to act and behave in a generative manner, whilst staff are typically more directed in their work and as a result are likely to be required to work more adaptively. It may also represent the difference in the locus of control for their learning with managers more able to chose were and how they learn, and staff being more directed in their learning. This effect is however mitigated by length of service, with the differential between staff and mangers being marked for longer serving (>6 years) respondents (Figure 13.2). One possible explanation for this is that length of service is acting as a proxy for a more finite assessment of job-level. Longer serving staff will have been in their role long enough to fully understand their environment. Consequently, they are likely to have obtained and developed appropriate patterns of working, and as a result maintain these through adaptive learning. These individuals are likely to require generative learning less frequently that newer members of staff who do not fully understand their environment and are still learning their roles. For managers, the longer serving individuals are likely to be more senior, and as a result more likely to be required to work and think generatively, than shorter serving (less senior) managers who have a greater operational aspect in their roles which would require an adaptive approach.

The significant differences for age and gender on individual learning occur for the older (>40 years) individuals in the sample, with men being more generative in their approaches to work than women at this level (Figure 13.1). This split could result from

similar reasons to those identified above for length of service and job level on individual learning. *WBC* is a typical British organisation, and it is likely that the majority of the older managers will be male and, being older they are more likely to be long-serving, plus the majority of the older members of staff will be female (given the survey focused on the central office staff at *WBC*) and equally long-serving. Equally, these differences are less evident with younger members of *WBC*, where such gender differentials are less likely.

The significant effect of department on organisational learning occurs because the executive office have a more positive attitude than the other departments in the sample. It is likely that this differential response has occurred because, whilst attitudes to this variable are relatively low across the organisation as a whole (the fact that organisational learning scores are lower than individual learning scores was identified above), they are going to be higher in the executive office, where the prime need for, and hence recognition of generative learning across the organisation as a whole is likely to occur.

Looking at the *OILLs-1* scales themselves (Table 13.8), despite both representing broadly generative approaches to learning across *WBC*, and indeed are correlated, ( $r = 0.23$ ;  $p < 0.05$ ), scores for individual learning (mean = 3.65) are higher than for organisational learning (mean = 3.21) (confirmed through a paired sample t-test). The significant difference in means observed between these scales, suggests that across *WBC*, in their attitudes to their workplace behaviour, individuals see themselves as more generative in their approaches than the organisation is as a whole. Explanation for this is unclear, and care must be taken if inferences are to be made from it. The pattern observed may be a result of respondents' natural desire to see themselves as independent of rather than subordinate to their organisation, but with those individuals who see themselves as more generative learners also being prepared to see the organisation as more generative, hence the correlations observed. There is also a suggestion in one respondent's comments (Appendix S) that they feel remote from *WBC*, and may have replied differently if they were responding in respect of their service unit. This appears to suggest that the assertion made in the literature review that the identification of levels in an organisation is fraught with difficulty is indeed true. It is also possible that the positive response obtained is indicative of some bias, possibly indicating social desirability in responses or perhaps resulting from the lack of a second mailing.

In relationships between the mental model assimilation and other variables (Table 13.18), significant correlations were found between organisational learning and both

shared mental model scales ( $r = 0.50$ ,  $p < 0.001$  for commitment;  $r = 0.63$ ,  $p < 0.001$  for outcomes) and between individual learning and service planning outcomes ( $r = 0.21$ ,  $p < 0.05$ ). Department (chief executives office versus other departments) was also correlated with both mental model commitment ( $r = -0.28$ ,  $p < 0.01$ ), and outcomes ( $r = -0.38$ ,  $p < 0.001$ ). No other significant correlations were observed.

The size of the significant correlations between organisational learning and the two measures of mental model assimilation suggests a strong relationship between these variables (variance explained is 25.0% for commitment, and 39.7% for outcomes), as does the contribution of organisational learning to the regression models produced (20.0% for commitment and 29.0% for outcomes; Table 13.20). This all points to a link between the extent of shared mental model assimilation, and attitudes in respect of organisational learning. This pattern follows that supposed, with an individual who exhibits a more generative organisational learning exhibiting higher assimilation of the mental model (and vice versa). However, further examination of this data does raise some questions.

The strength of the relationship observed between organisational learning and outcomes is higher than that for commitment, this is despite the fact that commitment has been clearly identified above as demonstrating greater assimilation than outcomes. This difference is likely to result from the fact that scores for organisational learning are quantitatively similar to those for service planning outcomes. Care must therefore be taken with the analysis and comparison of these results, as whilst an individual's attitude to organisational learning is linked explicitly to their assimilation of the shared mental model in *WBC*, organisational learning alone does not account for all the variation in mental model assimilation. Differences in attitudes to outcomes compared with commitment that are outside the scope of organisational learning in the terms identified here were identified above, and the results suggest that variables other than organisational learning do contribute to the extent of mental model assimilation. This is demonstrated by the inclusion of age and department in the regression model for service planning outcomes. The differential assimilation in terms of outcomes identified for the executive office at *WBC* which is represented by the department variable in the regression model has already been identified above. Whilst the effect of age here, suggests that the older the respondent, the lower their assimilation of the outcomes aspect of the shared mental model. Reasons for this are unclear, as this is not an effect which has been identified independently in the other tests applied above, and age may be acting as a proxy for other variables in

combination (perhaps length of service and job level). It should also be noted that individual learning was not identified as a significant variable with the service planning outcomes regression, despite the fact these two variables were identified as being significantly correlated (Table 13.19). It is likely that the effect of individual learning is mediated by the strength of organisational learning's influence in this model, and by the effect of age which was identified (with gender) as influencing attitudes in respect of individual learning above. This all demonstrates the complexities evident in the organisation which impact upon the key relationship between organisational learning and mental model assimilation identified here.

The objective of the discussion above was to describe the significant issues and relationships identified from the preceding results and analyses. This output also contributes to evidence in respect of the research hypotheses outlined in Chapter Seven.

### **13.11 *WBC* SURVEY PROBLEMS AND LIMITATIONS**

A number of problems and limitations can be identified within the survey results presented. Firstly, the fact that the *OILLs-1* instrument has been developed from its original form will reduce its comparability with other surveys, both within and external to this research. Equally, the organisational specificity of the mental model issue identified (the service planning process) effectively prevents generalisation and external comparison of the results obtained. Also the fact that evidence in respect of the initial representativeness of this shared mental model is based on its acceptance by senior managers within *WBC* means that its use here must be treated with caution.

The use of attitudinal, and workplace perspectives in respect of learning in particular, also limits the study, as results and relationships are based upon individuals' perceptions of the variables identified rather than their direct observation. Whilst this is a problem which cannot be resolved, as in reality many of the variables identified as important here cannot be observed directly, it should still be recognised. It should also be reiterated that despite the relationships identified above, and the explanations suggested for these, the correlations and statistically significant results observed do not imply causation, and consequently the explanations offered should be viewed as conjectural.

In terms of the survey itself (rather than its contents), it should also be recognised that whilst the response received (at 44.6%) is good it may nevertheless be open to



unknown bias. The lack of a second mailing may itself have resulted in some response bias, potentially indicated in the highly positive response received in respect of individual learning, which may also suggest a degree of social desirability in the responses obtained. The questionnaire also received a limited number of critical comments from respondents (Appendix S), concentrating primarily upon the generalisability of *CSI* statements and the complexity created by the transformation of some *MMQ-SPP* items to represent their opposite point of view. It should also be recognised that the treatment of mental model assimilation as the DV in the regression model may be viewed as contentious, and that this is an issue that will be discussed in the final chapter. Finally, in light of the limitations identified, in recognition of the exploratory nature of this research, and in a desire to ensure separation between this empirical research and consultancy projects looking at the 'learning organisation', no recommendations for *WBC* are included here.

### 13.12 SUMMARY

The outcomes of the survey research undertaken in the second organisation (*Westcountry Borough Council*) have been described above. The questionnaire used contained instruments assessing adaptive/ generative learning at the individual and organisational levels, the extent of assimilation of the shared mental model of the service planning process across *WBC*, and cognitive style. Data on respondent characteristics were also collected. Output from the analyses of these instruments described above indicates that the form of the *OILS-1* instrument adopted exhibits internal consistency and some degree of construct and concurrent validity. Results also suggest a number of important associations, not least of which is a significant statistical relationship between perceptions of organisational learning and extent of mental model assimilation (on two scales representing mental model assimilation in terms of commitment and outcomes). Implications of these results have been discussed above, and their problems and limitations have been outlined. These results also contribute evidence in respect of the research hypotheses, and will be referred to again when these are discussed in Chapter Fifteen.

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## CHAPTER FOURTEEN

# Study 3: Southwest County Council - Phase 2 Questionnaire Survey

### 14.1 INTRODUCTION

Results of the questionnaire survey undertaken in the third organisation (*SWCC*) are considered here. This addressed four key issues: the individual and organisational levels of learning; the learning environment in terms of systems and climate; shared mental model assimilation; and cognitive style. This chapter begins by reiterating the aims of this phase of the research, and by describing the developments undertaken in the survey. Specific details concerning the research methods and questionnaire instruments used, which expand upon Chapter Eight are then described, as are the data collection method and sample used. Results from the questionnaire are then discussed. Responses are analysed at the item and scale levels, and have been used for analysis of the relationships between the variables identified. The output is then discussed, and problems and limitations are outlined.

### 14.2 AIMS

The survey data presented below seeks to investigate the relationships between the shared mental model obtained in Phase One (Chapter Eleven), cognitive style and learning. The results provide evidence in respect of the hypotheses outlined above (Section 7.5.2). The research instrument has undergone some development subsequent to its use in *WBC*. These developments (the details of which are described below) have resulted in a shorter, revised form of the *OILLs*, and the inclusion of two additional, linked measures identifying attitudes to the ‘learning climate’ and ‘learning systems’ evident within an organisation.

### 14.3 METHOD

The content of the research questionnaire is outlined below. This expands upon methods described in Chapter Eight, providing specific details on the questionnaire’s elements.

### 14.3.1 Learning Levels

Information on learning at the individual and organisational levels was collected through the *Organisational and Individual Learning Levels* questionnaire; Version 2 (*OILLs-2*) which assesses propensity for adaptive/generative learning at these levels. This is a revised version of the instrument used in *WBC*, in which those items excluded from the final organisational and individual learning scales used in the *WBC* analysis have been dropped. This results in a shortened questionnaire consisting of six individual adaptive items, six individual generative items, seven organisational adaptive items and nine organisational generative items, 28 items in total. It was expected that the two bipolar dimensions of learning, identified through factor analysis of the *WBC* data would again be evident. A further development was made. Given the propensity for responding positively in respect of those items taken to represent generative learning identified in *WBC*, the decision was taken to reverse a number of generative items in order to mitigate against the effects of respondent bias. Four of the nine organisational generative, and three of the six individual generative items were reversed. This form of the *OILLs-2* is incorporated in Appendix T.

### 14.3.2 Learning Environment - Systems and Climate

Two additional measures of the learning environment were incorporated into the questionnaire, both consisted of three item scales, one indicative of attitudes to the 'learning climate' in the organisation (e.g. The organisation's goals and strategy are made clear to all employees), the other of attitudes in respect of 'learning systems' (e.g. Employees are encouraged and supported in undertaking job-related training and development activities). These measures were taken from an instrument measuring three elements of an 'learning environment' used by Chaston, Badger and Sadler-Smith (1999), the third element has been dropped, as it is concerned with 'learning orientation', and it was felt that this was an aspect of the learning environment already addressed in the *OILLs-2* (there was some overlap between the organisational items of the *OILLs-2* and the 'learning orientation' items). These climate and systems items take a form similar to those of the *OILLs-2*, and to avoid unnecessary complication they have been included on the end of the *OILLs-2* (Appendix T), extending this section to 34 items.

These new measures (learning systems and climate) were included to provide both additional information on the wider learning environment in *SWCC*, and a completer

picture of the operation of learning within this organisation. Together, they are described below as the ‘Learning Environment - Systems and Climate’ questionnaire (*LE-SC*).

### 14.3.3 Shared Mental Model

A *Mental Model Questionnaire of the Budget Setting Process (MMQ-BSP)* was constructed to assess assimilation of the shared mental model derived in Phase One. Again, this was a ‘one-off’ organisation-specific tool. Concepts from the shared model of the budget setting process have been taken and reframed as agree/disagree statements, and boxes around concepts in the shared model (Appendix R) indicate those included in items in the questionnaire. Concepts chosen that were identified on the basis of three criteria: (1) their degree merged; (2) their domain; and (3) their centrality. These three measures are summarised in Table 11.2, with concepts being included in the *MMQ-BSP* question set being marked with an asterisk (\*).

Twenty-six items were derived from the shared mental model, representing 35 concepts. A number of these items were ‘reversed’ so that they represented the opposite viewpoint to that expressed. This was done to reduce the potential for bias from respondents replying to the item set as a whole rather than each item individually (Oppenheim 1992; Garg 1996). Concepts and relationships represented by each item are summarised in Appendix U. These items were reviewed by the individuals who participated in the mapping before being included in the questionnaire (Appendix T).

### 14.3.4 Cognitive Style

Cognitive style was assessed using the *Cognitive Style Index (CSI)* developed by Allinson and Hayes (1996). The format and design of the *CSI* has been covered elsewhere in this thesis (Chapters Three and Eight).

### 14.3.5 Questionnaire Format

The elements described above were combined in a single self-reported questionnaire. Data was also collected on a number of respondents’ characteristics: gender, age, length of service, department, and job level. The final form contained four elements in the order: *OILLs-2* and *LE-SC*; *MMQ-BSP*; *CSI*; and Respondent Characteristics (Appendix T).

## 14.4 PILOT STUDY

A pilot study was undertaken in which the instrument outlined above (Appendix T) and a supporting letter (Appendix H) were sent to a sample of 50 individuals drawn at random from the mailing list provided by *SWCC*. 31 usable response were obtained (62% response rate). Analysis of these responses did not identify any problems, and the questionnaire was consequently applied to the rest of the sample in the form described above (Appendix T).

## 14.5 DATA COLLECTION

The questionnaire (Appendix T), a supporting covering letter, written and signed jointly by the researcher and head of personnel at *SWCC* (Appendix V), and a freepost return envelope were administered by post. No second mailing was made. The questionnaire asked respondents to indicate the extent to which the statements contained applied to themselves, and their organisation as appropriate. Respondents were offered feedback on their cognitive style.

### 14.5.1 *OILLs* and *LE-SC* Test-Re-Test Reliability

The opportunity was also taken to collect test-re-test data on the learning element of the questionnaire within *SWCC*, so that the temporal stability of the *OILLs-2*'s and *LE-SC*'s scales could be assessed. Approximately two months after returns had been received, a sample of 110 individuals was selected at random from those who had requested feedback on their cognitive style and were sent a short 'learning' questionnaire (Appendix W) accompanied by a letter explaining the purpose of this reliability study (Appendix X). 67 usable responses were returned. Details of this exercise are incorporated below.

## 14.6 SAMPLE

A sample of 947 individuals was identified by *SWCC*. This included all the council's departments, excepting social services which was undergoing a reorganisation and opted to be excluded from the research. 399 usable responses were obtained (incomplete questionnaires were excluded from the response set), representing a response rate of 42.1%. Participation was voluntary, and responses remained entirely confidential. 64.4% of the response (257 individuals) requested cognitive style feedback.

The response consisted of 235 (58.9%) males and 164 (41.1%) females, and its characteristics are summarised in Table 14.1. Data on ages and job levels were collected against five point scales (<31 years; 31-40 years; 41-50 years; 51-60 years; >60 years for age, and senior manager; middle manager; first line manager; staff; others - own description for job level). The others category consisted mainly of 'professional specialists' such as in-house solicitors. Individuals were also asked to indicate the number of year they had worked for *SWCC*. This has been aggregated into five groups (<6 years; 6-10 years; 11-15 years; 16-20 years; >20 years). Data was also collected on departments. Eight of which are represented (Chief Executives Office; Education; Information Services; Planning; Personnel; Treasurers; Transportation and Estates; Trading Standards).

		<i>n</i>	<i>Percent</i>
<b>Gender</b>	Male	235	58.9
	Female	164	41.1
<b>Age</b>	<31	50	12.5
	31-40	110	27.6
	41-50	134	33.5
	51-60	98	24.6
	>60	7	1.8
<b>Length of Service</b>	<6	70	17.5
	6-10	126	31.6
	11-15	70	17.5
	16-20	58	14.5
	>20	75	18.9
<b>Job Level</b>	Senior manager	27	6.8
	Middle manager	108	27.1
	First line manager	97	24.3
	Staff	131	32.8
	Others (own description)	36	9.0
<b>Department</b>	Chief Executive Office	9	2.3
	Education	75	18.8
	Information Services	58	14.5
	Planning	40	10.0
	Personnel Services	26	6.5
	Treasurers Department	19	4.8
	Transportation & Estates	160	40.1
	Trading Standards	12	3.0

**Table 14.1: *SWCC* - Characteristics of the Sample (*n* =399)**

## 14.7 SWCC SURVEY RESULTS

Results from the survey are presented and analysed below, beginning with the *OILLs-2*.

### 14.7.1 Learning Levels: Results

Item results from the *OILLs-2* which assesses individuals' attitudes in respect of both their own and their organisation's adaptive and generative learning are presented below. The hypothesised structure of the instrument is also considered, as its scale reliability and inter-item correlations. Results of exploratory factor analysis are presented, and the construct and concurrent validity of this instrument are explored.

#### 14.7.1.1 Learning Levels: Item Results

*OILLs-2* is made up of 28 items: six individual adaptive; six individual generative; seven organisational adaptive and nine organisational generative, summarised in Tables 14.2a-d.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.6	I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	2.5	3.5	8.3	51.4	34.3	1.89	1.06
q1.10	I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	2.8	4.8	9.3	55.6	27.5	2.00	0.90
q1.12	I dislike experimenting with new and novel ways of working.	1.3	5.8	10.8	59.6	22.5	2.04	0.82
q1.22	I rarely need to change my plans once I've made them.	0.3	16.8	17.5	55.9	9.5	2.42	0.89
q1.23	My working practices are fixed and I rarely have any need to change them.	0.5	11.5	11.8	60.2	16.0	2.20	0.86
q1.24	My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	0.8	3.8	12.3	65.9	17.2	2.05	0.72

**Table 14.2a: *OILLs-2* Item Summaries: Individual Adaptive Learning: (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; *n*=399)**

Table 14.2a incorporates item frequencies (percentage of total response for each point on the Likert type scale used), mean scores and standard deviations (*sd*) for the individual adaptive items from the *OILLs-2*. The combined score for disagree and strongly disagree being in excess of 65% for these items. Mean scores are in the range 1.89 to 2.42. These suggest that across *SWCC* individuals propensity for adaptive learning is low.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.3	I am often on the lookout for new ideas from any source.	33.1	48.6	14.5	2.5	1.3	4.10	0.83
q1.9*	I don't really need to improve my working practices in order to increase my efficiency and effectiveness.	2.0	5.8	20.0	59.4	12.8	2.25	0.82
q1.18	I put forward ideas about policy, even if they challenge senior managers' views.	10.5	49.6	29.1	10.0	0.8	3.59	0.84
q1.19*	I seldom try to communicate my decisions and their outcomes throughout the organisation.	0.8	14.0	25.6	46.6	13.0	2.43	0.91
q1.25*	I hardly ever challenge the organisation's mission, values and assumptions.	2.3	19.5	27.3	40.9	10.0	2.63	0.98
q1.27	I regularly experiment with new ways of working.	4.3	36.6	36.3	21.3	1.5	3.21	0.88

**Table 14.2b: OILLs-2 Item Summaries: Individual Generative Learning (%; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; sd = standard deviation; \* = item reversed; n=399)**

Results for the individual generative items, are shown in Table 14.2b. Responses for those item which were positively phrased (q1.3; q1.18; q1.27), are equally positive, with their means all being above 3 (3.21 to 4.10), whilst those items which were reversed (q1.9; q1.19; q1.25) and represent a negative perspective on generative learning were disagreed with and exhibit a negative response (means: 2.25 to 2.63). This pattern is confirmed in the item frequencies, and suggests that in SWCC there is a high propensity for individual generative learning.

<i>Q.No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.1	We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	3.5	22.8	15.5	47.2	11.0	2.61	1.06
q1.4	This organisation's strategy and policy are prescribed by senior managers. No one else can really have a say.	12.0	29.8	20.6	31.6	6.0	3.10	1.15
q1.5	This organisation doesn't encourage or use feedback from employees or customers on how well it works.	8.5	21.4	17.0	44.1	9.0	2.76	1.14
q1.11	This organisation has a limited range of very efficient working practices that it sticks to.	1.3	15.0	39.6	38.3	5.8	2.68	0.84
q1.13	Employees are discouraged from experimenting with new and novel ways of working.	1.5	18.3	32.3	41.9	6.0	2.67	0.89
q1.17	Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	3.0	35.3	30.6	29.3	1.8	3.09	0.91
q1.20	The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	5.0	39.5	29.6	22.6	3.3	3.21	0.96

**Table 14.2c: OILLs-2 Item Summaries: Organisational Adaptive Learning (%; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; sd = standard deviation; n=399)**



Item frequencies for the organisational adaptive items suggest patterns of response which are neutral/ borderline negative, with none of the items showing a response strongly biased towards agree or disagree (Table 14.2c). This pattern is confirmed from the means which are in the range 2.61 to 3.21. This suggest that attitudes in respect of the extent of organisational adaptive learning across *SWCC* are broadly neutral.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.2	As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	10.6	49.9	17.5	19.5	2.5	3.46	1.00
q1.7	This is an open organisation and as much information as possible is made available to employees.	5.1	30.8	26.8	28.3	9.0	2.95	1.07
q1.8*	Risk taking and experimentation is rarely encouraged and rewarded in this organisation.	10.3	34.8	29.3	22.8	2.8	3.27	1.01
q1.14	Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	1.1	18.3	23.3	35.3	13.0	2.59	0.97
q1.15	There is two way communication between employees of all levels about what this organisation's doing and where it's going.	1.6	28.3	23.8	34.8	11.5	2.73	1.04
q1.16*	This organisation tends not to look out for new ideas from suppliers, customers and competitors.	2.5	18.8	30.8	42.1	5.8	2.70	0.92
q1.21*	As an organisation, we tend not to encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	3.8	24.6	18.5	43.1	10.0	2.69	1.07
q1.26	As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	6.3	64.7	16.5	11.5	1.0	3.64	0.81
q1.28*	This organisation tends not to allow its broad strategy to be continuously challenged and re-interpreted.	3.2	39.1	38.6	17.8	1.3	3.25	0.83

**Table 14.2d: *OILLS-2* Item Summaries: Organisational Generative Learning (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; \* = item reversed; *n*=399)**

Item summaries for organisational generative items exhibit a somewhat mixed response (Table 14.4d). Two positively phrased items: q1.2 and q1.26 have means of 3.46 and 3.64 respectively, and their frequencies show relatively high levels of agreement. Two reversed (negative) items (q1.16 and q1.21) show relatively high levels of disagreement in their frequencies and means (2.70 and 2.69 respectively). Both these pairs of responses indicate relatively positive attitudes in respect of organisational generative learning. However, frequencies for the majority of the remaining items suggest a more neutral response, confirmed by their means: four items, two positively phrased (q1.7 and q 1.15) and two reversed (q1.8 and q1.28) have means in the range 2.73 to 3.27. The final item (q1.14) is positively phrased yet exhibits a more negative response (mean = 2.59).

Results for the *OILLs-2* suggest that attitudes in respect of both adaptive and generative learning at the organisational level are broadly neutral, whilst individuals' attitudes to their own learning are more extreme. Responses indicate a strong preference for individual generative learning evidenced in the workplace behaviour, and an equally low propensity for individual adaptive learning.

#### *14.7.1.2 Learning Levels: Hypothesised Structure – Item Analysis*

The form of the *OILLs* questionnaire adopted (Appendix T) was arrived at through the revision of the original instrument following its application in *WBC* (Chapter Thirteen). The hypothesised structure was retained. This means that the 12 individual items and 16 organisational items described above are taken to be representative of two separate bipolar scales, the extremes of which represent adaptive and generative learning respectively, and descriptive statistics for these individual and organisational scales are shown in Table 14.3. In order to obtain the average scores shown, generative items has been treated as positive (with scoring reversed for the negatively phrased items), adaptive items as negative, and these were summed and divided by 12 or 16 as appropriate. This gave, for each scale, a score between 1 and 5, with the higher that score, the greater the propensity for generative learning, and the lower the score, the greater the propensity for adaptive learning.

	<i>Mean</i>	<i>sd</i>	<i><math>\alpha</math></i>	<i>Median</i>	<i>Range</i>
Organisational Learning (hypothesised scale)	3.08	0.62	0.90	3.06	1.38-4.63
Individual Learning (hypothesised scale)	3.75	0.48	0.80	3.75	2.33-4.92

**Table 14.3: *OILLs-2* Descriptive Statistics - Hypothesised Structure**

Internal (scale) reliabilities (Cronbach  $\alpha$ ) for both scales are acceptable (Table 14.3;  $\alpha > 0.7$ ; Guilford 1956); broadly confirmed by the item reliability results (Table 14.4). None of the 'alpha if item deleted' statistics (Cronbach  $\alpha$  if the respective item is removed) suggest the removal of items. For item-total correlations all but one of the scores are acceptable ( $> 0.3$ ; Nunnally 1978; Rust and Golombok 1989). This result suggests that the reliability of the *OILLs-2* would be improved if this item (q1.11) was dropped.

<i>Q. No.</i>	<i>Type</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>	<i>Q. No.</i>	<i>Type</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>
q1.6	Adaptive	0.45	0.78	q1.1	Adaptive	0.56	0.89
q1.10	Adaptive	0.40	0.79	q1.4	Adaptive	0.63	0.89
q1.12	Adaptive	0.45	0.78	q1.5	Adaptive	0.73	0.89
q1.22	Adaptive	0.45	0.78	q1.11	Adaptive	0.24	0.90
q1.23	Adaptive	0.57	0.77	q1.13	Adaptive	0.67	0.89
q1.24	Adaptive	0.52	0.78	q1.17	Adaptive	0.52	0.89
q1.3	Generative	0.38	0.79	q1.20	Adaptive	0.47	0.90
q1.9*	Generative	0.33	0.79	q1.2	Generative	0.60	0.89
q1.18	Generative	0.44	0.78	q1.7	Generative	0.49	0.89
q1.19*	Generative	0.42	0.78	q1.8*	Generative	0.65	0.89
q1.25*	Generative	0.46	0.78	q1.14	Generative	0.63	0.89
q1.27	Generative	0.42	0.78	q1.15	Generative	0.63	0.89
				q1.16*	Generative	0.52	0.89
				q1.21*	Generative	0.63	0.89
				q1.26	Generative	0.44	0.90
				q1.28*	Generative	0.61	0.89

(a): Individual Learning Hypothesised Scale

(b): Organisational Learning Hypothesised Scale

**Table 14.4: *OILLs-2* Reliability Analysis (\* = item reversed)***14.7.1.3 Learning Levels: Exploratory Factor Analysis*

Factor analysis (principal components analysis of items) has been used to further explore the structure of the *OILLs-2*. This statistical technique allows a researcher to examine a set of variables in order to discover whether coherent and (relatively) independent subsets of variables exist within it (Tabachnick and Fidell 1996). Details on its operation were provided in Section 13.7.1.3). Principal components analysis of items is used here to scrutinise how this revised form of the *OILLs* matches its hypothesised structure. To avoid confusion, prior to this analysis those items representing generative learning were recoded to ensure they all represent attitudes positively.

The initial (unrotated) solution identified five factors with eigenvalues over one which account for 52.0% of the variance observed (Table 14.5). Examination of the scree plot does not suggest a conclusive break-point, and in an attempt to reconstruct the structure previously observed (Newstead 1992), and as 'eigenvalues over one' is recognised as overestimating the number of factors to be extracted (Tabachnick and Fidell

1996: 672), the strategy adopted in *WBC* is reapplied here. This requires the generation of a number of potential (and increasingly complex) solutions, in order that a consistent logical pattern can be identified in the data. An additional benefit of this approach is that it is also recognised as appropriate when the scree plot is inconclusive and where the established estimators of factor structure do not concur (Tabachnick and Fidell 1996: 673).

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	6.93	24.76	24.76
2	3.49	12.45	37.21
3	1.74	6.21	43.42
4	1.28	4.58	48.00
5	1.12	4.00	52.00

**Table 14.5: *OILLs-2* Initial Unrotated Solution (5 factors)**

Following this strategy two, three and four factor solutions were generated and rotated to simple structure using orthogonal (varimax) rotation. The two factor solution was retained (Table 14.6), these factors have eigenvalues of 6.45 and 3.96 and account for 37.2% of the variance in the data set

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	6.45	23.04	23.04
2	3.96	14.15	37.19

**Table 14.6: *OILLs-2* Two factor Solution Following Varimax Rotation**

Factor loadings for the two factor solution adopted are shown in Table 14.7. Items have been labelled in the second column by type: individual adaptive ('IA'); individual generative ('IG'); organisational adaptive ('OA'); organisational generative ('OG') learning. Item wording is as it was on the survey form, but it should be remembered that the generative items that originally represented a negative view have been reversed. A value of 0.32 was taken as the criterion of salient loading (Tabachnick and Fidell 1996: 677), and loadings of 0.32 and over are shown in bold.

<i>No.</i>	<i>Code</i>	<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
q1.1	OA	We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	<b>-0.61</b>	0.11
q1.2	OG	As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	<b>0.68</b>	0.02
q1.3	IG	I am often on the lookout for new ideas from any source.	0.19	<b>-0.44</b>
q1.4	OA	This organisation's strategy and policy are prescribed by senior managers. No one else can really have a say.	<b>-0.66</b>	0.21
q1.5	OA	This organisation doesn't encourage or use feedback from employees or customers on how well it works.	<b>-0.77</b>	0.09
q1.6	IA	I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	-0.07	<b>0.54</b>
q1.7	OG	This is an open organisation and as much information as possible is made available to employees.	<b>0.59</b>	0.03
q1.8*	OG	Risk taking and experimentation is rarely encouraged and rewarded in this organisation.	<b>0.70</b>	-0.17
q1.9*	IG	I don't really need to improve my working practices in order to increase my efficiency and effectiveness.	0.09	<b>-0.47</b>
q1.10	IA	I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	-0.02	<b>0.52</b>
q1.11	OA	This organisation has a limited range of very efficient working practices that it sticks to.	-0.22	0.31
q1.12	IA	I dislike experimenting with new and novel ways of working.	0.01	<b>0.55</b>
q1.13	OA	Employees are discouraged from experimenting with new and novel ways of working.	<b>-0.70</b>	0.20
q1.14	OG	Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	<b>0.72</b>	0.03
q1.15	OG	There is two way communication between employees of all levels about what this organisation's doing and where it's going.	<b>0.72</b>	0.06
q1.16*	OG	This organisation tends not to look out for new ideas from suppliers, customers and competitors.	<b>0.59</b>	-0.02
q1.17	OA	Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	<b>-0.56</b>	0.13
q1.18	IG	I put forward ideas about policy, even if they challenge senior managers' views.	0.06	<b>-0.51</b>
q1.19*	IG	I seldom try to communicate my decisions and their outcomes throughout the organisation.	0.17	<b>-0.47</b>
q1.20	OA	The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	<b>-0.50</b>	0.17
q1.21*	OG	As an organisation, we tend not to encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	<b>0.70</b>	-0.05
q1.22	IA	I rarely need to change my plans once I've made them.	-0.01	<b>0.61</b>
q1.23	IA	My working practices are fixed and I rarely have any need to change them.	-0.04	<b>0.72</b>
q1.24	IA	My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	-0.10	<b>0.65</b>
q1.25*	IG	I hardly ever challenge the organisation's mission, values and assumptions.	0.04	<b>-0.58</b>
q1.26	OG	As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	<b>0.49</b>	-0.09
q1.27	IG	I regularly experiment with new ways of working.	-0.04	<b>-0.51</b>
q1.28*	OG	This organisation tends not to allow its broad strategy to be continuously challenged and re-interpreted.	<b>0.66</b>	-0.07

**Table 14.7: OILLS-2: factor loadings (loadings of 0.32 and over in bold; \* item originally reversed)**

Factor One (Table 14.7) represents significant loadings in respect of organisational learning. All nine organisational generative items loaded positively, and all but one of the seven organisational adaptive items loaded negatively. The exception is q1.11 which failed to load significantly on either factor. All twelve items representing individual learning loaded on Factor Two. Generative items load negatively and adaptive items positively. Overall these results are encouraging, broadly confirming the expected bipolar structure of the *OILLs-2*. With one exception, items loaded clearly and distinctly on the factors obtained, and this factor analysis will be used alongside the reliability analysis above to confirm the scales used in subsequent analyses.

#### 14.7.1.4 Learning Levels: Descriptive Statistics and Reliability Analysis

Scales for individual and organisational learning are derived from the *OILLs-2* in response to its factor and item analyses. The individual learning scale is made up of twelve items (six adaptive and six generative), whilst the organisational learning scale consists of fifteen items (six adaptive and nine generative). Item q1.11 has been dropped as it did not load in the factor analysis and has a low item-total correlation. Scores reported in Table 14.8 represent means for these bipolar scales (generative items treated positively, adaptive negatively), and have a score between 1 and 5 (higher scores indicate greater propensity for generative learning, lower greater propensity for adaptive learning).

	<i>Mean</i>	<i>sd</i>	<i><math>\alpha</math></i>	<i>Median</i>	<i>Range</i>
Organisational Learning	3.07	0.65	0.90	3.07	1.33-4.67
Individual Learning	3.75	0.48	0.80	3.75	2.33-4.92

**Table 14.8: *OILLs-2* Descriptive Statistics - Resultant Structure**

Results suggest that across *SWCC* attitudes at the individual level are generative (mean= 3.75), whilst attitudes to organisational learning are more neutral (mean= 3.07). A paired sample t-test confirms this difference ( $t = 19.121$ ,  $df = 398$ ,  $p < 0.001$ ), suggesting that these two scores represent statistically different scales. Both scales are normally distributed, and exhibit acceptable levels of internal (scale) reliability ( $\alpha > 0.7$ ). Significant correlation exists between organisational and individual learning ( $r = 0.22$ ;  $p < 0.001$ ),

indicating that the more generative an individual's learning the more generative their view of organisational learning, and vice-versa.

Two months after the return of the research questionnaires, the opportunity was also taken to assess the temporal stability of these scales (test-re-test reliability), with a limited sample from *SWCC* (67 respondents). The outcome of this was that both the organisational and individual learning scales exhibited acceptable temporal stabilities (Table 14.9; high significant correlations and  $p > 0.05$  for the paired sample t-tests).

	<i>Original</i>		<i>After 2 months</i>		<i>Correlation</i>	<i>Paired t-test</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>		<i>t</i>	<i>p</i>
Organisational Learning	2.94	0.69	2.92	0.63	0.82***	0.47	0.640
Individual Learning	3.85	0.50	3.79	0.47	0.76***	1.64	0.106

**Table 14.9: OILLs-2 Test-Re-Test Reliability (\*\*\* =  $p < 0.001$ ,  $df = 66$ )**

#### 14.7.1.5 Learning Levels: Construct Validity

Assessment of the construct validity of the *OILLs-2* can be obtained by considering the extent of the relationship between this measure and cognitive style as measured by the *CSI*. The mean *CSI* result (scored on an additive scale, in the range 0 to 76, with the higher the score the more analytical an individual's cognitive style, the lower the more intuitive) in *SWCC* is 29.33, the range 2 to 50. Scale reliability is again acceptable ( $\alpha > 0.7$ ) and in line with those previously published (Allinson and Hayes 1996; Armstrong Allinson and Hayes 1997). Scores for the *CSI* are approximately normally distributed.

Construct validity would be demonstrated by significant correlations between *CSI* scores and scores on the individual and organisational learning scales. Individual learning and *CSI* are significantly correlated ( $r = -0.43$ ,  $p < 0.001$ ). This indicates that the more generative an individual's learning the more intuitive their cognitive style, the more adaptive their learning the more analytical their style. No significant correlation was obtained between organisational learning and the *CSI*.

#### 14.7.1.6 Learning Levels: Concurrent Validity

The concurrent validity of the *OILLs-2* is demonstrated by its ability to differentiate between groups which are presumed to differ in their attitudes to individual and organisational learning. Assessment of this is undertaken here through examination of the effects of respondent characteristics on the individual and organisational learning scales.

Source of Variation	Organisational Learning			Individual Learning	
	df	F	p	F	p
Main Effects					
Gender	1	0.153	0.696	<b>7.536</b>	<b>0.006</b>
Age	3	<b>3.392</b>	<b>0.018</b>	<b>2.710</b>	<b>0.045</b>
Length of Service	2	2.650	0.072	<b>3.122</b>	<b>0.045</b>
Job Level	1	1.500	0.221	<b>40.276</b>	<b>0.000</b>
2-Way Interactions					
Gender-Age	3	0.582	0.627	0.327	0.806
Gender-Service	2	1.952	0.143	1.000	0.369
Gender-Job	1	0.043	0.836	0.980	0.323
Age-Service	6	1.650	0.132	1.930	0.075
Age-Job	3	1.593	0.191	1.670	0.173
Service-Job	2	<b>3.493</b>	<b>0.031</b>	1.180	0.308

Table 14.10: *OILLs-2* Effect of Respondent Characteristics (p<0.05 shown in bold)

Influence of gender, age, length of service and job level was assessed using simple factorial analysis of variance (*n*-way Anova). Department is dealt with separately below. To maintain a consistency of approach in addressing concurrent validity, age has been reduced from five categories to four (<31; 31-40; 41-50; >50 years), length of service from five to three (<6; 6-10; >10 years), and job level from five to two (managers; and staff). Main, effects and 2-way interactions from the simple factorial anova are summarised in Table 14.10, significant effects (p<0.05) are highlighted in bold. These identify significant main effects of all these four respondent variables on individual learning. Age and length of service and job level in combination (service-by-job) both have significant effects on organisational learning. No other significant effects were identified.



*Gender:* Main effects indicate that the men in the response exhibit a more generative approach to individual learning than the women (means of 3.82 and 3.65 respectively).

*Age:* It is evident from the means for the effects of age on organisational and individual learning that attitudes to both scales are increasingly positive with age for the first three categories (Table 4.11). However the mean responses for the oldest (>50 years) group indicates a less positive response, and less generative attitudes to both individual and organisational learning compared than the next youngest group (41-50 years).

<i>Age</i>	<i>Organisational Learning</i>	<i>Individual Learning</i>
<31	2.84	3.60
31-40	2.99	3.73
41-50	3.17	3.85
>50	3.12	3.71

**Table 14.11: OILLS-2 Means for Effect of Age**

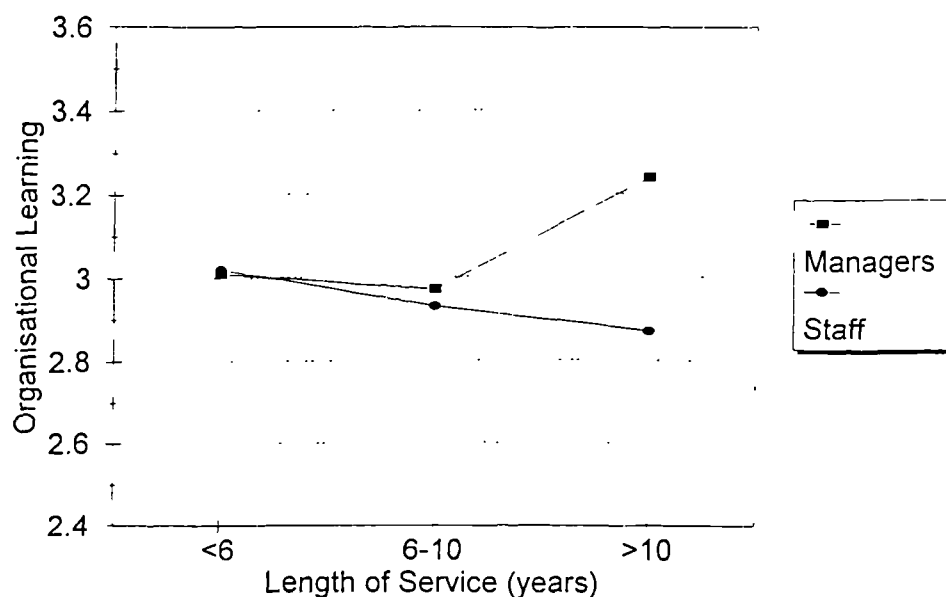
*Length of Service:* Means show that whilst the shortest and longest serving individuals exhibit similar attitudes to individual learning (both the <6 years service and >10 years service groups have the same mean: 3.78), those individuals between them exhibit a lower propensity for generative learning (mean for the 6-10 years service group is 3.67).

*Job Level:* Managers in SWCC are more generative in respect of their own learning (mean = 3.87) than their staff (mean = 3.51).

*Length of Service and Job Level:* Means for the combined effect of length of service and job level on organisational learning (Table 14.12 and Figure 14.1) indicate that the significant effect results from the longest serving managers (>10 years) reporting more generative attitudes in respect of organisational learning than the rest of the sample.

<i>Length of Service</i>	<i>Organisational Learning</i>	
	<i>Managers</i>	<i>Staff</i>
<6	3.01	3.02
6-10	2.97	2.93
>10	3.24	2.87

**Table 14.12: OILLs-2 Means for Two-Way Interaction, Effect of 'Service-by-Job'**



**Figure 14.1: OILLs-2 Effect of Service-by-Job on Organisational Learning**

*Department:* This was excluded from the  $n$ -way Anova, because as a nominal variable it contravenes the assumptions of this test. Instead, chi-squared comparison of medians, which tests whether two or more samples are drawn from populations with the same median, was adopted to explore its effect. No significant effect on individual learning was observed. A significant effect was obtained for organisational learning ( $\chi^2 = 19.97$ ,  $df = 7$ ,  $p < 0.01$ ), the distribution of responses around the median identifies three departments with majority of above the median responses (the chief executives office, education and information services), the rest all have a majority of their responses below the median.

### 14.7.2 Learning Environment: Results

Item results, scale reliability, a factor analysis, temporal stability and the construct and concurrent validity of the six items added to the questionnaire to assess learning climate and systems (*LE-SC*) are considered below.

#### 14.7.2.1 Learning Environment: Item Results

Item frequencies, means and standard deviations for the *LE-SC* items are included in Table 14.13, labelled to identify them as representing learning climate or systems. Item frequencies suggest that the learning climate items (q1.29, q 1.33 and q1.34) exhibit broadly neutral responses, confirmed by their means which are in the range 2.76 to 3.07. The response for the learning systems items (q1.30, q1.31 and q1.32) is more positive, item frequencies indicate that more respondents agreed with these items than disagreed. Their means are in the range 3.28 to 3.62. This suggest that across *SWCC*, learning systems appear to be in place, but a climate supportive of learning is not as widely recognised.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q1.29c	Constructive feedback is given to all employees on how they're doing in their jobs.	3.3	28.6	22.6	32.1	13.4	2.76	1.11
q1.30s	Employees are encouraged and supported in undertaking job-related training and development activities.	12.0	55.9	17.3	11.8	3.0	3.62	0.95
q1.31s	Employees who've experienced learning, training or development are encouraged to share the learning with colleagues.	6.0	44.4	25.0	21.1	3.5	3.28	0.98
q1.32s	People share their knowledge and resources.	4.8	50.1	25.1	16.0	4.0	3.36	0.94
q1.33c	The organisation's goals and strategy are made clear to all employees.	2.8	38.8	27.6	24.1	6.7	3.07	1.00
q1.34c	People aren't afraid to voice differing opinions on organisational matters and conflicts are worked through constructively.	1.3	36.3	30.6	26.6	5.2	3.02	0.94

**Table 14.13: *LE-SC* Item Summaries (%; *SA* = Strongly Agree; *A* = Agree; *N* = Neutral; *D* = Disagree; *SD* = Strongly Disagree; *sd* = standard deviation; c = Learning Climate; s = Learning Systems; n=399)**

#### 14.7.2.2 Learning Environment: Hypothesised Structure – Item Analysis

Descriptive statistics for the learning systems and climate scales are included in Table 14.14, whilst item reliabilities (item-total correlations and alpha if item deleted) are summarised in Table 14.15. Both scales exhibit acceptable internal (scale) reliabilities

(Cronbach  $\alpha > 0.7$ ; Guilford 1956), and examination of the item reliabilities does not suggest the removal of items from either scale.

	<i>Mean</i>	<i>sd</i>	<i><math>\alpha</math></i>	<i>Median</i>	<i>Range</i>
Learning Systems	3.42	0.78	0.75	3.67	1.00-5.00
Learning Climate	2.95	0.81	0.71	3.00	1.00-5.00

**Table 14.14: *LE-SC* Descriptive Statistics - Hypothesised Structure**

<i>Q. No.</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>
q1.30	0.52	0.73
q1.31	0.65	0.57
q1.32	0.56	0.68

**(a): Learning Systems**

<i>Q. No.</i>	<i>Item-total correlation</i>	<i>Alpha if item deleted</i>
q1.29	0.48	0.68
q1.33	0.54	0.59
q1.34	0.56	0.58

**(b): Learning Climate**

**Table 14.15: *LE-SC* Reliability Analysis**

#### 14.7.2.3 Learning Environment: Exploratory Factor Analysis

Exploratory factor analysis (principal components analysis of items) was undertaken on the six *LE-SC* items. The initial unrotated solution identified one factor with an eigenvalue over one, explaining 53.1% of the variance in the data which significantly incorporates all the items on a single component. Examination of the scree plot suggests that a two factor solution is most appropriate. This was extracted, and is shown following orthogonal (varimax) rotation in Table 14.16. The two factors extracted have eigenvalues of 3.19 and 0.82, and explain 66.8% of the observed variance between them. Factor loadings are shown in Table 14.17. The learning climate and systems scales have not been reconstructed through the exploratory factor analysis. Four items load significantly onto factor one, the three ‘systems’ items and one of the climate items. (q1.29). Factor Two consists of five items, only q1.30 fails to load. Half the items load on both factors.

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>	<i>Factor Transformation Matrix</i>	
				1	2
1	2.11	35.16	35.16	0.738	0.675
2	1.90	31.67	66.83	-0.675	0.738

**Table 14.16: *LE-SC* Two factor Solution Following Varimax Rotation**

<i>No.</i>	<i>Item</i>	<i>Factor 1</i>	<i>Factor 2</i>
q1.29c	Constructive feedback is given to all employees on how they're doing in their jobs.	<b>0.67</b>	<b>0.35</b>
q1.30s	Employees are encouraged and supported in undertaking job-related training and development activities.	<b>0.87</b>	0.06
q1.31s	Employees who've experienced learning, training or development are encouraged to share the learning with colleagues.	<b>0.74</b>	<b>0.36</b>
q1.32s	People share their knowledge and resources.	<b>0.52</b>	<b>0.54</b>
q1.33c	The organisation's goals and strategy are made clear to all employees.	0.23	<b>0.81</b>
q1.34c	People aren't afraid to voice differing opinions on organisational matters and conflicts are worked through constructively.	0.18	<b>0.84</b>

**Table 14.17: *LE-SC*: factor loadings (loadings of 0.32 and over in bold; c = Learning Climate; s = Learning Systems)**

#### 14.7.2.4 Learning Environment: Descriptive Statistics and Reliability Analysis

Two scales for the *LE-SC* are reported (each the mean of three items) in Table 14.18, representing attitudes in respect of the learning climate and learning systems within *SWCC*. Scores are in the range 1 to 5, and the higher the score the more positive the attitudes and greater the recognition in respect of these variables. Despite the failure of the factor analysis to reconstruct these scales, the distinction between learning systems and climates is maintained. This is because independently, both these scales are broadly normally distributed, and exhibit acceptable levels of internal reliability ( $\alpha > 0.7$ ). Examination of item-total correlations and alpha if item deleted does not suggest the exclusion of any items from either scale. A paired sample t-test also suggests that the scales represent significantly different samples ( $t = -13.956$ ,  $df = 398$ ,  $p < 0.001$ ).

	<i>Mean</i>	<i>sd</i>	<i>a</i>	<i>Median</i>	<i>Range</i>
Learning Climate	2.95	0.81	0.71	3.00	1.00-5.00
Learning Systems	3.42	0.78	0.75	3.67	1.00-5.00

**Table 14.18: *LE-SC* Descriptive Statistics - Resultant Structure**

Learning climate and learning systems are significantly correlated ( $r = 0.64$ ;  $p < 0.001$ ), indicating that attitudes to these issues are linked. Both are also significantly correlated with organisational learning ( $r = 0.66$ ;  $p < 0.001$ , and  $r = 0.56$ ;  $p < 0.001$  respectively), indicating that a more generative attitude to organisational learning links to higher recognition of learning systems and climate. However, neither correlate significantly with individual learning. This suggests that whilst attitudes in respect of the

organisational variables (i.e. organisational learning, learning climate and learning systems) are linked, they are independent of attitudes to learning at the individual level.

	<i>Original</i>		<i>After 2 months</i>		<i>Correlation</i>	<i>Paired t-test</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>		<i>t</i>	<i>p</i>
Learning Climate	2.77	0.80	2.87	0.82	0.63***	-1.30	0.199
Learning Systems	3.29	0.82	3.42	0.78	0.67***	-1.60	0.115

**Table 14.19: LE-SC Test-Re-Test Reliability (\*\*\*= $p < 0.001$ ,  $df = 66$ )**

Temporal stability (test-re-test reliability), after two months was also assessed for the LE-SC scales with a limited sample (67 respondents; Table 14.19). This is acceptable for both scales (high significant correlations and  $p > 0.05$  for the paired sample t-tests).

#### 14.7.2.5 Learning Environment: Construct Validity

Comparison of results for the learning climate and learning systems scales with CSI scores allows some assessment of their construct validity. Both learning climate and learning systems are significantly correlated with CSI ( $r = 0.09$ ,  $p < 0.05$ , and  $r = 0.12$ ,  $p < 0.05$  respectively), and whilst this might suggest some construct validity, these correlations are small, of marginal significance, and must therefore be viewed with caution.

#### 14.7.2.6 Learning Environment: Concurrent Validity

The concurrent validity of the LE-SC can be assessed through examination of the influence of respondent characteristics. Influence of gender, age, length of service and job level was assessed using simple factorial analysis of variance ( $n$ -way Anova). Main, effects and two-way interactions are summarised in Table 14.20, significant effects ( $p < 0.05$ ) are highlighted in bold. No significant effects were identified on learning systems, whilst effects of age alone, and of length of service and job level in combination on learning climate are identified in Table 14.20. Higher order effects are not shown in Table 14.20, one of these was identified as significant, the effect of gender, length of service and job level on learning climate ( $F = 3.493$ ;  $df = 2$ ;  $p = 0.031$ ).

Source of Variation	df	Learning Climate		Learning Systems	
		F	p	F	p
Main Effects					
Gender	1	3.119	0.078	0.009	0.925
Age	3	<b>2.949</b>	<b>0.033</b>	2.194	0.088
Length of Service	2	2.329	0.099	1.290	0.277
Job Level	1	1.227	0.269	0.522	0.471
2-Way Interactions					
Gender-Age	3	0.812	0.488	0.908	0.437
Gender-Service	2	0.021	0.979	0.029	0.972
Gender-Job	1	0.130	0.718	0.152	0.697
Age-Service	6	1.300	0.257	1.899	0.080
Age-Job	3	0.077	0.972	0.307	0.820
Service-Job	2	<b>7.071</b>	<b>0.018</b>	0.772	0.463

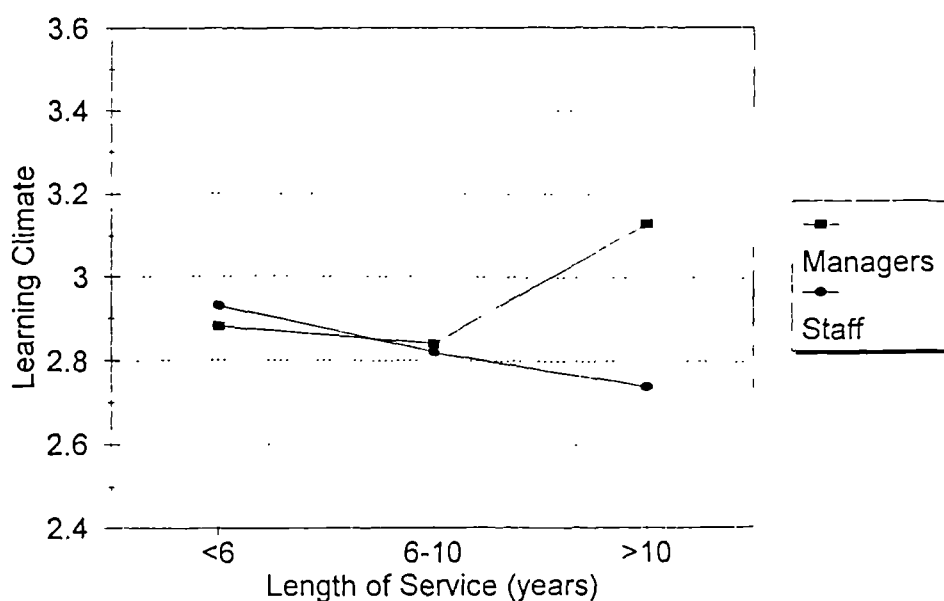
**Table 14.20: LE-SC Effect of Respondent Characteristics (p<0.05 shown in bold)**

*Age:* Means for the effects of age on learning climate indicate that attitudes to the learning climate across SWCC are increasingly positive with age.

*Length of Service and Job Level:* Means for this effect are summarised in Table 14.21, and Figure 14.2. These show that the longest serving managers (i.e. those employed for over ten years) report a higher mean learning climate score than the rest of the sample.

	<i>Managers</i>	<i>Staff</i>
<6	2.88	2.93
6-10	2.84	2.82
>10	3.13	2.74

**Table 14.21: LE-SC Means for Two-Way Interaction, Effect of ‘Service-by-Job’**



**Figure 14.2: LE-SC Effect of Service-by-Job on Learning Climate**

<i>Length of Service</i>	<i>Male</i>		<i>Female</i>	
	<i>Managers</i>	<i>Staff</i>	<i>Managers</i>	<i>Staff</i>
<6	3.09	2.85	2.70	3.02
6-10	2.88	2.84	2.78	2.80
>10	3.02	2.97	3.38	2.55

**Table 14.22: LE-SC Means for Three-Way Interactions, Effect of 'Gender-by-Service-by-Job'**

*Gender, Length of Service and Job Level:* Means for the significant three way interaction are identified are summarised in Table 14.22. Identification of patterns in the 3-way analysis is difficult, but it appears that significant differences may result from the higher mean (3.38) of the longest serving (>10 years) female managers, and lower mean (2.55) of the longest serving female members of staff. Attitudes for the other groups identified are in the range 3.09 to 2.70 indicating generally neutral/ marginally negative attitudes in respect of the learning climate in SWCC. There is also a greater differential between responses for females (both managers and staff) with differing lengths of service compared with the male response.



*Department:* This was assessed through chi-squared comparison of medians, and whilst no effect was identified for learning climate, department is identified as having an effect on learning systems ( $\chi^2 = 19.013$ ,  $df = 7$ ,  $p = 0.008$ ). Examination of the distribution of responses around the median suggests that this is a result of the education department alone having a majority of responses above the median.

### 14.7.3 Shared Mental Model: Results

Item results and exploratory factor analysis of the shared mental model of the 'budget setting process' questionnaire (the *MMQ-BSP*) are presented below. No pre-supposed structure exists, hence no consideration is given to item analysis or any hypothesised structure. Equally, no consideration of construct or concurrent validity is made.

#### 14.7.3.1 Shared Mental Model: Item Results

Item results (frequencies, means and standard deviations) for the 26 items included in the *MMQ-BSP* are presented in Table 14.23. These are shown in the order and form in which they appeared in the questionnaire, with those items which have been reversed and therefore represent the opposite point of view to that already espoused being marked with an asterisk (e.g. q2.2\*).

The pattern of responses summarised in Table 14.23 is broadly consistent. Frequency results show that none of the positively phrased items have obtained high levels of disagreement, and no reversed items show a strong positive response. With two exceptions, means for the 15 normally phrased items are in the range 3.38 to 4.28, confirming this positive response. The exceptions are items q2.6 and q2.21 which both have high numbers of neutral responses, and means of 3.26 and 2.98 respectively. Ten of the eleven reversed items have means in the range 2.16 to 2.74, confirming the strong disagree response observed in the frequencies. Exceptional is q2.2, this has a mean of 3.27, and examination of the frequencies shows that responses for this item are more evenly distributed across the scale. These results suggest that the recognition of the shared mental model across *SWCC* is reasonably good. Relationships between these items are explored through factor analysis below.

<i>Q. No.</i>	<i>Item</i>	<i>SA</i>	<i>A</i>	<i>N</i>	<i>D</i>	<i>SD</i>	<i>Mean</i>	<i>sd</i>
q2.1	There is a growing gap between the resources that the council has available and the needs it must fulfil.	41.6	47.4	8.0	3.0	0	4.28	0.74
q2.2*	Communication is not an on-going part of the budget-setting process.	9.5	37.1	27.1	23.8	2.5	3.27	1.01
q2.3*	National government does not have a significant impact on the funds available for the council's budget.	2.8	13.5	21.3	39.1	23.3	2.18	1.11
q2.4	The potential effects upon council tax payers are recognised throughout the budget-setting process.	4.8	43.1	38.3	12.5	1.3	3.38	0.81
q2.5*	The Senior Management Board do not play an significant role in the budget-setting process.	1.3	7.3	43.1	36.6	11.7	2.50	0.84
q2.6	There has been a move by the council to deal with budgetary issues, such as financial management, savings plans and budget strategy on a three year as opposed to one year timetable.	3.8	26.1	63.7	5.0	1.4	3.26	0.68
q2.7*	There is no argument for treating Cornwall's budget as a special case when compared with the budgets of other counties.	4.3	8.5	13.8	45.9	27.5	2.16	1.06
q2.8*	The standard spending assessments provided by national government are not a major factor controlling the council's spending plans.	1.0	3.5	30.1	44.1	21.3	2.19	0.84
q2.9	Communication between all those involved in the process is critical to setting the budget.	31.1	53.6	13.0	2.0	0.3	4.13	0.73
q2.10	The major aim of the budget-setting process is to maintain effective service delivery across the council.	22.3	59.4	10.3	6.8	1.2	3.95	0.84
q2.11	The council provides a number of services which are not explicitly recognised by the public.	28.7	64.2	6.3	0.8	0	4.21	0.58
q2.12	The cost of inflation varies between departments and units depending upon the nature of the service they provide.	7.0	48.1	34.1	10.0	0.8	3.51	0.80
q2.13	The spending budget represents the agreed distribution of funds between the departments and units of the council.	5.3	46.3	39.8	7.8	0.8	3.48	0.75
q2.14*	Pressure to provide 'best value' is not a part of the budget-setting process.	2.3	15.0	29.1	44.1	9.5	2.56	0.94
q2.15	Traditional service managers and departments are supported by a number of internal business units within the council.	7.8	53.9	36.8	1.5	0	3.68	0.64
q2.16*	Service committees are not influenced by national politics.	0.3	4.8	29.5	52.4	13.0	2.27	0.75
q2.17	Negotiation and compromise is required between service committees in order to ensure that an effective service is maintained.	9.3	69.9	18.2	2.3	0.3	3.86	0.61
q2.18	Departments and units within the council have to respond to and operate under sets of pressures which are unique to them.	10.5	55.9	23.0	9.8	0.8	3.66	0.82
q2.19*	The impact of internal service providers (such as personnel and information services) on the budget-setting process is clearly understood by the rest of the council.	0.5	7.5	39.6	44.4	8.0	2.48	0.77
q2.20*	The elected members of the council are not influenced in their decisions about the budget by local political factors.	0.8	3.3	20.7	51.1	24.1	2.06	0.80
q2.21	Ownership of the spending budget across the council is built by its communication throughout the council.	0.5	17.0	64.7	15.0	2.8	2.98	0.67
q2.22*	The County Treasurer does not play a major role in the budget-setting process across the council.	1.3	7.8	47.1	33.8	10.0	2.56	0.82
q2.23	The budget-setting process results in spending targets for departments and units which aim to minimise the gap between needs and resources across the council.	4.0	48.4	37.3	9.0	1.3	3.45	0.77
q2.24	The council's officers provide professional and expert assessment of the options available in the budget-setting process.	6.3	51.9	35.3	6.5	0	3.58	0.71
q2.25	There exists within the council an internal market, serviced by a range of internal business units.	8.3	58.4	27.0	5.8	0.5	3.68	0.73
q2.26*	There are no significant differences in the way the budget-setting process operates within the council's departments and units.	0.3	8.5	58.1	30.8	2.3	2.74	0.65

**Table 14.23: MMQ-BSP Item Summaries (%; SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree; \* = item reversed; sd = standard deviation; n=399)**

#### 14.7.3.2 Shared Mental Model: Exploratory Factor Analysis

The latent structure of the MMQ-BSP is examined here through exploratory factor analysis (principal components analysis of items). Seven factors with eigenvalues over one, explaining 49.8% of the variance, were obtained in the initial (unrotated) solution (Table

14.24). The scree plot was again inconclusive suggesting three or five factor solutions. Following the iterative approach adopted above (Tabachnick and Fidell 1996: 673), three, four and five factor solutions were obtained and rotated to simple structure using orthogonal (varimax rotation). Patterns of loadings on these solutions are unclear, all three analyses have a significant numbers of items which either fail to load or load on multiple factors. Furthermore, examination of the detail of the factor structures failed to identify any logical patterns in the item loadings. As no logical latent structure appears evident from this analysis, no subsequent presentation of a resultant factor solution is made here.

<i>Factor</i>	<i>Eigenvalue</i>	<i>Variance Explained (%)</i>	<i>Cumulative Variance (%)</i>
1	4.24	16.31	16.31
2	2.45	9.46	25.77
3	1.54	5.92	31.69
4	1.31	5.03	36.72
5	1.15	4.41	41.13
6	1.12	4.32	45.45
7	1.12	4.30	49.75

**Table 14.24: *MMQ-BSP* Initial Unrotated Solution (7 factors)**

#### *14.7.3.3 Shared Mental Model: Descriptive Statistics*

A single scale representing shared mental model (*SMM*) assimilation has been created in recognition of the failure of the factor analysis of the *MMQ-BSP* to identify any latent structure. Derived from the *MMQ-BSP*, this represents the mean score (negatively phrased items reversed) for all 26 items included in the instrument. This scale has a mean score of 3.62, a standard deviation of 0.30, a median of 3.62 and scores in the range 2.88 to 4.50. It exhibits acceptable internal reliability ( $\alpha > 0.7$ ; no removal of items suggested by item-total correlations or alpha if item deleted) and has an approximately normal distribution. Overall, it suggests that assimilation of the shared mental model is broadly positive.

#### *14.7.3.4 Shared Mental Model: Respondents' Comments*

The *MMQ-BSP* instrument concluded with an open question: 'If you would like to make any further comments about the budget setting process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.' 52 individuals (13.0% of the respondents) replied to this question, with the largest portion of

these (24 individuals) exhibiting a lack of understanding or input into the budget setting process: *“Haven’t a clue how the budget setting process works”* is typical. Other comments were concerned with more general issues within the budget setting process, including the impact of internal service providers (e.g. *“Internal service providers do not seek feedback on the quality of service provided or justify costs to that service”*) and the political and economic controls exercised over the budget setting process (e.g. *“I believe that the budget setting process owes as much to political pressures as it does to departmental needs”*). A significant number of these expressed concerns that the process was overly directive and controlled from above rather than participative: e.g. *“the budget is determined by the elected members and senior management boards... middle and junior members of staff may provide information but do not feature in the budget setting process.”* For the most part, the remaining comments dealt with highly specific departmental or individual concerns. A full record of the comments obtained is included in Appendix Y.

#### 14.7.4 Cognitive Style : Results

The CSI has previously demonstrated both construct validity and temporal stability (Allinson and Hayes 1996; Armstrong, Allinson and Hayes 1997; Sadler-Smith Spicer and Tsang 1999). Consequently no item analyses or factor analysis is presented here. Results for this variable have already been considered in relation to the construct validity of the OILLs-2 and LE-SC above and it is used in the regression analysis below.

### 14.8 SWCC MULTIPLE REGRESSION ANALYSIS

Multiple regression is used here to explore the degree and character of the relationships between shared mental model assimilation and the other variables identified. As a technique, multiple regression assesses the total proportion of variance in a dependent variable (DV) explained by a set of independent variables (IVs) (Tabachnick and Fidell 1996; Sapsford and Jupp 1996). Details of the design of the regression model were outlined in Chapter Thirteen. It is used here to identify the importance of the IVs in explaining mental model assimilation as well as to explore the nature of the relationships amongst the IVs as predictors of the mental model variable.

	<i>Mean (ratio)</i>	<i>sd</i>
<i>SMM</i> Assimilation	3.62	0.30
Organisational Learning	3.07	0.65
Individual Learning	3.75	0.48
Learning Climate	2.95	0.81
Learning Systems	3.42	0.78
Cognitive Style ( <i>CS</i> )	29.33	9.20
Gender	1.41	0.49
Age	2.75	1.02
Job Level	1.33	0.47
Length of Service	13.17	8.27
Department	1.72	0.45

**Table 14.25 SWCC Regression Variables: Means and Standard Deviations (n=399)**

The DV for the subsequent analysis is shared mental model assimilation (*SMM* Assimilation). Ten IVs have been identified: organisational learning; individual learning; learning climate; learning system; cognitive style (*CS*); gender; age; job level; length of service; and department. Some of these have been transformed in order that the assumptions of regression are not violated. Gender, job level and department all represent dichotomous dummy variables (Griffiths, Hill and Judge 1993). The aggregation of department was done in response to the effect observed for this variable on shared mental model assimilation, assessed through chi-squared comparison of medians ( $\chi^2 = 27.160$ ,  $df = 7$ ,  $p < 0.001$ ). This identifies a 50:50 split between the departments identified. Four which provide support or indirect services for SWCC (the chief executive office; information services; personnel; and the treasurers department) have a majority of responses above the median, and have been grouped together and labelled 'internal' departments. The other four (education; planning; transportation and estates; and trading standards) have the majority of their responses below the median and are directly responsible for service delivery; labelled 'service providers'. Length of service is used in its un-aggregated form. It should be recognised that not all these variables represent ratio or interval data (for which regression is designed), however Sapsford and Jupp (1996), Cramer (1994) and Lord (1953) all suggest that regression can be undertaken with ordinal variables, and their advice is followed here. Means and standard deviations for these regression variables are show in Table 14.25. Means for dichotomous variables represent the ratio of cases which

have been coded thus: gender as 1 = male, 2 = female; job level as 1 = managers, 2 = staff; department as 1 = internal departments, 2 = service providers. The mean for age is based on values identified for each of the categories included in Table 14.1 (1 = <31; 2 = 31-40; 3 = 41-50; 4 = 51-60; 5 = >60).

	Organisation -al Learning	Individual Learning	Learning Climate	Learning Systems	CSI	Gender	Age	Job Level	Length of Service	Depart- ment
<i>SMM</i> Assimilation	0.19***	0.22***	0.11*	0.17***	-0.09*	-0.11*	0.11*	-0.10*	0.08	-0.23***
Organisation -al Learning		0.22***	0.66***	0.56***	-0.01	0.02	0.14**	-0.15**	0.15**	0.01
Individual Learning			-0.01	0.02	-0.43***	-0.17***	0.06	-0.35***	0.02	0.03
Learning Climate				0.64***	0.09*	-0.04	0.21***	-0.11*	0.13**	0.06
Learning Systems					0.12*	0.05	0.13**	-0.07	0.13**	-0.05
CSI						0.11*	-0.02	0.18***	0.01	-0.09*
Gender							-0.09*	0.14**	-0.18***	-0.18***
Age								-0.12*	0.46***	0.08
Job Level									-0.19***	-0.10*
Length of Service										-0.01

**Table 14.26: SWCC Regression Variables: Zero Order Correlations (n=399; \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$ )**

Correlations (Pearson's product moment) between the DV and IVs show that shared mental model assimilation is significantly correlated with all the IVs, except length of service (Table 14.26). Higher levels of mental model assimilation are exhibited by those individuals who are more generative in their attitudes to both individual ( $r = 0.22$ ;  $p < 0.001$ ) and organisational learning ( $r = 0.19$ ;  $p < 0.001$ ), and show more positive responses in terms of learning climate ( $r = 0.11$ ;  $p < 0.05$ ) and learning systems ( $r = 0.17$ ;  $p < 0.001$ ). *CSI* is negatively correlated with *SMM* assimilation ( $r = -0.09$ ;  $p < 0.05$ ).

Prior to the regression analysis, screening of the data was undertaken. Scatterplots of the DV and IVs did not suggest any outliers, nor any marked skewness or heteroscedascity. Correlations between the IVs suggest multicollinearity is not present ( $r < 0.9$ ; Table 14.26; Tabachnick and Fidell 1996: 86). The full sample of 399 respondents has been employed, and is appropriate for testing both the multiple correlation ( $n \geq 50 + 8$  IVs), and the individual predictors ( $n \geq 104 + 1$  IVs) (Tabachnick and Fidell 1996: 132).

Standard (simultaneous) regression was again chosen over the alternative (stepwise) methods available. This allows the researcher to retain control over the inclusion and exclusion of variables in the model, whereas with stepwise regression, these decision are made by the computer on the basis of an arbitrary statistical measure, which may not find the best combination of variables. The output from stepwise regression can also be difficult to interpret (Cramer 1994; Tabachnick and Fidell 1996; Wright 1997).

<i>Variables</i>	<i>B</i>	$\beta$
Organisational Learning	0.057 <sup>#</sup>	0.124
Individual Learning	0.089 <sup>#</sup>	0.143
Learning Climate	-0.080	-0.055
Learning Systems	0.044 <sup>#</sup>	0.115
Cognitive Style ( <i>CSI</i> )	-0.001	-0.044
Gender	-0.079 <sup>#</sup>	-0.131
Age	0.031 <sup>#</sup>	0.104
Job Level	-0.015	-0.024
Length of Service	-0.012	-0.032
Department	-0.176 <sup>#</sup>	-0.265
Intercept =	3.425 <sup>#</sup>	
	$R^2 = 0.16$	
	Adjusted $R^2 = 0.14$	
	$R = 0.40^{***}$	

**Table 14.27: SWCC Standard Multiple Regression (n=399; <sup>#</sup> =p<0.1; \*\*\*=p<0.001)**

The outcome of the regression model is summarised in Table 14.27, included are the unstandardised regression coefficients (*B*) and intercept, the standardised regression coefficients ( $\beta$ ), *R*,  $R^2$  and adjusted  $R^2$ . Examination of the residual and partial regression plots confirmed that no violations of the assumptions of the regression model were evident. Malhalanobis Distance (p=0.001; Tabachnick and Fidell 1996: 178), Cook's Distance (<1; Tabachnick and Fidell 1996: 134; Wright 1997:107), and studentised residuals (>2; Wright 1997: 107) all confirm no multivariate outliers, and the collinearity diagnostics indicate that multicollinearity is not evident (Tabachnick and Fidell 1996: 104). *R* for the regression is significantly different from zero ( $F = 7.36$ ,  $df = 10, 388$ ,  $p$

<0.001), but the model only explains 16% (14% adjusted) of the variability in mental model assimilation. At the 90% confidence level six of the ten IVs (organisational learning, individual learning, learning systems, gender, age and department) can be identified as contributing significantly to the explanation observed (Table 14.28). In line with the strategy adopted above (after Wright 1997), this regression has been re-run with a more parsimonious model, incorporating only those IVs identified as significant at the 90% level above. The 90% confidence limit ( $p < 0.1$ ) is used to select variables here in an attempt to maximise the explanation observed and in recognition of the exploratory nature of this research. Output from this revised model is summarised in Table 14.28.

<i>Variables</i>	<i>B</i>	$\beta$	$sr^2$
Organisational Learning	0.043	0.094	0.006
Individual Learning	0.112	0.179	0.028
Learning Systems	0.035	0.090	0.005
Gender	-0.076	-0.125	0.014
Age	0.025	0.086	0.007
Department	-0.173	-0.261	0.065
Intercept =	3.283		
		$R^2 = 0.16$	
		Adjusted $R^2 = 0.14$	
		$R = 0.40^{***}$	

**Table 14.28: SWCC Revised Standard Multiple Regression (n=399; \*\*\*= $p < 0.001$ )**

$R$  for the revised regression is significantly different from zero ( $F = 12.05$ ;  $df = 6, 392$ ,  $p < 0.001$ ), and the revised model still explains 16% (14% adjusted) of the variation in shared mental model assimilation. Semi-partial correlations ( $sr^2$ ) for each of the IVs are also incorporated in Table 14.28. From these it can be seen that the majority of the explanation of shared variation is accounted for by department ( $sr^2 = 0.065$ ). Individual learning and gender also make significant contributions ( $sr^2 = 0.028$  and  $0.014$  respectively). The remaining IVs (organisational learning; learning systems; age) each contribute less than 1% of explained variance ( $sr^2 < 0.01$ ). Together, these six variables contribute another 3.5% (0.035) of shared explanation.



The department variable which accounts for the majority of explanation above is a dummy variable which splits departments on the basis of whether they are ‘service providers’ (i.e. education; planning; transportation and estates; and trading standards) or ‘internal’ units (i.e. the chief executive office; information services; personnel; and the treasurers department) within the council. Recognising the significance of this variable, two further models regression models were created, which looked at the explanation of shared mental model assimilation in each of these groups independently.  $R$  for the ‘internal’ departments model was not significantly different from zero ( $F = 1.458$ ,  $df = 9$ ,  $102$ ,  $p = 0.174$ ), indicating that the predicted explanation is no better than might from the data at random.  $R$  is significant for the ‘service providers’ model ( $F = 4.680$ ,  $df = 9$ ,  $277$ ,  $p < 0.001$ ). However this model only explains 13% (10% adjusted) of the variance in mental model assimilation, and has only two IVs (individual learning and gender) which are significant, even at the 90% level. All these models will be discussed below.

#### 14.9 SWCC RESPONDENTS COMMENTS

The questionnaire concluded with an open question: ‘Finally, if you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.’ 56 individuals chose to respond to this item (14.0% of the sample), and their comments are included in Appendix Y. Very few of these were concerned with the questionnaire directly. Again there are a number of respondents raising highly specific issues and concerns (such as specific training or development needs) and a number of individuals highlighting their perceived poor understanding of the budget setting process (e.g. “*answers to section 2 not based on much personal knowledge or experience*”). Additionally, a number of comments made comparisons between their departments/ units and SWCC as a whole. “*I find my own section of the organisation generally good in terms of policy and forward-thinking. However my general view of the whole authority is that it is often backwards and not forward thinking enough.*”

#### 14.10 SWCC SURVEY DISCUSSION

Analysis of the survey response obtained in SWCC is reported above, these results generate a number of issues which are considered below. This discussion begins with the four key

elements of the questionnaire: *OILLs-2*; *LE-SC*; *MMQ-BSP*; and *CSI*, and the scales derived from them. The relationships identified between these variables are also examined.

In terms of their internal (scale) reliability, the results of the *CSI* are acceptable ( $\alpha > 0.7$ , confirmed by item-total correlations and alpha if item deleted), and match those obtained in other studies (Allinson and Hayes 1996; Armstrong, Allinson and Hayes 1997; Sadler-Smith, Spicer and Tsang 1999) and observed above (Chapter Thirteen). However the mean score for this variable (29.33) is somewhat lower than that reported in other studies. This suggests that across *SWCC* cognitive style may be more intuitive than elsewhere. This observation is of course supposition, but could have implications in terms of preferred approaches to work and ways of dealing with information across the council.

Assimilation of the senior managers' shared mental model of the budget setting process was assessed through the *MMQ-BSP*. Exploratory factor analysis was undertaken, and as no logical latent structure was identified, the *MMQ-BSP* was realised as a single scale. Exploratory factor analysis is not a technique which tests statistical significance, it is rather a method for supporting the decisions made by researchers for the construction of scales and the inclusion or exclusion of items, failure of exploratory factor analysis to identify any logical structure does not necessarily mean that items cannot be used in combination. The fact that no logical elements were identified within the *MMQ-BSP* may suggest it is best seen as representing a single issue. This assertion is supported by the facts that the scale created for shared mental model assimilation exhibits acceptable internal reliability ( $\alpha > 0.7$ ; Table 14.15), and that item-total correlations and alpha if item deleted do not suggest that it could be improved by the exclusion of items.

Results from the shared mental model assimilation scale suggest a broadly positive response (mean = 3.65) indicating that, for the most part, this shared mental model of the budget setting process is recognised by individuals across *SWCC*. However, evidence from respondents' comments (Appendix Y) indicates that a number of individuals are not involved with budget setting. Two sets of attitudes appear to be evident, there are those individuals who identify themselves as having absolutely no involvement in the budget setting process: '*don't get involved with budgets*' is a typically forthright comment. Whilst others identify responsibilities within budget setting but see themselves as devolved from decision making, e.g.: '*although I am theoretically partly responsible for a budget and do make some financial decisions, most important decisions and juggling of money between*

*budgets takes place at levels above me.*' The implication of this is that despite the levels of shared mental model assimilation observed, there are still those individuals within the organisation who do not engage with the mental model. It is likely that the relatively high levels of 'neutral' responses obtained for most of the items included in the *MMQ-BSP* (Table 14.13) are indicative of this lack of involvement in budget setting, one respondent's comment even makes this explicit: *'in section 2 I do not know enough about the subject so I have answered neutral.'* This has an important implication for this research. As well as the assimilation suggested above, two other potential issues can be identified in the mental model questionnaire responses, the first is the lack of engagement indicated by a high neutral response, as may be the case for some respondents here, the second is rejection of or disagreement with the mental model by respondents. This scenario would be evidenced by a negative response to the mental model questionnaire. This difference is fundamental as a lack of engagement with a mental model across an organisations presents different needs and pressures on that organisation than rejection of that model would.

Two scales have been derived from the 'learning environment' element of the questionnaire (*LE-SC*), representing attitudes in respect of the learning climate and learning systems across *SWCC*, both of which exhibit acceptable reliability ( $\alpha > 0.7$ ; Table 14.18). These two independent scales have been retained despite the fact that they are not supported through the exploratory factor analysis undertaken. Again, the failure of exploratory factor analysis to identify the supposed structure does not necessarily mean that this structure is inappropriate (Child 1990). It does however mean that extra care should be taken in the subsequent application of scales. Learning climate and systems were therefore retained as separate scales in response to their observed reliability. This differentiation is further supported by the significant difference observed between these two scales through a paired samples t-test, which suggest that learning climate and learning systems are represented by different attitudes across the organisation. They are however correlated, exhibiting 41.0% in shared variation, suggesting that the higher an individual's recognition of the learning climate, the higher their recognition of appropriate systems for learning in *SWCC*. Generally attitudes reported in respect of these items suggest that the recognition of the existence of appropriate learning systems across *SWCC* is higher (mean = 3.42) than learning climate (mean = 2.95). This broadly neutral response for learning climate may suggest that this is lacking in *SWCC*, a more negative response would indicate that the climate in *SWCC* prohibited learning.

Consideration was also given to the temporal stability, construct validity and concurrent validity of these scales. Their temporal stability is broadly confirmed by their test-re-test reliabilities (Table 14.19). There is less support for construct validity however. Whilst the internal consistency of the learning climate and systems scales evidenced through item analyses suggests some construct validity, the failure of the factor analysis to differentiate the scales adopted points towards their failure in this respect. Furthermore, whilst both the learning climate and learning systems scales are significantly correlated with the established *CSI* scale, which may be indicative of construct validity, these correlations are small and of marginal significance. The use of this correlation in this way must therefore be viewed with caution. Furthermore, it is questionable whether a significant correlations between the an individual's cognitive style and their attitudes to aspects of their organisation are truly indicative of validity in this way.

Support for the concurrent validity of the learning climate and learning systems scales is also mixed. Some evidence that the learning climate scale differentiates between groups on the basis of age, of length of service and job-level, and of gender, length of service and job-level in combination was obtained. This suggests that this scale does differentiate between groups which may be supposed to differ in their attitudes in respect of the learning climate across *SWCC*. The only significant differentiation observed in respect of learning systems was in relation to department. This again provides limited support for the concurrent validity of this scale. Reasonable explanations for most of these differences can be identified, which support the limited concurrent validity identified here.

The departmental difference in response observed for learning systems results from Education having a more positive response than the other seven departments in respect of this scale. Items included in the learning systems scale are concerned with training and development, and it is perhaps unsurprising that a department concerned with learning would more readily identify with and support continuing development.

For the learning climate scale explanations for observed differences are less forthcoming. The effect of age suggests that older individuals generally show more awareness of the need for a culture which supports learning, no organisational explanation occurs, but this could be representative of the wisdom that comes with age. Effect of job level in combination with length of service identifies one major difference: scores for the longest serving (>10 years) (and perhaps more senior) managers are noticeably more positive than those across the rest of the organisation (Figure 14.2; Table 14.21). This

could suggest that a learning climate does exist, but only at this level. For gender, length of service and job level together, the greatest differences could be observed between the longest serving (>10 years) female managers and the longest serving female staff (Table 14.22). It is stereotypical, but not unreasonable to suppose that the longest serving female staff are likely to be employed in secretarial and clerical roles, and may be a low priority for the information sharing and communication activities represented in the learning climate scale, hence their more negative response to this item. A reason for the more positive attitude of the longest serving female managers is less obvious, but also could be explained in terms of a fundamental gender difference in approaches to management.

Results for the *OILLs-2* are supportive of its expected composition and of the results obtained above (Chapter Thirteen). They suggest that this development of the questionnaire provides an instrument which is indeed capable of assessing, in terms of workplace behaviour, adaptive/ generative learning at the individual and organisational levels. Furthermore, test-re-test reliability suggests that the individual and organisational learning scales also exhibit acceptable temporal stability (Table 14.9).

Exploratory factor analysis has reconstructed the structure observed for the *OILLs* instrument in the previous study, and both scales exhibit acceptable internal reliability (Cronbach  $\alpha > 0.07$ ; Table 14.8). One 'organisational adaptive' item was recognised as problematic (q1.11), and was removed from the organisational learning scale. One possible explanation for the dubious nature of this item could be the fact that it includes in combination two indistinct qualifiers (shown in italics): 'This organisation has a *limited* range of *very* efficient working practices that it sticks to'. It is likely that the assessment of what is meant by a 'limited' range of 'very' efficient working practices is something that will differ between individuals in a subjective way. This highlights the importance of ensuring that items are as clear and unambiguous as possible (Oppenheim 1992), and that even in scales and instruments which have undergone some development (as is the case with the *OILLs-2*), this is still an issue which can surface.

Despite the single problematic item identified above, the factor analysis and the internal consistency suggest that the *OILLs-2* does exhibit a degree of construct validity (Oppenheim 1992; Hinkin 1995). This was further explored through examination of the correlations between the individual and organisational learning scales and the *CSI*. Scores for individual learning and *CSI* are correlated ( $r = -0.43$ ,  $p < 0.001$ ). Generative learners tend to exhibit a more intuitive cognitive style, adaptive learners are typically analytical.

This logical link between the behavioural measure of learning and the cognitive assessment undertaken through the *CSI* points towards the construct validity of the individual learning scale. Organisational learning was not significantly correlated with cognitive style, and no support for its construct validity is obtained in this way. However, as indicated in Chapter Thirteen, the expectation of a link between the organisational learning and the individual assessment of cognitive style may be unrealistic.

Differences in respect of individual and organisational learning between groups on the basis of respondent characteristics were explored to assess the concurrent validity of these scales. The expectation here is that the *OILLs-2* scales will be able to differentiate between groups supposed to differ in attitudes to individual and organisational learning. Again, results suggest limited support in respect of this form of validity. Individual learning is identified as differentiating between groups on the basis of age, gender, length of service and job level as independent characteristics, whilst organisational learning differentiates on the basis of age and department as independent issues, and between groups identified from length of service and job level in combination.

The effects of age indicates a general increase in positive responses for older individuals in respect of both organisational and individual learning (Table 14.11). For the first three age groups (>31, 31-40, 41-50) the older the respondent the more generatively they view learning, but there is a fall in the mean response for both these variables with the oldest individuals (>50 years). This suggests that in *SWCC*, older individuals generally show more awareness of a need of open approaches to individual and organisational learning, but explanation as to why this might fall for the oldest respondents is unclear.

The pattern of responses for the effect of length of service on individual learning indicates that the shortest (<6 years) and longest serving (6-10 years) respondents having the same mean (3.78) which is indicative of a more generative approach to individual learning than that obtained for the middle group (3.67). Individual learning is also significantly effected by gender, with the male portion of the sample indicating a more positive response (mean = 3.82) than the female (mean = 3.65), suggesting that across *SWCC*, men report their workplace behaviour as marginally more generative than that of the women in the organisation. Job level too has an effect on individual learning with managers reporting more generative individual learning (mean = 3.87) than staff (mean = 3.52). However, despite the statistically significant results obtained, all these differential responses are indicative of generative attitudes in respect of individual learning. This

suggests that despite the differences observed between groups, their approaches in respect of individual learning are in fact reasonably similar, and whilst a degree of difference is evident, this does not represent a fundamental differences in approach. This highlights the importance of identifying the logic behind the statistical differences observed. Particularly here, where the statistically significant tests obtained from relative small differences in attitudes to individual learning may be archetypes of the large sample size, rather than representative of any real differences in attitudes.

Effect of department on organisational learning identifies three departments with a majority of responses above the median for this scale (the chief executive's office, information services and education). For education, the reasons for the more generative response may be similar to those given in respect of learning systems above. The pivotal role of the chief executive's office in any organisation, acting as the hub through which much of the interaction between departments occurs, may explain the recognition of the importance of a generative approach to organisational learning observed here. This may be particularly the case in *SWCC*, which in its operations appears both directive and bureaucratic, with detailed interaction only apparently occurring at higher levels in the organisation. The positive (more generative) reaction of information services to organisational learning may be at odds with this, but it is possible that as this department is required to provide, and support information technology across the entire council, its employees are required to work with and sometimes on placement in other departments, and will need to be more generative in their interaction with the rest of the organisation, in order that they can work with and identify the needs of colleagues and other departments.

Job level was seen in combination with length of service as having an effect on organisational learning (Figure 14.1; Table 14.12). This suggests that whilst attitudes across the rest of the organisation are broadly neutral (means in the range 2.87-3.02), the longest serving (>10 years) managers have a more generative attitude towards learning across the organisation (mean = 3.24). The neutral responses obtained suggest a degree of indifference to learning across the organisation. However, this indifference does not appear to be shared by the council's longest serving managers (who in practice are likely to be more senior managers in the organisation), who are more likely to be required to work and learn across the organisation (*SWCC* is hierarchical, and transfers of information and knowledge are only likely occur at more senior levels in the organisation).

Returning to the *OILLs-2* scales themselves, a paired sample t-test confirms that results for the individual learning and organisational learning scales represent statistically different scales. Nevertheless their correlation (0.22,  $p < 0.001$ ) suggests that they are linked. However, this is limited representing only 4.8% of shared variation (i.e. less than 5% of the variation in individual learning can be explained by the variation in organisational learning and vice-versa). Also it should be remembered that this correlation does not necessarily imply a causal link, but it would not be unreasonable to suppose that individual's attitudes to learning across the organisation could be, in some way affected by their attitudes in respect of their own learning in the workplace.

The significant difference observed in the *OILLs-2* results from higher responses in respect of individual learning (mean = 3.75) compared with organisational learning (mean = 3.07), this suggests that individuals see their own approaches to learning as more generative than those across the organisation. This pattern is similar to that observed in *WBC*, where it was suggested that this difference could represent the desire of individuals to see themselves as independent of their organisation. It was also indicated that this might represent a degree of 'distance' between individuals and their organisations, and this could again be the case here, with some respondents comments (Appendix W) indicating a degree of remoteness or separation from the organisation as a whole. Also, there is the identification by some individuals that their responses would be different if the unit of analysis were the department, rather than the organisation, e.g.: *'If I had considered [department] as the organisation I would have answered some questions differently than for [SWCC] as a whole.'* It is therefore likely that a different pattern of responses would have been observed if the individual, department, and organisation were all identified as units for analysis in the survey, highlighting the complexities affecting the identification of learning in organisations.

One further issue is raised by the responses received for the *OILLs-2*: at 3.07, the mean for organisational learning suggests attitudes to the nature of learning across the organisation are broadly neutral. This has three potential implications. The first is that individuals in *SWCC* see learning across the organisation as being balanced between the adaptive and generative approaches. This would be indicated by positive responses for both adaptive and generative items included in the organisational learning scale which are cancelling each other out when the scale is constructed. The second alternative is that this response represents a general lack of engagement in both adaptive and generative learning,



and broadly neutral responses for items across the scale would indicate this. The third possible explanation is that individuals' attitudes to both types of organisational learning are negative (indicated by negative responses for items across the organisational learning scale) suggesting that the learning across the organisation is dysfunctional. Examination of the distribution of responses and means for the items (Tables 14.2c and 14.2d) suggest that it is the second case which is more likely, with the attitudes of *SWCC*'s employees suggesting a lack of engagement in organisational learning.

Relationships between shared mental model assimilation and the other variables identified are now considered. From Table 14.26 it can be seen that assimilation of the shared mental model is significantly correlated with all the other variables identified, except length of service. The largest correlations were identified between shared mental model assimilation and department ( $r = -0.23$ ,  $p < 0.001$ ), and three of the four learning scales ( $r = 0.22$ ,  $p < 0.001$  for individual learning;  $r = 0.19$ ,  $p < 0.001$  for organisational learning;  $r = 0.17$ ,  $p < 0.001$  for learning systems), yet each of these only accounts for between 5.3 and 2.9% of variation in shared mental model assimilation. The other significant variables (learning climate, learning systems, gender, age and job level), all explain less than 1.5% of variance in shared mental model assimilation.

These relationships were further explored through multiple regression analysis. The resultant regression model which incorporates six of the IVs identified above (organisational learning, individual learning, learning systems, gender, age and department) explains only 16% (14% adjusted) of the variation in shared mental model assimilation. This suggests that assimilation of the mental model of the budget setting process is in fact affected by other variables which have not been identified. The IV which explains most of the variation is department, with the split between internal and service providing departments contributing 6.5% to the explained shared variance. Individual learning contributes 2.8%, gender 1.4% and the remaining IVs (organisational learning, learning systems and age) all contribute less than 1%. The failure of the other significant correlations to contribute to the explanation observed here indicates that their effects are mediated by the six IVs identified above, which in combination contribute 3.5% of the shared variation observed. It should be noted here that the importance of organisational learning in explaining mental model assimilation identified in *WBC* is not identified here. This failure may be linked to the lack of engagement in organisational learning (evidenced the neutral response received in respect of this scale across *SWCC*) identified above.

The significance of department in explaining shared mental model assimilation warranted further investigation. Consequently two further regression models were produced in order that the relationships between shared mental model assimilation and the other IVs could be explored in these two groups independently. No improvements in explanation of mental model assimilation were obtained through this split (it was possible that relationships in one set of departments were hidden by addressing them in combination with the other). Department must therefore be seen as the key variable identified as explaining shared mental model assimilation. Examining the pattern of responses, the departments identified as having greater assimilation of the shared mental model are those which are ‘internal’ to the council providing support services within the organisation, they are: the chief executive’s office, information services, personnel, and the treasurers department. Those departments with lower assimilation are external ‘service providers’ responsible for the provision of direct services (education, planning, transportation and estates, and trading standards). One explanation of this difference could be that this fundamental split in the nature of these departments also indicates a split in their involvement with the budget setting process. Whilst the pressures on these departments are likely to be many and varied, the more open nature of the ‘service providers’ may mean they experience a greater range of pressures and forces (many of which will be service and hence departmentally specific), than those departments ‘internal’ to the council. Hence these ‘internal’ departments have a relatively more straightforward interaction with the budget setting process, which is indicated here through their higher assimilation. This assertion is at least partially supported by concepts within the shared mental model (Appendix R): this split between internal and external service providers was identified, as was the fact that they interact with the budget setting process in different ways. Also, those departments for which specific and individual issues were identified in the shared mental model are those providing direct services (e.g. the effect of standard spending assessments on the distribution of funds across these departments).

#### **14.11 *SWCC* SURVEY PROBLEMS AND LIMITATIONS**

This research is organisation specific. The shared mental model identified (of the budget setting process) and the instrument developed from it (the *MMQ-BSP*) are unique to *SWCC* and prevent the generalisation and external comparison of the results. The further

development of the *OILLs* instrument also reduces its applicability, and comparability with other surveys.

The use of attitudinal, and workplace perspectives for the scales developed also limits this study. Results are based upon individuals' perceptions of the variables identified rather than their direct observation. A problem which cannot be resolved, but should still be recognised. Also, the correlations and statistically significant results observed do not imply causation, and the explanations suggested for these represent conjecture.

The fact that participation was voluntary and anonymous, means that the survey response was self-selecting and therefore may be open to some bias. This may have been compounded by the lack of a second mailing which increases the potential for response bias and socially desirable responding in the sample. Additionally, the decision by the social services department to be excluded from the survey is problematic as it means these results do not cover the full range of *SWCC*'s activities. Given the significance of department identified above, it should also be recognised that a different pattern of responses may have been observed if department had been included as a unit of analysis in the assessment of learning alongside the individual and the organisation.

A number of issues in respect of the shared mental model assimilation variable also need to be recognised. The acceptance of the model from which this is derived was based upon the recognition of this shared model by senior managers in *SWCC*, this is potentially problematic, and as a result this variable must be viewed with caution. The *MMQ-BSP* derived from this shared mental model represents a considerable loss of detail when compared with representation of the shared mental model obtained (Appendix R). This results in a loss of 'fine-focus' in identifying and understanding the interaction between the mental model and other variables that may mask more complex relationships. Furthermore, the high levels of neutral responses to items in the mental model scale, identified through respondents comments (Appendix Y) as indicating a lack of engagement in the shared mental model, may also influence the outcomes of this survey. The treatment of mental model assimilation as the DV in the regression model may also be viewed as contentious.

In light of the limitations identified, in recognition of the exploratory nature of this research, and in a desire to ensure separation between this empirical research and 'learning organisation' consultancy, again no specific recommendations are made.

## 14.12 SUMMARY

Results of the survey undertaken in *Southwest County Council* have been presented above. Instruments assessing individual and organisation learning (in terms of a bipolar adaptive-generative scale), the learning climate, learning systems, and cognitive style across SWCC have been considered, as have the relationships between these, respondent characteristics and the key issue of shared mental model assimilation. Results presented provide some support for the construct and concurrent validity, and temporal stability of the learning scales incorporated, and suggest that within SWCC, department (described in terms of the split identified between ‘internal’ and ‘service providing’ departments) has the greatest effect on mental model assimilation. Ultimately, these results provided evidence in respect of the hypotheses identified (Chapter Seven). These are considered next.

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## **CHAPTER FIFTEEN**

# **Conclusions and Directions for Future Research**

### **15.1 INTRODUCTION**

The preceding chapters have presented and discussed research looking at the relationships between mental models, individual and organisational learning and a range of other factors, including cognitive style. This chapter begins by summarising the research undertaken. Its outcomes are then considered, and in particular evidence for (or against) the research questions and hypotheses is presented. The limitations of and problems with the research are detailed. Overall conclusions are then proposed, and implications of these for the research model introduced in Chapter Six are discussed. This chapter and thesis conclude by considering the directions that any further research may take.

### **15.2 RESEARCH SUMMARY**

The research was split into two phases. The first of these was concerned with the elicitation and representation of the senior managers' individual and shared mental models of particular issues in a range of organisations. The second phase involved questionnaire surveys which attempted to assess the degree to which these managerial mental models have been assimilated across the organisations, alongside the assessment of cognitive style and attitudes on a range of learning measures. Results from both phases were presented above (Chapters Nine to Fourteen), and are summarised below.

#### **15.2.1 Phase 1: Mapping Mental Models**

Four organisations participated in Phase One. This consisted of interviews aimed at eliciting senior managers' mental models of particular issues identified as important to each organisation. The methodology adopted was drawn from best practice identified in

the literature (Eden, Jones and Sims 1983; Jones 1985a; 1985b; Brown 1992; Eden 1992; 1994; Langfield-Smith 1992; Vennix and Gubbels 1992; Scheper and Faber 1994). The organisations studied were: The University of Plymouth Business School (*UPBS*, Chapter Nine); Westcountry Borough Council (*WBC*, Chapter Ten); Southwest County Council (*SWCC*, Chapter Eleven); and Training and Development Southwest (*TDSW*, Chapter Twelve). Each organisation identified its own issue to be addressed, these were: the 'role of the business school' in *UPBS*; the 'service planning process' in *WBC*; the 'budget setting process' in *SWCC*; and the culture of *TDSW*.

In total 28 interviews, lasting between 45 minutes and in one case over two hours, took place, and from these causal cognitive maps were drawn which were taken to represent each individual participant's (senior manager's) mental model of the issue addressed in their organisation. The subsequent representation of the concepts and links identified by interviewees (Appendices J; L; N; P) typically required another hour.

To represent the shared mental model in each organisation, congregate cognitive maps incorporating all the concepts and links identified in the individual maps were created through the merging of concepts from individual maps identified as equivalent with each other (Brown 1992). This process was time consuming, with each shared map taking around 12 hours to complete. Four congregate maps, representing the issue identified in each organisation, were drawn (Appendices K; M; O; Q). Support for and recognition of these maps by senior managers in each organisation was taken as indicating that they represent the senior manager's shared mental model of the issue in question. The implications of this assumption are discussed below, it should however, be recognised as problematic, not least of all because this support was lacking in one organisation (*TDSW*). Graph theoretical measures were used to obtain assessments of the complexity, density and similarity for the (individual and shared) maps produced.

### 15.2.2 Phase 2: Questionnaire Surveys

Phase Two of this research consisted of questionnaire surveys, undertaken in two of the four organisations (*WBC* and *SWCC*). *TDSW* was also expected to participate in this phase of the research, but following the concerns expressed by senior managers in relation to the shared mental model derived in this organisation (Chapter Twelve) over some of its content, they were unwilling to allow the survey to go ahead.

In the initial survey within *WBC* (Chapter Thirteen), the questionnaire contained three key elements. The first was a new instrument (the *Organisational and Individual Learning Levels* questionnaire; *OILLs-1*) which was derived from an existing measure (the *Organisational Learning Orientation Scale*; Sadler-Smith, Chaston and Spicer 1999), and was designed to assess attitudes to learning at the individual and organisational levels, in terms of a bipolar generative-adaptive scale. The second element was a one-off organisation specific instrument, created to assess the extent of recognition (assimilation) of the senior managers' shared mental model of the service planning process (*a Mental Model Questionnaire of the Service Planning Process*; *MMQ-SPP*), and designed in response to best practice in respect of generation of questionnaires for mental model data (Roberts 1976b; Tomaskovic-Devey, Leiter and Thompson 1994; Ferguson, Kerrin and Patterson 1997; Kleindl 1997). Thirdly, respondents' cognitive styles were assessed using the *CSI* (*Cognitive Style Index*), an established measure of cognitive style based upon a single bipolar intuitive-analytical dimension (Allinson and Hayes 1996). Respondent details were also collected. This survey obtained 112 usable responses.

The second survey, undertaken with *SWCC* (Chapter Fourteen) contained a number of developments. A revised and shortened version of the *OILLs* questionnaire was adopted (*OILLs-2*), and a new element was added incorporating scales assessing attitudes in respect of learning systems and the learning climate in an organisation (the *Learning Environment -Systems and Climate* questionnaire; *LE-SC*), again derived from an existing instrument (Chaston, Badger and Sadler-Smith 1999). An organisationally specific mental model questionnaire was derived from the senior managers' shared mental model, here assessing the assimilation of the budget setting process (the *MMQ-BSP*). Data on cognitive style (*CSI*) and respondent details were also collected. 399 usable responses were obtained.

Analytical techniques used in both surveys were similar. Results were described at the item and scale levels, and the reliability, construct validity and concurrent validity of the learning measures (*OILLs* and *LE-SC*) were considered. Multiple regression was employed in order that the influences of the other variables identified (organisational learning, individual learning, learning systems, learning climate, cognitive style, and respondent details) upon shared mental model assimilation could be assessed.

### 15.3 RESEARCH OUTCOMES

The output of the research is considered below. Evidence relating to the research questions and hypotheses are considered, and other, general outcomes are identified.

#### 15.3.1 Research Questions

Three research questions, addressed through Phase One were outlined above (Chapter Seven), and are restated below. These address the creation and representation of the individual and shared mental models. The success or failure of the research to answer each of these questions is considered.

**RQ1:** *Individual mental models of specific issues may be identified and elicited through application of cognitive mapping procedures.*

Individual cognitive maps representing the knowledge and understanding held by senior managers in the organisations studied, of four (organisation specific) issues have been elicited. In the 22 interviews undertaken in *UPBS*, *WBC* and *SWCC* (Chapters Nine to Eleven), these maps exhibited some face validity: when reviewing their maps only two respondents felt the need to change the resultant images, and these changes were minor. As these images are unique, no other forms of validity could be assessed. The fact that maps were typically unchanged upon validation suggests that they are fair representations of individuals' knowledge and understanding (Tomaskovic-Devey, Leiter and Thompson 1994). This acceptance of the maps, identified here as being indicative of face validity was taken above as indicating the success of the cognitive mapping procedure adopted. Managers' identification with their own maps was seen as indicating that they are representative of their individual mental models in respect of the issues identified. Furthermore, feedback from interview participants was identified above as being supportive of the view that the individual cognitive maps obtained are not only representative of explicit knowledge and understanding, but also identify and characterise implicit understanding as well. A number of respondents, when discussing their maps with the researcher following their interviews claimed that these identified relationships which they had not explicitly 'recognised' before. As all the content of an individual's map was created by that individual, this suggests that the cognitive mapping methodology adopted



may indicate deep understanding, and complex constructs representing individuals knowledge in respect of the issues addressed (Norman 1983; Scheper and Faber 1994). All this appears to indicate the ability of the cognitive mapping procedure to identify individuals' mental model which guides their behaviour and decision making in respect of these organisationally derived issues.

However, support for individual maps was not always forthcoming. Two of the six interview participants in the final organisation (*TDSW*) failed to return maps which were sent to them for validation. Whilst this does not categorically identify these maps as unrepresentative, it does mean that both these models may have less validity than those sanctioned by subjects, and the extent to which they truly represent their owners' knowledge and understanding cannot be gauged. Beyond these failures to obtain face validity, it should be recognised that assessment of face validity is itself subjective (Bailey 1994; DeVaus 1996), and whilst support by individuals may be indicative, this cannot be taken as fact, especially where respondents may have a vested interest in seeing their map as effective. Respondents may have been willing to accept their cognitive maps rather than identify them as inappropriate because doing the latter might open individuals to the criticism that they do not recognise or understand an issue which is important to the organisation in which they work. Furthermore, a number of the models obtained are simplistic, containing relatively few concepts and/ or links, which is at odds with the conceptualisation of mental models as complex abstract or conceptual archetypes built through detailed understanding (Johnson-Laird 1983). This assertion is based upon the acceptance that it is a complex rather than a simple mental model that is held by individuals in respect of the issues identified, which would be realistic given the nature of these issues.

Overall, evidence appears to suggest that the first research question has achieved only limited support. The cognitive mapping procedure adopted indicates a degree of face validity and appears capable of identifying the complex and implicit knowledge and understanding in respect of the specific issues identified in the organisations studied. However, the extent to which this knowledge and understanding is truly representative of these individuals' mental models is difficult to assess. Cognitive mapping was introduced above in order that a degree of separation would be maintained between the images elicited and the mental models they are taken to represent, and this distinction holds. Mental models were identified above as 'conceptual constructs' which help individuals

and researchers understand understanding. This description is deliberate and fundamental, the need to comprehend how individuals obtain, retain, share and utilise knowledge and information is key to the development of an understanding of learning at every level, and whilst the mental model concept allows us to characterise these mechanisms, their own complexity, and the complexity of the issues they represent and environments in which they are acted upon, all mitigate against their clear delineation. The complexity of the mental model construct was discussed in detail above (Chapter Four), and it is this complexity that ultimately prevents their categorical identification. Therefore whilst the acceptance of their cognitive maps by participants in the interviews has been used to confirm that these maps are representative and allow the research to proceed, it is recognised that these images cannot be explicitly equated with mental models, and as a result, they should be seen as being used and identified as proxies or approximations for the mental models, rather than representing the mental models themselves. This distinction retains that made above between cognitive maps and mental models, and allows for the fact that they may not be equivalent. It should also be recognised that methodologically, the approach adopted has a number of other benefits which are discussed below, and despite the distinction made it still represents an effective and efficient means for the elicitation and representation of individuals' knowledge and understanding.

**RQ2:** *Shared mental models may be constructed through the aggregation of individual mental models which are representative of the shared understandings of the issues identified and elicited through the cognitive mapping procedure.*

Congregate cognitive maps representing shared understanding of each the specific issues were drawn, one for each organisation, four in total. These congregate maps incorporate all the concepts and links identified in the individual maps, connected through those concepts identified as sufficiently similar upon merging (see Chapter Nine for details of this process). This approach ensures that the shared map created contains all the elements of the individual maps, and in this respect can be seen as representative of all of the individual images. Furthermore, the creation of additional connectivity within the aggregated (shared) map (identified in the higher complexity scores obtained in the shared maps compared with individual maps, see below), by the bringing together of distinct individual models, suggests that additional (shared) understanding is evident when individuals are able to link and share their knowledge and understanding.

The face validity of these maps was assessed with the senior management groups/boards in each organisation (except *UPBS*). The congregate cognitive maps were presented to these groups, and acceptance of and identification with this representation of shared understanding by managers in *WBC* and *SWCC* indicates a degree of face validity for the shared maps obtained in these organisations. This acceptance was taken (as it was with the individual maps) to indicate that the image obtained represents the mental model of the issue identified as shared in each organisation. However in *TDSW*, less support was evident, and senior managers identified a number of concerns in respect of the issues identified in the shared map (describing *TDSW*'s developing culture). This points to a lack of face validity, and may suggest that the shared image obtained is not representative of this group's shared understanding. However, in discussion above (Chapter Fifteen), this lack of support was identified as representing the senior management's concerns that the rest of *TDSW* would respond negatively to the aspects of the shared cognitive map they identified as problematic. These managers did recognise the map, but believed some of its content was contentious, and consequently, they were unwilling to expose their shared understanding to the rest of the organisation.

The results suggest that the shared maps do possess some utility, in that they appear to provide a means for surfacing and sharing important, and potentially contentious issues across an organisation. However, the distinctions and limitations identified for the individual maps remain, in that if these are only proxies for the individual mental models and cannot be explicitly identified as representative of it, and as the shared map is derived from them, the shared map must, at best only be a proxy for the shared mental model. Also, as the shared image obtained is a construct built through a systematic process following interviews with individual senior managers, it is in effect artificial, and as a result, evidence as to the extent to which it is truly representative of shared understanding and the shared mental model are further limited. Meaning supposed through aggregation in this way is not the same as shared meaning obtained or created through learning across an organisation, and cannot be linked to a particular level of learning (generative or adaptive). This represents a fundamental limitation, which may outweigh the potential of the methodology applied here. Furthermore, the facts that the participants in the interviews were all senior managers (excepting *UPBS*), and that the acceptance of the resultant image was obtained at the senior management level, mean that these images must be seen at best, as indicative of the shared understanding at the senior management level only, and whilst

the merging process does suggest additional shared understanding, no support for the effectiveness or relevance of this was obtained. All this means that whilst within its boundaries, the process adopted for the creation of a shared image is effective, it does not completely support this second research question.

**RQ3:** *Techniques may be developed which allow structured comparison of the complexity and similarity of the individual and shared mental models obtained within an organisation.*

The third research question addresses the identification, development and use of measures for assessment of the complexity and similarity of the images obtained. Here, it is the structure of representations, rather than their fundamental nature, that is being explored.

The measure of similarity identified above was developed from that used by McKeithan et al. (1981), this assesses the similarity of two maps on the basis of their 'proportion in common' (Appendix D), in effect the ratio of shared concepts between two maps over the total number of concepts contained in both maps, but this is based upon a natural logarithmic transformation in order to minimise the effects of map size. Whilst McKeithan et al. (1981) report a successful application of this measure, the models they elicited were significantly different to the causal cognitive maps drawn here. Hence, the use of this similarity measure here represents a new application. This has been broadly successful, and within organisations figures for similarity between individual models were in the range 0.000 to 0.702 (the zero figure was obtained in *WBC*, and indicates that two respondents had models that were distinct and unconnected). However, the use of this measure does create a number of issues. The first of these is the absence of norms. As this measure has not been applied to causal maps of this type before, there are no studies with which the levels of similarity obtained here can be compared. If the continued use of this measure is to be made, and indeed both cognitive mapping and the study of mental models would both benefit from consistent and comparable studies, the outcomes of this research represent a starting point in this respect, similarities for 86 pairs of individual models are identified above, and examining these a tentative suggestion may be that a figure of less than 0.350 would be indicative of low similarity (and of two models which contain less than approximately 20% of concepts in common), whilst a figure in excess of 0.650 might indicate a relatively high similarity (indicating two models which have in excess of half

their concepts in common). Further work is needed to confirm or refute these norms. The identification of appropriate norms is complicated by the natural logarithmic scale adopted, and whilst this improves the comparability of similarity estimates obtained, limiting the effect of model size, the absolute size of models still needs to be considered, as the larger the models, the greater the number of concepts and the greater the potential that some of these will exist in common. This is evident in the figures for similarity observed between individual maps and the congregate shared map in each organisation, as all concepts from every individual model have been included in the shared model, this measure effectively represents the proportion of contribution that each individual map makes to the shared map, which is ultimately dependent on the number of concepts that map contains. Results for similarity also suggest that the protection against the effect of model size afforded by the natural logarithmic transformation is reduced when the two models compared are of vastly differing size, and that the norms suggested above are only appropriate for models of size similar to those obtained here. Across the four organisations studied, the number of concepts contained in individual maps ranged from 12 to 36.

Two measures of complexity were adopted. A simple measure of complexity ( $\beta$ ) and a measure of model density ( $\gamma$ ).  $\beta$  describes complexity of models in terms of a ratio of links per concept (Johnson, Gregory and Smith 1986), and across the individual maps in all four organisations scores were in the range 1.15 to 2.87.  $\gamma$  measures density by calculating an index of the total number of links in a causal map divided by its theoretical maximum number of links, defined as the maximum possible number of links between a given number of concepts (Klein and Cooper 1982). This scale has a theoretical maximum score of one which would indicate that every concept is directly linked to every other concept in a model. Across all four organisations density scores for individual maps were in the range 0.034 to 0.212. Calculations for both these scales are included in Appendix D. Again, whilst other applications of these indices have generated norms (notably in the study of physical systems; Haggett and Chorley 1969), these are wholly inappropriate for the maps developed here, and as the application of both these scales to causal maps of the type studied here has not been undertaken, no norms exist.

For complexity, the values obtained (1.15 to 2.87) suggest that a ratio of two concepts per link might represent a useful break point between higher and lower levels of complexity. On the basis of this, across the four organisations studied 18 individual maps have low complexity ( $<2$ ), ten have high ( $>2$ ). However, *TDSW* is unique, in that all the

individual maps obtained here have complexities below two, with the split in the other three organisations being more even. Examining these models highlights a key point. The low levels of relative complexity observed in *TDSW* result from the highly descriptive nature of the models obtained (respondents typically identified a number of concepts describing the elements of the company), and hide the fact that these models are in absolute terms more complex, in that they generally incorporate a higher actual number of concepts than those obtained in the other organisations. Care must therefore be taken in the application of this measure. The absolute (actual) size of a model is still important, and as a result the norms suggested should at best only be seen as indicative of models of equivalent size (i.e. number of concepts) to those identified here.

The density scores obtained (0.034 to 0.212) are all considerably smaller than this index's theoretical maximum of one. However, it was suggested in previous chapters that this maximum score is inappropriate in the context of the models studied, as it would be evident of a degree of connectivity between concepts that is itself inappropriate for the causal maps of knowledge and understanding obtained. The mapping process adopted draws links between concepts on a sheet of paper. Long before the theoretical maximum score of one is reached such a model would become too complex to represent, and would effectively become incomprehensible. A model containing ten concepts would have to include 45 links to gain a density score of 0.500, for a 15 concept map the score requires 105, and 20 concepts requires 190 links. This demonstrates that the potential number of links rises exponentially as the size of the model increases, and means that the absolute size of a map, i.e. the actual number of links and concepts it contains, is again important. Furthermore, it could be argued that an individual whose map contains a vast number of links is indicating a failure of understanding which is as important as, but resulting from very different reasons to the failure of understanding that low density and a lack of links might indicate. Recognising this, for maps comparable with those identified here, a range of 0.050 to 0.200 might be seen as representing 'acceptable' or 'typical' scores for density. These are however entirely subjective.

The effect of size on complexity ( $\beta$ ) and density ( $\gamma$ ) scores is evident with the shared maps generated in each organisation. Typically, the shared map in each organisation had a lower density, but higher complexity than any of the individual models. The lower density results from the higher potential number of links created between the larger number of concepts present when the individual models are merged. Whilst

complexity goes up because the coupling of concepts through the merging process effectively reduces the absolute number of concepts (compared with the total number of concepts in the individual models separately) without a commensurate reduction in links, as individuals identify different links for the same concept which are all incorporated in the shared map. It is in this way that the additional understanding identified above as evident in the shared model is itself identified.

Overall, it should be recognised that the scales adopted, within the limitations identified, all represent useful first steps in the establishment of these tools for the assessment of causal maps. However, as this research has been unable to explicitly link those maps with mental models, the effectiveness of the measures in characterising mental models cannot be commented upon.

In the preceding discussion of the research questions, no explicit link has been obtained between the cognitive maps and the mental models they are taken to represent, and as a result these maps, are seen at best as being only proxies for mental models. This distinction is not widely recognised, and has implications in the context of wider mental modelling research which are discussed below. However, where these maps are referred to in the survey results below, the term mental model will be retained. Despite their limitations, and in some ways because of their recognition, these causal cognitive maps still represent the best form of mental model representation which could be identified.

### 15.3.2 Hypotheses

The hypotheses which were described in Chapter Eight are presented again below. These link to the empirical surveys undertaken in *WBC* and *SWCC* in Phase Two of this research. Results, analysis and evidence relating to each of these hypotheses are considered below.

**H1:** *The shared mental model obtained at the management level is assimilated and evidenced by individuals throughout an organisation.*

Shared mental model assimilation was assessed in *WBC* and *SWCC* through application of organisation-specific questionnaires derived from the shared mental models generated for these organisations in Phase One. In both organisations responses were broadly positive, which appears to indicate that the shared mental models obtained at the senior

management level are evidenced and assimilated by individuals throughout both organisations. In this way, these results can be seen as supporting Hypothesis One.

This support is important for this research, as without recognition of the senior management mental model, and the resultant implication that this mental model is more widely shared in the organisation, the relationships between mental models and learning cannot be explored. However, one key limitation should be noted. The shared models generated in Phase One were described above as proxies for the shared mental model in organisations. It is these models that have been used to construct the mental model questionnaires. This means that it is the assimilation and recognition of the shared understanding represented in these proxies rather than mental models themselves which is being assessed, and as a result, as has been suggested above any relationships with mental models identified must only be viewed as conjecture. It should also be recognised that items for inclusion in the mental model questionnaires were selected on the basis of those which were identified as 'most important' within the shared model derived in Phase One (i.e. extent merged, and domain and centrality scores), in the expectation that it would be these key concepts which are most likely to be shared across the organisation. This positive selection may have introduced bias and potentially increased the extent of assimilation observed. It is also possible that, despite the attempts to minimise their likelihood, the positive responses observed are indicative of acquiescence and/or social desirability in responses. All these limitations therefore suggest that the support for Hypothesis One must be qualified.

**H2:** *Assimilation of the shared mental model by individuals throughout an organisation is consistent, in that this assimilation is representative of a single factor depicting consistent understanding of the mental model 'issue' across that organisation.*

In considering Hypothesis One above, generally positive attitudes to the items incorporated in the mental model questionnaire was taken as indicative of the assimilation of senior managers understanding of the issues presented across the organisations studied. However, examination of the detail of both sets of survey responses indicates more complex patterns within the response.

In *WBC* principal components analysis of items identified two factors which upon examination appeared to be indicative of two latent variables. The first of these contained



items concerned with ‘commitment’ to service planning, the second related to the ‘outcomes’ of the service planning process. Scales were derived for both of these which were identified as having acceptable levels of internal reliability, and a paired sample t-test confirmed these scales were significantly different. Attitudes in respect of commitment were higher, i.e. more positive (mean = 3.75), than those for outcomes (mean = 3.08).

No latent variables which could be easily labelled were evident through principal components analysis of items undertaken with the mental model questionnaire in *SWCC* (addressing the ‘budget setting process’). As a result a single scale was constructed for mental model assimilation in this organisation. Again this exhibited acceptable levels of internal reliability, and had a positive mean (3.65). However, in *SWCC*, despite the positive response indicated by the mean, a considerable quantity of neutral responses were identified within the survey, supported by respondent comments in which a number of individuals identified a lack of engagement with the budget setting process.

The outcomes from the results described above mean that Hypothesis Two must be rejected. Whilst evidence suggests that the assimilation, or at least recognition of the senior managers’ shared model has occurred within the organisations studied, this is not consistent. Evidence from *WBC* suggests that the mental model questionnaires and the issues they represent, cannot necessarily be considered as a single factor, even the relatively simple issues studied here potentially contain a number of elements, which are assimilated differently across an organisation. Whilst in *SWCC* results suggest that individual’s attitudes indicating assimilation may themselves be inconsistent across an organisation as a whole. Implications of this will be detailed further below.

**H3:** *Adaptive and generative learning represent the poles of independent scales for learning at the individual and organisational levels.*

Attitudes in respect of adaptive and generative learning at the individual and organisational levels were assessed through the *OILLs* questionnaire (*Organisational and Individual Learning Levels*). Two versions of this were employed, with the second application of the questionnaire (in *SWCC*) representing a revised version following its assessment in application with *WBC*. In both cases, factor analysis (principal components analysis of items), and item analyses (item-total correlation; Cronbach’s  $\alpha$ ) broadly confirmed the hypothesised structure. Individual and organisational items within the *OILLs* questionnaire

load onto separate factors which exhibit internal consistency, and generative and adaptive items load upon these with different signs (+/-). In the realisation of scales from this instrument, generative items were treated positively, adaptive negatively so that each scale represents learning (at the individual or organisational level), upon which a high score is indicative of generative attitudes, a low score of an adaptive approach. The factor, item, and other analyses suggest that both scales exhibit some construct and concurrent validity. Test-re-test reliability, assessed in *SWCC*, indicated that both scales are stable over time.

The outcomes in respect of the *OILLs* suggest acceptance of Hypothesis Three. The hypothesised structure in relation to generative and adaptive learning at the individual and organisational levels has been broadly confirmed. However the limitations upon this should be noted. Firstly, the *OILLs* does not measure learning directly, instead it assesses attitudes to learning as evidenced in workplace behaviour. Consequently, Hypothesis Three should be more properly thought of relating to the structure of the *OILLs* rather than learning in the wider sense, and the relationships between adaptive and generative learning, and the individual and organisation as units of analysis these results suggest are explored further below. This assessment also has a limitation, shared in common with all research of this type, in that hypotheses are only tested in relation to the perceptions of reality held by respondents (Black 1993). Furthermore, validity is not consistent across the scales, and the basis for some validity assessments made could be questioned (see below).

**H4:** *The attitudes of individuals towards organisational learning are commensurate with their espoused approach to individual learning.*

A similar pattern of responses in respect of individual and organisational learning was obtained in both organisations (*WBC* and *SWCC*). Paired sample t-tests confirmed that the scales were representative of different attitudes. They are however, significantly correlated ( $r = 0.23$ ,  $p < 0.05$  in *WBC*;  $r = 0.22$ ,  $p < 0.001$  in *SWCC*) indicating that the more generative a respondent's attitude to individual learning, the more generative their attitude to learning across the organisation, and visa-versa. However in both organisations, the observed correlation accounts for only around 5% in shared variation, and results suggest that attitudes in respect of individual learning are more positive (i.e. indicative of more generative attitudes) in both organisations (mean = 3.65 in *WBC*, and 3.75 in *SWCC*) than those for organisational learning (mean = 3.21 in *WBC*, and 3.07 in *SWCC*).

The results suggest limited support for Hypothesis Four. Individual and organisational learning represent independent scales, but these are linked. In both organisations, those individuals who report their approach to individual learning as more generative are more likely to express generative attitudes in respect of organisational learning. It should be recognised however, that this relationship, whilst significant is small, and that the limitations in respect of these scales identified above still apply. In particular, attitudes in respect of individual learning are in fact more generative than those for organisational learning, and this was identified above as potentially resulting from the desire of individual to assert their individuality and see themselves as superior to their organisation. Also, the rates of response obtained are such that these (and other) statistically significant relationships may be also be an artefact of sample size. Other implications and outcomes linked to these scales are discussed below.

**H5:** *The attitudes of individuals towards learning systems and learning climate represent linked but independent scales describing differing aspects of the learning environment.*

Items relating to learning systems and climate were incorporated in the revised questionnaire applied in *SWCC*. Scales for these variables were identified as having internal reliability, and exhibit degrees of both construct and concurrent validity (see below). Test-re-test reliability confirms that both are stable over time. Factor analysis of the items which make up these scales however did not identify the expected structure.

Results suggest that attitudes in respect of both these scales are linked, as they are significantly correlated ( $r = 0.64$ ,  $p < 0.001$ ), exhibiting approximately 41.0% of shared variance. They are nevertheless confirmed as separate scales through a paired sample t-test, with attitudes in respect of learning systems being more positive (mean = 3.42) than those for learning climate (mean = 2.95), which are themselves broadly neutral.

Again results suggest qualified support in respect of this hypothesis (Five). Attitudes in respect of learning systems and climate are undoubtedly linked, exhibiting over 40% in shared variation. Nevertheless these still appear to represent independent scales (suggested by their internal consistencies and the t-test). Whilst factor analysis failed to support this structure, it should be remembered that this does not necessitate its rejection (Child 1990), but does limit its endorsement. Limitations in respect of scale

variables identified with the *OILLs* above also apply here. Other outcomes relating to the learning climate and systems scales are identified below.

**H6a:** *Attitudes in respect of organisational learning are independent of cognitive style.*

**H6b:** *Attitudes in respect of individual learning are independent of cognitive style.*

**H6c:** *Attitudes in respect of learning systems are independent of cognitive style.*

**H6d:** *Attitudes in respect of the learning climate are independent of cognitive style.*

No relationship was observed between organisational learning and cognitive style (*CSI*) in either organisation. Individual learning and cognitive style were significantly correlated however ( $r = -0.40, p < 0.001$  in *WBC*;  $r = -0.43, p < 0.001$  in *SWCC*). This indicates that in both organisations, the more generative an individual's attitudes to individual learning the more intuitive their cognitive style, the more adaptive their attitudes the more analytical their style. Significant relationships were also found between cognitive style and both learning climate and learning systems in *SWCC*. These are, however small ( $r = 0.09$  for learning climate;  $r = 0.12$  for learning systems), in each case explaining less than 1.5% in shared variance and are of only marginal significance ( $p < 0.05$ ).

The results obtained suggest the acceptance of Hypothesis Six-a, and the rejection of the other three sub-hypotheses identified. However, given the marginal nature of the results obtained in respect of learning climate and systems rejection of Hypotheses Six-c and Six-d must be qualified.

These results were also used in combination with the factor and item analyses to explore the construct validity of the learning measures adopted. Results with respect to individual learning do suggest a degree of construct validity, in that a clear, logical and significant link can be made between the established individual assessment of cognitive style, and the new behavioural assessment of learning at the individual level. No such link exists with organisational learning. Results for the learning systems and climate scales are also less than convincing. Their marginality suggests that any assertion of construct validity on this basis is limited. Additionally, it could be considered inappropriate to compare organisational variables with an individual scale (*CSI*) in this way.

**H7:** *Responses in respect of the learning variables identified (individual and organisational learning; learning climate; learning systems) are independent of respondent characteristics (gender; age; length of service; job level; department).*

Hypothesis Seven must be rejected. Across the two organisations studied, significant effects were observed for age, and department independently, and length of service and job level in combination on organisational learning. Gender, age, length of service, and job level all have independent effects on individual learning. Two significant two-way interactions were also observed on individual learning: gender and age; and length of service and job level. In *SWCC*, significant effects of department on learning systems and of age alone, length of service and job level, and gender, length of service and job level in combination on learning climate were observed.

These results were also used to indicate the concurrent validity of the learning scales, with the ability of these scales to differentiate between groups (based on respondent characteristics), which can be supposed to differ in the attitudes to learning (across the measures), indicating that they are valid in this respect. However, it should be recognised that some of the observed differences are not necessarily indicative of fundamental differences in attitudes to these scales, instead identifying differences in degree. This is particularly the case in *SWCC* where the large sample obtained allows statistically significant relationships to be identified with relatively small differences in response. Also, logical explanations for some of the observed differences were not identified. This may suggest they are spurious or irrelevant.

**H8a:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to generative learning at the individual level.*

**H8b:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to generative learning at the organisational level.*

**H8c:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to espoused attitudes in respect of its learning system.*

**H8d:** *The extent of assimilation of the shared mental model throughout an organisation is positively related to espoused attitudes in respect of its learning climate.*

**H8e:** *Individuals' assimilation of the shared mental model throughout an organisation is positively related to intuitive cognitive style.*

**H8f:** *The effects of organisational learning, individual learning, learning climate, learning systems and cognitive style on shared mental model assimilation are independent.*

**H8g:** *The extent of assimilation of the shared mental model throughout an organisation is independent of respondent characteristics (gender; age; length of service; job level; department).*

This final hypothesis addresses the key relationships of this research: the interactions between mental model assimilation and the other variables identified, hence the identification of seven sub-hypotheses. These were explored through multiple regression in which shared mental model assimilation was identified as the dependent variable.

Limited support for Hypothesis Eight-a was obtained in *SWCC*, here individual learning and mental model assimilation were significantly correlated ( $r = 0.22, p < 0.001$ ), and individual learning contributed 2.8% to shared variance explained in the regression model. In *WBC*, no significant relationship was observed between service planning commitment (the first of two mental model variables) and individual learning, and whilst service planning outcomes and individual learning are significantly correlated ( $r = 0.21, p < 0.001$ ), individual learning was not identified as significant within the regression model. These results do not indicate a consistent relationship between individual learning and shared mental model assimilation, and suggest that Hypothesis Eight-a should be rejected.

Strong relationships were observed between mental model assimilation, in terms of both service planning commitment and outcomes, and organisational learning in *WBC*, both variables were significantly correlated with organisation learning ( $r = 0.50, p < 0.001$  for commitment,  $r = 0.63, p < 0.001$  for outcomes), and organisational learning contributed the majority of explanation for variance in regressions with both these variables (21% for commitment and 29% for outcomes). These results suggest the acceptance of Hypothesis Eight-b in this organisation. However comparable results were not obtained in *SWCC*, whilst organisational learning and mental model assimilation are significantly correlated, ( $r = 0.19, p < 0.001$ ), the extent of the relationship this explains is smaller, and whilst organisational learning was entered into the regression model in this organisation, its

significance is marginal, and it is only identified as contributing less than 1% to the explanation of shared variance.

Hypotheses Eight-c and Eight-d were only assessed in *SWCC*. Both learning climate and learning systems were significantly correlated with shared mental model assimilation ( $r = 0.17$ ,  $p < 0.001$  for learning systems;  $r = 0.11$ ,  $p < 0.001$  for learning climate), but for each the percentage of variation that either has in common with shared mental model assimilation is small (less than 3%). Learning climate was not significant in the regression model, and whilst learning systems was included it was of marginal significance, and contributed less than 1% to the explanation of shared variance. These results point to the rejection of both these hypotheses.

No significant relationships were observed between cognitive style and the mental model variables in *WBC*. In *SWCC*, the correlation between cognitive style and shared mental model assimilation of  $r = -0.09$  was statistically significant at the 5% level and identifies only 0.81% of variation in common. Cognitive style was not significant in any of the regression models. Results point to the rejection of the hypothesis (Eight-e).

Hypothesis Eight-f was included in order that any relationships between the key independent variables included in the regression model could be explored. Across the two studies, significant correlations were identified between organisational learning and individual learning, individual learning and cognitive style, organisational learning and learning climate, organisational learning and learning systems, cognitive style and learning climate, and cognitive style and learning systems. A number of these were identified above. Despite these correlations, none of the variables identified exhibited multicollinearity (i.e. shared variation) to the extent that they should have been excluded from or aggregated within the regression models. Nevertheless, the significant correlations observed point to the rejection of Hypothesis Eight-f.

The final sub-hypothesis (Eight-g) identifies the effect of respondent characteristics on mental model assimilation, again results point to its rejection. In *SWCC* all of the respondent characteristics, excepting length of service were significantly correlated with mental model assimilation. Whilst gender and age also contributed to shared variation in the regression, the most important respondent variable identified was department. This was aggregated into a dichotomous dummy variable identified through chi-squared comparison of medians, which categorised respondents on the basis of whether they worked within the

council's internal departments (chief executive's office; treasurers; personnel; and information systems), or in those departments identified as providing service direct to the community (education, transportation and estates, planning and trading standards). In *SWCC* this was correlated with shared mental model assimilation ( $r = -0.23$ ,  $p < 0.001$ ), and department was identified as the most significant variable in the regression model, explaining 6.5% of variance in assimilation. In *WBC*, department was the only respondent characteristic significantly correlated with either mental model scale ( $r = -0.28$ ,  $p < 0.01$  for commitment;  $r = -0.38$   $p < 0.01$  for outcomes). Here, the dummy variable identified through chi-squared comparison of medians represents the differences in responses observed between the chief executives department and all the other departments. This split was identified as significant in respect of the service planning outcomes regression, explaining 3% of shared variance, as was age which explained 2%.

Overall results in respect of mental model assimilation suggest highly complex relationships between mental model assimilation and the other variables identified. These appear to be specific to the organisations studied. Evidence in *WBC* points towards a strong relationship between mental model assimilation and organisational learning. This was not observed in *SWCC*, where the nature of departments appears most important in explaining the assimilation of the mental model issue. These differences and their implications are discussed further below.

### 15.3.3 Other Research Outcomes

As well as the results described above, a number of other outcomes can be identified. Whilst these do not necessarily relate directly to the issues identified above, they are still significant in the wider scope of the research, and are considered below.

Returning to Phase One, and the cognitive mapping undertaken here, it should firstly be recognised that this process has a number of methodological outcomes. The distinction made between mental models and cognitive maps is the most important of these, which has implications for mental model research in the widest sense. The point was made above that the causal cognitive maps obtained represent the best form of mental model representation available, despite and in some ways because of the recognition of their limitations. Care has been taken through this thesis to separate the conceptual construct of the mental model from its physical representation as a cognitive map. The



limitations of the mapping procedure identified centre around its failure to identify images which can be categorically linked to the mental models it is aiming to represent. This is a criticism that can be levelled at much of the research identifying and describing mental models evident in the literature (see Chapter Four), but it is not one which is widely recognised, nor made explicit by the majority of researchers. Methods drawn from cognitive mapping are widely used to identify and describe mental models without considering the differences between these models and their representations. Making this explicit, at least allows this fundamental difference to be recognised, if not yet overcome.

The methods adopted in Phase One also have benefits which mitigate against some of the common criticisms of cognitive mapping approaches. The limited face validity obtained has already been discussed. The interview procedure adopted is relatively straight-forward and not too time-consuming, as a result, it appears not to suffer the lack of buy-in by participants which other methods obtain (Swan 1995). The methods adopted also identify the individuality of maps by retaining their owners language (Norman 1983), and may be capable of identifying deeper implicit understandings and hence complexity of understanding in respect of the issues studied. The method adopted is systematic, and hence does not allow untoward influence on the part of the researcher (Brown 1992), but skill, training and practice on the part of the researcher are still important in ensuring maps are as comprehensive and complete as possible. All these benefits point to the interview procedure itself as a research outcome.

The generation of the shared map was more time-consuming. However, within this it should be recognised that the elicitation of 'property' information detailing and describing concepts significantly added the researchers confidence in the merging process (Scheper and Faber 1994; Bougon 1992). An additional unexpected use was identified for this property information above, in that it provided the researcher with information explaining terms which were unfamiliar. This points to an further application for this methodology. The cognitive mapping procedure undertaken represents a grounded approach which allows for detailed and comprehensive assessment of understanding in respect of specific issues across any organisation or group, even when a researcher is uninformed as to the detail of that issue (as was the case here). The methods described have much to commend them, even for researchers not interested in cognitive maps as representations of mental models. Another outcome of this research related to this is the data generated in respect of the four organisational issues. Whilst this was considered

above, it is of only peripheral interest in this research, and could be considered separately for what it tells us about these important organisational issues. Within this, further use could be made of the domain, centrality and merged data which identify the relative importance of concepts with the shared mental model.

Also potentially important to the organisations studied are the implications of the extent of the similarity, complexity and density observed within the maps obtained. These too have implications in terms of research into cognitive maps and mental models. Norms for each of these measures were suggested above, and the application of these measures to causal maps and the norms that have been tentatively suggested as a result are themselves outcomes of this research, but their limitations should be recognised. The point was made above that whilst a map which has a low density (relatively few links) and fails to identify any complexity in respect of an issue could indicate the failure of that map's owner(s) to adequately understand the issue it addresses, it is also possible that a map with an excessively high density, which contained a vast number of links, may equally be indicative of a failure to properly understand an issue. In this second scenario the owner(s) may be overcompensating for their poor understanding by indicating all the possible links rather than those which are important, relevant or significant. Reasons for and strategies for overcoming both failures would be different. Similar distinctions could be made for complexity. For similarity, the two extremes are characterised by pairs of maps which either have no concepts in common or are identical. In the first case the total lack of shared understanding is problematic when individuals are required to work together and interact over the issue in question. In the second case there is redundancy which has effectiveness issues for the organisation in question. To some extent, all these issues are evident in the four organisations studied, and would warrant further investigation.

Turning to Phase Two of the research, the development of the new instruments incorporated in the surveys is in itself a significant outcome of this research. In particular the *OILLs* instrument which in its application here has demonstrated a consistent structure, representing individual and organisational learning as independent bipolar adaptive-generative scales. These scales have been explored through factor analysis, and demonstrated both internal and test-re-test reliabilities. Some construct and concurrent validity for the organisational and individual learning scales have also been obtained. The *LE-SC* incorporating scales assessing learning climate and systems has not received as much support. Whilst the scales do demonstrate internal and test-re-test reliabilities, they

were not identified in exploratory factor analysis, and whilst some evidence of concurrent validity was obtained, the support for the construct validity of this scale is not strong.

No mention was made of the face (content) validity of either of these measures (*OILLs* and *LE-SC*) above. This is essentially subjective, ultimately dependent upon the opinions of a researcher (Bailey 1994; DeVaus 1996). Here, there is no reason to suppose that the scales are not indicative of the constructs they are supposed to measure. However, in respect of attitudes to organisational and individual learning, the relationship observed between individual learning and cognitive style observed as indicative of construct validity above, might suggest that it could be more appropriate to view these as representing individual and organisational learning styles (in terms of a preference between adaptive and generative approaches in the workplace), rather than representing individual and organisational learning *per se*.

Despite the limitations identified above, results nevertheless suggest that further development of both the *OILLs* and the *LE-SC* is legitimate. Also, the assessments of validity and reliability made should themselves be seen as a significant outcomes of this research, given that these are issues which are not consistently addressed with measures adopted elsewhere (Thompson 1994; Whittington 1998).

It should also be recognised that a number of relationships (statistically significant correlations) were observed which have not been identified above, particularly between the learning scales identified. In particular, high and statistically significant correlations were obtained between organisational learning as measured by the *OILLs*, and the learning systems and climate scales contained in the *LE-SC* ( $r = 0.66, p < 0.001$  for climate;  $r = 0.56, p < 0.001$  for systems). No significant correlations were observed between individual learning and either of the *LE-SC* scales. These links may suggest a degree of construct validity. Organisational learning, learning systems and learning climate are all aspects of the organisation, individual learning is not. Correlations between these scales may be more indicative of construct validity than the supposed correlations with cognitive style which is a individual rather than organisational construct. This validity is, of course conjectural as none of these learning measures can, as yet be characterised as reliable and valid in their own right. Additionally, systems and climate are two of the environmental elements posited above as influencing organisational learning effectiveness (Figure 5.5), the correlations obtained suggest that this could indeed be the case, and suggests an aspect of the research which may warrant further investigation.

As well as the developments of the learning scales identified, the results obtained here in respect of the *CSI* provide further support for the reliability of this instrument. In its application in the two organisations surveyed, the *CSI* demonstrated internal reliability and produced results in line with those already reported (Allinson and Hayes 1996; Armstrong, Allinson and Hayes 1997; Sadler-Smith, Spicer and Tsang 1999). Furthermore the size of the sample obtained in the two councils (511 respondents in total) is such that confirmatory analysis of the *CSI* scale could be undertaken.

Other outcomes from the use of a questionnaire to assess attitudes of individuals across the organisations studied in respect of the mental model issues also need to be recognised. The identification of the cognitive mapping interview procedure used in this research as a grounded approach appropriate for organisational research was made above, and the development of a survey from the interviews through the systematic approach adopted here could also be used in this way. More specifically, the links back to the mental models identified in the survey response in *SWCC* should be recognised. These identified issues which were in the mental model, but had not been included in the survey, and as a result may suggest further support for the shared mental model's representativeness. Also, the outcomes of the exploratory factor analyses undertaken with the mental model questionnaires suggest that this is a potential method for the identification and validation of organisation-specific constructs.

Finally in respect of other outcomes, the success of the strategies adopted to gain organisational support and maximise response to the questionnaires should be noted. The opportunity to identify their own issue for consideration in the research was key to gaining the support of participant organisations, and comments from participants suggested that they were more willing to be involved in the research because of the clear link it maintained with their own organisational concerns. Following this, it is recommended here that, where possible and appropriate organisational and business research is linked clearly and explicitly with issues that the organisation itself sees as important. This should be possible even when, as was the case here, these issues are not of central importance to the researcher's perspective. In dealing with respondents, the provision of prompt feedback also appears to be beneficial. With the surveys, the rapid return of individual feedback on cognitive style following the receipt of the initial response appeared to generate another wave of returns mostly requesting cognitive style feedback. No specific records of this were kept, but the impression gained was that this second peak in responses may result

from respondents discussing their feedback with colleagues who then return questionnaires to gain this feedback for themselves. The support of the questionnaire through internal e-mail in *WBC* should also be highlighted as a means for improving response.

#### 15.4 PROBLEMS AND LIMITATIONS

Prior to considering the overall conclusions, problems, limitations and criticisms of the research are considered below. Issues unique to each phase are considered in turn, before limitations these share and of the research as a whole are identified.

In Phase One, the most significant limitation identified is the lack of a specific and explicit link between the cognitive maps obtained and the mental models they are taken to represent. Whilst face validity and acceptance of these models have been taken as proxies for their representativeness, these links are unproven, and as a consequence the subsequent results which rely upon these maps as representations of mental models are themselves only conjecture. Furthermore, the maps obtained are themselves limited. Limitations in respect of the scope and applicability of the images obtained were identified throughout the research. The reasons for identifying a specific issue in each organisation were two-fold, to ensure that the maps obtained focused upon a manageable topic and to gain support from organisations by allowing them to identify a topic which was of interest to them. However, even within these issues there is considerable complexity which makes their identification more difficult. For example, none of the issues identified have a clear boundary, evidenced by the varying concepts identified with individual maps, including, for example the identification of departmental concerns within organisational issues. This was a particular problem in *SWCC* (Chapter Thirteen). Choosing to deal only with senior managers during elicitation also reduces the wider applicability of these models, as does the relatively limited sample size obtained in each organisation. The voluntary participation of managers was also identified above as potentially introducing bias to the results, although this could in more positive terms be characterised as a form of random sampling. It should also be recognised that as all the issues identified have developed over time, the understanding maps contain may now be (and if not now it will become) inaccurate or irrelevant.

The fact, that the methodology adopted in Phase One has changed the understanding it seeks to represent is another limitation which needs to be recognised. This

is a fundamental criticism of mental model and cognitive mapping research which effectively cannot be resolved. In fact, this is a fundamental problem with any and all research. In subatomic physics Heisenberg's Uncertainty Principle is used to explain that it is impossible to assess or measure the properties of a particle without changing it, and it is possible to see by extension that any complex issue or indeed any aspect of the world is likely to be influenced or changed through assessment or observation. For most research, these effects are minor enough to be ignored. However, here where significant changes are more likely, this potential problem must be recognised.

In respect of the Phase One methodology, the facts that respondents were volunteers and were promised anonymity must also be identified as potentially problematic. Volunteers are likely to have viewed the research positively and as a result some response bias may be evident in the mental models obtained. Furthermore, the anonymity of response may have led individuals to identify aspects of their mental model to the research which they would be unwilling to share with colleagues directly. This may have resulted in the identification of shared understanding through the generation of the shared mental model which in reality does not exist.

The limitations of cognitive maps as representations themselves also need to be recognised. The causal cognitive maps identified above (Appendices J; L; M; O; P; R; S; and U) lack the flexibility of the models held in *Decision Explorer*, and even these models, which can be interrogated and explored interactively fail to adequately identify the true complexity of the understanding they represent (hence the separation between cognitive maps and mental models made above). Nevertheless, the maps obtained do simplify (which is a key aim of a model) understanding in a way that allows considerable complexity to be contained in a single image. It should be recognised that other types of cognitive maps exist, and the form of these images is dependant upon the form of representation chosen. Problems relating to the effect of model size on the measures of similarity, complexity and density identified above should also be remembered, as should the lack of appropriate norms for these measures.

Overall, results from Phase One suggest important implications for mental model research. The failure of this research to make unequivocal links between individuals' and organisations' mental models and their representations, means that the outcomes and conclusions identified here are only conjecture. These implications extend even further. The distinction between mental models and cognitive maps as conceptual understanding

and their representation is not widely recognised in existing research. Elicited images (however they are obtained or labelled) are typically accepted as representative of mental models without consideration of the issues identified above, and results here suggest that this work should be re-examined in light of the distinctions made. Whilst this potentially represents a retrograde step for mental model research, it is only by examining the relationships between mental models and their representation, and the exploration and development of methodologies which provide representations which have proven reliability and validity can truly effective insights into mental models occur. The concern is this distinction may be an insurmountable methodological barrier, and unequivocal proof for cognitive maps as representations of mental models might remain elusive.

Turning to those issues specific to the surveys undertaken in Phase Two, a number of limitations relating to the mental model questionnaire derived from Phase One should be recognised. Firstly, the impact of the conjectural nature of the mental models themselves should be recognised. The cognitive maps obtained cannot be explicitly linked to the mental models they are supposed to represent, and as a result this survey must be seen as assessing these proxies for the mental models of the issues identified, rather than the mental models themselves. Also, the mental model questionnaires contain items representing only a limited number of concepts and relationships from the shared mental model as a whole. This results in considerable loss of detail and focus in respect of the mental model issues and their representations. Furthermore, the selection strategy adopted for items, focusing upon those items identified as important on the basis of domain, centrality and extent merged, whilst logical in that it identifies those items which may be expected to be shared, does potentially lead to a bias in the response. These are issues which should be explored alongside the consideration of mental model research methodologies called for above.

The responses obtained in *WBC* and *SWCC* were taken to indicate the extent of assimilation in respect of the mental model issues. However, as these issues were initially identified at the senior management level, it is possible that this assimilation could itself have been affected by politics, power and influence, with respondents replying positively to the mental model questionnaire items because they recognise them as representing their senior managers point of view, rather than because they are indicative of their own understanding in respect of the issues identified. This problem is one which can be linked to acquiescence and social desirability, and whilst the design of the research was such that

these should have been minimised, it must nevertheless still be recognised as a potential problem within the survey responses, particularly in respect of the positive responses obtained here for mental model assimilation, and in respect of attitudes towards individual learning which were identified above as potentially indicative of individuals desire to place themselves in the best light.

Within the surveys, as well as the potential for acquiescence and social desirability in responses, a number of other limitations can be identified. The fact that the majority of the assessment is based upon attitudes and perceptions of issues and constructs, rather than their direct observation (which for the most part is impossible or impractical) was identified as a limitation above, as were the lack of secondary mailings and the voluntary and anonymous nature of the response, all of which may have introduced bias into the results. It is also possible that the size of samples is such that some of the significant results obtained may be an effect of sample size.

Limitations in respect of the validity assessments made for the learning measures also need to be recognised. The fact that the comparison of organisational and individual constructs (i.e. organisational learning, learning systems and learning climate with cognitive style) may not be effective as an assessment of construct validity has been identified as a problem. This means that, whilst their shared variation has been identified as potential evidence for construct validity, this cannot be properly assessed as there is as yet, a lack of any appropriate comparable organisational scales. Furthermore, the assessments of construct and concurrent validity made are subjective, and whilst significant results suggest validity, failures do not inevitably suggest that a scale is invalid.

Limitations in respect of the analyses undertaken also have to be recognised. The details of the limitations of the statistical tests are too complex to be included here, but care has been taken to ensure that the tests used are appropriate to the variables used. Within this two specific issues should be highlighted. The first is re-iteration of the recognition that the correlations identified do not necessarily imply causal relationships, and that as a result the causal explanations offered for the relationships observed are speculation. Secondly, it was identified above that the treatment of mental model assimilation as the dependent variable in the multiple regressions undertaken may be contentious. This is because treating mental model assimilation as the dependent variable supposes that it is contingent upon or leads from the independent variables identified, and this inherently suggests a degree of causality, and whilst mental model assimilation is



identified here as key, whether for example, mental model assimilation leads to organisational learning or vice-versa is not something that, as yet has been supposed. Whilst this limitation should be recognised its impact is less significant when regression is used to explore relationships, as is the case here, than when it is used as a predictive tool. The nature of the relationships identified in respect of mental model assimilation are addressed in the overall conclusions below.

It should also be recognised that there is a potential limitation inherent in the design of this thesis and the research themes discussed above. The division made on the bases of phases and between hypotheses and research questions might suggest that the research is predicated upon the notion that a division exists between qualitative and quantitative research. Whilst the ignoring of practical outcomes of the research might equally suggest a division between empirical theory and applied research. Both of these would be somewhat at odds with the philosophical notion of ‘pragmatic pluralism’ identified with above, and the high specificity and contextual nature of the data collected and the outcomes identified. This is not the case, but divisions have been made and aspects of the outcomes disregarded in order that the thesis follows a logical structure, and in an attempt to control the size and scope of this document. Potentially, however, this organisational specificity represents a limitation of the research overall. The identification of a specific mental model issue in each organisation, whilst beneficial for gaining access and support from participant organisations prevents comparisons being made. If a generic issue had been identified and applied to all the organisations studied, direct comparisons may have been possible. Conversely, in light of the importance of the organisational context for learning and the development of shared understanding identified in the outcomes discussed above and below, perhaps more should have been made of this organisationally unique aspects. Furthermore, developments made to the survey between its applications in *WBC* and *SWCC* also limit comparability.

*TDSW*’s withdrawal of support for Phase Two of the research must also be recognised as a significant limitation for the research overall, particularly as both *SWCC* and *WBC* are service providing public sector organisations, ultimately controlled through local government, and as a consequence any (limited) comparisons with other organisations should be restricted to those of a similar type.

## 15.5 OVERALL CONCLUSIONS

Outcomes from the results were identified above, and from these the evidence in respect of the research questions and hypotheses was considered. From this it can be seen that much of what was supposed and hypothesised remains equivocal. Recognising this, this section therefore addresses reasons for the results obtained and identifies what conclusions implications in respect of the relationships between mental models and individual and organisational can be drawn from the research undertaken. In particular, the implications of the results for the research model described in Chapter Six are considered.

The nature of the maps obtained as representations of mental models has been identified as a key limitation above. This is unfortunate in that it is the role of these mental models in relation to individual and organisational learning that this research wished to address. The maps and images obtained do however appear to represent knowledge and understanding, and whilst they cannot be linked categorically to mental models, this does not prevent their use conjecturally here. The fact that individual and shared mental models are potentially too complex to ever be effectively characterised is evident from the research, and it was suggested above that the lack of unequivocal proof for cognitive maps as representations of mental models is indeed a major concern for mental modelling research that requires investigation. Nevertheless results using this information representing shared understanding still point to a number of tentative conclusions in respect of the effects and interactions relating to the complexity evident in shared understanding in organisations.

The complexity of the shared understandings obtained is evident. The range of concepts identified in cognitive maps points to this, as does the identification of both commitment and outcomes as aspects of the service planning process in *WBC*. Differences in mental model assimilation on the basis of respondent characteristics, and in particular the departmental differences also suggest that understanding of these issues is not as straightforward as may have been supposed. A complexity in responses with respect to the scales identified as representing the mental model assimilation was also identified, that suggests that whilst these were discussed in terms of the extent of assimilation of senior managers understanding they represent, assimilation is only one of three potential outcomes in relation to the shared understanding.

Results from the mental model questionnaires indicate that the three potential scenarios in respect of the mental model questionnaire are represented by responses which agree, disagree, or neither agree nor disagree with the shared mental model (shared understanding) evident at the senior management level. These are respectively indicative of individuals who have assimilated, rejected or are neutral in respect of the issues identified. Each scenario suggests different implications for an organisation. Agreement, indicating assimilation suggests that understanding of the mental modelling issue across the organisation matches that evidenced by its senior managers. Neutrality suggest that individuals across the organisation are not involved with that issue or do not see it as important or relevant in respect of their role. Respondents comments in *SWCC* suggested two potential reasons for a neutral response. The first was that individuals are not involved with the mental model issue identified (in this case *SWCC*'s budget setting process), this may be a result of the survey including individuals who genuinely are not expected to be involved with the issue, but as *SWCC* identified the issue and sample, this is unlikely. More likely is that these individuals are withdrawn from the issue and in this respect the understanding (mental model) is not shared. The second reason for neutrality in responses given was that a respondent, whilst recognising that they were involved in budgets felt they had no real input or control, and that decisions were made at levels above them in the organisation. This response, whilst it suggests a degree of recognition of the senior managers shared understanding, suggests that any sharing of this across the organisation may be superficial. The third scenario (disagreement) is the potentially most dysfunctional, in that it suggests that the shared understanding held at the senior management level is at odds with the understanding of individuals across the organisation. Whilst this was not evident in either organisation surveyed, it is a logical third scenario in respect of shared mental model (shared understanding) assimilation. The importance of the three alternative patterns of response (which it should be recognised may be hidden within the wider response itself) described is that they potentially identify different needs in relation to learning. If the mental model is assimilated (agreement) organisational learning would most likely be required to support this, and as a result adaptive learning might be most appropriate. If there is recognition but not assimilation (neither agree nor disagree), the organisation could potentially require more generative learning to ensure that the ideas are embedded across the organisation, but a balance of learning (adaptive and generative) is also likely to be key. In the case of a mismatch between the senior managers mental model

and understanding across the organisation (disagreement), generative learning may be required even more, but it is also likely that unlearning (identified in the literature review as key to the development of new understanding) may also be required. This all assumes that the issue has to be shared, and that the senior managers' point of view is correct. In the third case, whether the unlearning is required by senior managers or the rest of the organisation is another issue: it should not be assumed that the senior managers understanding is most appropriate.

The attitudes in respect of organisational learning linked to the alternative scenarios suggested in respect of attitudes evident in the mental model questionnaire might therefore be evident in the responses obtained. In *SWCC*, where a strong neutral element was identified in the mental model questionnaire response, attitudes in respect of organisational learning were equally neutral. This may suggest a balance between adaptive and generative learning which was identified above as required if the neutrality in respect of the issue identified is to be overcome. However, in *WBC*, attitudes to organisational learning are (marginally) more positive indicating a disposition towards generative organisational learning, this might be linked with the lower assimilation of service planning outcomes identified. These were described in respondent comments as yet unseen, and the inclination to generative learning observed may represent the efforts of the organisation to develop their understanding of service planning and bring these to fruition. It does not suggest a link with service planning commitment however, assimilation of which was more evident. Again it appears that the complexity of the issues (mental models) prevents the identification of clear relationships and the drawing of a firm conclusion. Furthermore, a degree of complexity in attitudes in respect of learning could also be preventing the identification of any clear relationships.

Results for the *OILLs* appear to identify some empirical support for the notion of learning at the adaptive and generative levels posited by Senge (1990b). However, in the same way that responses to the mental model questionnaire can be seen as indicating three potential scenarios, attitudes to learning assessed through the *OILLs* can be seen as representing three significantly different responses, in terms of the balance and interaction between adaptive and generative learning indicative of a neutral response. These differences are as likely irrespective of whether learning is considered at the individual or organisational level, and relate to the ways in which adaptive and generative learning interact to create the score obtained for their bipolar scales. In their construction these

scales treat generative learning as positive and adaptive learning as negative, so that a high score indicates attitudes representative of a generative approach (evidenced in workplace behaviour), a low score indicates an adaptive approach. However a neutral response can occur in three ways: (i) through neutral responses to both adaptive and generative items (indicating a lack of engagement in either form of learning); (ii) through a positive response in respect of both adaptive and generative items (indicating a balance between both form of learning); and (iii) through a negative response in respect of both adaptive and generative items (indicating a failure to undertake either form of learning). It is only the second of the scenarios which is truly indicative of a balanced approach which could be hypothetically linked to the neutral responses in respect of the mental model questionnaires observed above, and here this was not the pattern observed. Responses in both organisations suggest that the neutral attitudes to organisational learning observed occur because attitudes in respect of both adaptive and generative learning are themselves neutral. This may indicate a lack of engagement in learning across the organisations which is at odds with the expectations of a balanced approach to learning expected above.

More generally, the patterns of responses obtained from the *OILLs* in respect of individual and organisation learning have implications for the ways in which adaptive and generative learning interact. Whilst it appears evident that the individual and organisation are indeed distinct and independent units of analysis, and learning at these levels can be represented at separate scales, the relationships between adaptive and generative learning are more complex. Whilst learning has been characterised as existing on a bipolar adaptive-generative scale, the question remains as to whether adaptive and generative learning represent 'bad' versus 'good' aspects of learning or are in fact just 'different', but equally important. In the discussion of the literature above the suggestion was made that, dependent upon context, both are potentially important. However, results obtained for learning at the individual level in *WBC* and *SWCC* may suggest that within the responses obtained from the *OILLs*, this is not how these approaches have been seen. In both organisations, for individual learning, high levels of agreement were identified with respect to generative items, whilst individual adaptive items typically exhibited significant negative responses. This suggests that in their perceptions participants see these as qualitatively rather than quantitatively distinct. This distinction is less critical if the *OILLs* is considered as a measure of preferred learning style as was suggested above, but it does potentially have implications for the typology of learning presented above (Figure 5.2).

The results obtained here are inconclusive as to the nature and interactions of the adaptive and generative learning levels. It should also be recognised in respect of this typology that whilst the individual and organisation have been confirmed as units of analysis, the significant effects identified in respect of departments on learning and mental model assimilation, and the comments obtained stating that respondents replies to the survey would have been different if their department was considered instead of the organisation suggest that the retention of an intermediate (group or department) unit of analysis between the individual and organisation may in fact be appropriate.

The combined effects of job level and length of service in *SWCC* on organisational learning which identify a majority of neutral responses and a small group of long-serving managers who exhibit a more positive response to organisational learning, also suggests another potential outcome for the *OILLs*, in that this differentiation between the most senior managers' and the rest of the organisation's attitudes to learning may be indicative of a distinction between managerial and organisational learning, and that in *SWCC*, given the nature of the organisation, distinction of generative learning as representing a managerial approach may be more appropriate.

Complexities relating to the shared mental models (shared understanding) and to organisational and individual learning have been identified above. These are the key issues which have been under consideration here. Implications relating to the nature of these constructs have been identified above, but what is ultimately most important is their interaction. A hypothetical link between the nature of mental model assimilation (or lack of it) and organisational learning was suggested above. This is not born out in the results obtained, and no clear links between the extent of mental model (shared understanding assimilation) and individual and organisational learning (or any of the other variables) have been identified. These themselves result from the complexities evident in the research undertaken.

Specific complexities were identified in both the organisations that participated in the research. In *WBC*, a significant relationship was obtained between organisational learning and both aspects of the service planning process (commitment and outcomes) identified from the mental model questionnaire, however no such relationship was observed in *SWCC*. In *WBC* it was a department dummy variable (representing the split between internal and service providing departments identified in this council) was identified as the most important aspect of the organisation explaining differences mental

model assimilation. This appears to suggest that the factors affecting mental model assimilation are themselves organisation specific. *WBC* is in many ways a progressive organisation, headed by a chief executive who is a proponent of a learning approach across the organisation, and who was keen to see this applied in the creation of the service planning process. Recognising this the relationship observed between organisational learning and the understanding of the service planning process is perhaps unsurprising, as it is possible that this organisation is more capable and open to learning generatively. Conversely *SWCC* is an organisation typified by a more traditional approach to management, and when this is linked with a traditional and long standing issue in that organisation (the budget setting process), the importance of the way a department works (identified in terms of an internal versus service providing split) is more important than the extent or nature of shared (organisational) learning in explaining how it interacts with the issue identified. This organisation is less likely to foster real organisational learning.

It should also be recognised that other variables were also identified as important in explaining mental model assimilation across the organisations. Particularly in *WBC* where the partial contribution of organisational learning to explanation of mental model assimilation differed in respect of the service planning commitment and outcomes regressions. This was higher for outcomes where age and department were also identified as significant, for commitment organisational learning alone was identified as an observed variable explaining mental model assimilation. These differences suggest that alongside the organisational specificity affecting mental model assimilation, this assimilation is itself affected by the nature of the mental model (shared understanding) itself, which may result from different factors but may also require different interactions with those factors. The openness of *WBC* to organisational learning identified above, might in some way illustrate these differences, the stronger relationship between organisational learning and service planning outcomes (compared with organisational learning and service planning commitment), may in fact result because service planning outcomes are not as widely shared as the commitment to the process, and as a result in *WBC*, generative learning is taking place to address this. This identification of sub-models within the shared understanding evident in *WBC* links to Richardson et al.'s (1994) assertion that mental models are multi-faceted, but may also suggest that the stage of development of the mental model (i.e. the extent and depth to which it is shared) may affect the variables identified as important in explaining and driving this, and in turn link the shared understandings studied

here to the notions of mental model development espoused by Hill and Levenhagen (1995) (Figure 4.2).

Despite the explanations observed, none of the regression models explained more than 45% of the variance in mental model assimilation or shared understanding. This and the fact that assimilation appears to be both organisation and issue (mental model) specific suggest that there are other unidentified variables that contribute to the development of shared understanding in these organisations, which in their identification and interaction could themselves could be organisation and issue specific. The importance of the CEOs identified in two of the organisations studied suggests that power and influence are likely to be important. In *WBC*, the chief executive's role in fostering a learning approach has been identified as important, and within the models obtained in *TDSW*, the role played by and importance of their new CEO in developing the company's new culture was widely recognised. It is also likely that other issue such as politics (with both a large and a small 'p' in the case of the councils studied here) may be important, and given the potential of learning climate and systems to explain mental model assimilation, it is likely that the other aspects of the environment identified above as creating complexities in organisational learning (communication, people, knowledge, strategy, structure and the nature and rate of change; Figure 5.5) could also potentially affect the extent and effectiveness of shared understanding in an organisation.

Reference needs to be made to the implications of this research to the notion of experiential learning, which has been identified above as the framework for the understanding of learning explored here, and which represents a major aspect of the theory and model (Figure 6.7) developed here. No direct assessment of experiential learning or the experiential aspects of the research model were made, and as a consequence evidence in respect of the supposed importance of experiential learning is lacking. Some anecdotal evidence of the importance of learning through experience was observed within Phase One. Most notably in *WBC*, where two respondents identified learning as a key aspect of the process of change undertaken with the introduction of the service planning process (Appendix M). This suggests that the cognitive mapping methodology might, in future be used to explore the experiential learning process with individuals and within organisations. However, at this stage the significance of experiential learning remains theoretical rather than empirical.



The question therefore remains: what are the implications of the results obtained for the research model (Figure 6.7)? The assessments undertaken and described above, have all been made within the conceptual domain, and as a result no identification of the relationships in respect of the operational domain can be made. Within the conceptual domain, the failure of this research to identify a categorical link between the maps of shared understanding obtained and the mental models these are taken to represent, prevents any clear relationships with these mental model being espoused. Furthermore in the research model, both individual and shared mental models were described as incorporating frameworks (*weltanschauung* in shared mental models) and routines (organisational routines), which were linked explicitly with generative and adaptive learning respectively. Whether the shared maps obtained are representative of shared understanding in terms of *weltanschauung* or routines is itself unclear, and as a result those (limited) relationships that have been identified between organisational (generative) learning and shared understanding are themselves further limited. The role of cognitive style is also unclear. Hypothesised as acting as a perceptual filter surrounding mental models and acting as an intervening variable between learning and mental models influencing the organising and processing of information, the only relationship observed was between individual learning and cognitive style, and as a result cognitive style cannot be identified as affecting learning and mental model assimilation at the organisational level. Also, whilst a link was identified between individual and organisational learning through the *OILLs*, this does not necessarily point to the importance of the role of the individual in the learning model. This in part results from the fact that organisational learning in the research model is seen as being driven through the sharing of the experiential learning process between individuals, but the *OADI* (Observe-Assess-Design-Implement) model's description of learning as a cyclical process driven by experience remains untested. Fundamentally the complexities, of the research model of learning in organisations and of mental models themselves, and the lack of adequate and available means of assessing many of the constructs identified (the issues with the mental models have been stated above, and it appears an assessment of the *OADI* cycle might also be beneficial) mean that this research model (Figure 6.7) remains conjecture. Nevertheless, its construction through the principles of pragmatic pluralism (Section 7.3; Wright 1997) means that this model can be clearly and explicitly linked to the key theories identified from the literature and as a theoretical construct for describing the process of learning, it

still represents a powerful tool for considering how individual and organisational learning, individual and shared mental models and cognitive style interact, overcoming many of the limitations of other models. Significantly, it meets DeCiantis and Kirton's (1996) criticism of the experiential learning model, describing explicit relations between the learning process, learning (in this case cognitive) style, and the levels of learning identified.

More generally, the approach adopted, informed by pragmatic pluralism (Wright 1997), which has combined quantitative and qualitative methodologies has been successful. Whilst this research has failed to confirm the majority of the relationships supposed, it has nevertheless identified a number of important outcomes. In summarising the research, the only conclusion which can be effectively drawn is that relationships between shared understanding and learning are complex and organisation- and issue-specific. Whilst this seems somewhat simplistic, what this research has done is begin to identify the sources and causes of this complexity within the organisational and learning environments. Results from *WBC* may suggest that in learning aware organisations the development of shared understanding can be linked to generative learning. This like all the issues and relationships distinguished requires further investigation. Other specific contributions from the research include the methods employed themselves. The instruments assessing learning represent new perspectives, and have all been identified as worthy of further investigation. *The cognitive mapping methodology employed (both the interview process and subsequent questionnaire generation)*, and the means of analysis applied to it (i.e. measures of complexity, density and similarity) also represent significant additions to the research toolbox, and themselves require extension and replication. The conjectural model of organisational learning, whilst unproved also represents a significant step in the theoretical understanding of the learning process in organisations. Finally, the identification and delineation of mental models and cognitive maps as conceptual models and their representations which cannot be unambiguously linked is an outcome which has far reaching implications for mental model research.

## 15.6 DIRECTIONS FOR FUTURE RESEARCH

One question remains: how can this research proceed?

Firstly, the potential for additional analyses of the data already collected should be reiterated. The content of the cognitive maps elicited provides a valuable source of

information in respect of the issues identified, and the use of these grounded interviews to explore these ideas should be undertaken. The identification of *CSI* results from *WBC* and *SWCC* as a confirmatory sample in respect of this measure of cognitive style and Allinson and Hayes' (1996) analytical-intuitive dimension of cognitive style, was also made above, and this represents another potential application for the results obtained.

The relationships between cognitive maps and mental models need to be explored. Given the problems identified in making an explicit link between the representations of shared understanding obtained and the mental model they are supposed to portray, and the potential consequences of this for mental model research in general and the interaction of mental models with learning this is critical. A potential hypothesis, that 'individual and shared mental models are potentially too complex to ever be effectively characterised', could represent a focus for research of this type, and may ultimately represent a barrier for progression of understanding in this area. In undertaking further research in respect of cognitive maps and mental models, both exploration and extension of the methods adopted above needs to be made. Both in other organisations, and through different levels in an organisation, but also so that the relationships between mental models and cognitive maps can be explicitly explored. Detailed identification of shared understanding at levels other than senior management (i.e. junior managers and staff) through these methods, which was in common with the senior management models might create more confidence in the assertions of the representativeness of the models obtained. The changing structure and nature of individuals' and organisations' understanding of these dynamic issues over time should also be explored, and further research exploring the measures of mental model/cognitive map similarity, complexity and density should be made. This must include further development and confirmation of norms for these indices in respect of maps of the type studied here, as well as scrutiny of the effects of map size on these assessments. Additionally, alongside this further examination of interview methods and shared mental model development, the effectiveness of the mental model questionnaires, and in particular their relationships with social desirability should be considered.

The need for further development of the other survey scales and measures used has also been identified. Both the *OILLs* and the *LE-SC* were recognised as warranting further investigation. This should include the extension, application and development of both instruments in a wider range of organisations and environments, the use of further exploratory and confirmatory factor analyses to scrutinise their structures, and further

examination of the reliability and validity of the scales they contain. In addition, the *LE-SC* could be extended to incorporate scales representative of the other aspects of the ‘environmental elements influencing organisational learning effectiveness’ model (Figure 5.5) outlined above, which like learning systems and the learning climate could potentially influence the extent of assimilation of shared understanding in organisations. Relationships between these scales and organisational learning could also be explored.

Links with other models should be explored. The suggestion has been made that the differing attitudes in respect of service planning commitment and outcomes within the mental model observed in *SWCC*, potentially represents sub-models of the type suggested by Richardson et al. (1994). They could also indicate models at different stages of mental model development, akin to those suggested by Hill and Levenhagen (1995) (Figure 4.2). This is another aspect of the mental models which could potentially be explored through the mental modelling methodologies adopted above.

The typology of organisational learning presented should also be explored (Figure 5.2). Results above suggest the extension of this to incorporate the department (group) as an additional unit of analysis. This could potentially be added to the *OILLs* as a third dimension. Given the question raised as to whether they are qualitatively or quantitatively different, the relationships between the adaptive and generative levels of learning should also be investigated. If this inquiry into the interaction of adaptive and generative learning is to be undertaken with the *OILLs*, this instrument could itself require some development, as attitudes evidenced in its current form appear to pre-suppose that generative learning is good and adaptive learning is bad. Ultimately, structural equation modelling could be used to explore how the *OILLs* scales interact.

Given its centrality and the failure of the research to adequately explore this model identified above, direct assessment and examination of the experiential model of learning (characterised above in relation to Kofman’s (1992) *OADI* cycle) and its application and interaction at the individual and organisational levels would also be beneficial. This represents a major undertaking given the lack of measures examining learning in this way. Potentially however this could come through re-examination of Kolbs’ (1984) characterisation of experiential learning and the scales of learning style which are linked to it: Kolb’s (1985) *Learning Styles Inventory*; and the *Learning Styles Questionnaire* developed by Honey and Mumford (1986; 1992). These were identified above, but were discarded as they and learning style are concepts and models which are widely criticised

for lacking clarity, validity and empirical support. Nevertheless, it may only be by including an assessment of the experiential learning model, which is a fundamental aspect of the learning process in organisations, that a more complete picture of the research (conjectural) model (Figure 6.7) may be obtained.

Every effort must be made to identify the additional sources of complexity in organisations. Whilst some of these have been identified above, and others have been suggested, given the complexity of the organisation, its environment, of both individual and shared mental models, and individual and organisational learning it is only through the identification and delineation of the causes of complexity that in-depth understanding of how an effective learning process occurs in organisations will be obtained. Given the issue and organisation specificity identified it appears that this research will by necessity have to be based upon a case-study approach, and in its investigation, tools that allow for even more comprehensive characterisation of mental models, learning processes and the wider environment are required. Even with the relatively limited set of variables identified here it is possible that the interactions between mental model assimilation, organisational learning, individual learning, learning systems, learning climate, cognitive style, department and the other respondent characteristics identified are more complex than can be identified through regression analysis. This assumes a direct effect of each independent variable upon the dependent variable, however some of the correlations identified between the independent variables might suggest other causal relationships, and a more powerful tool which allows the examination of combined effects (such as structural equation modelling) may have to be employed. Such techniques were outside the scope of this research. For example, an individual's cognitive style could potentially effect that individual's preference in terms of their own approach to learning (i.e. extent of individual adaptive or generative learning). Attitudes to individual learning in turn, could combine to influence the preferred approaches to learning across the organisation, which could also be dependent to some degree on the extent of the learning systems and learning climate in that organisation. All of which could vary between departments, on the basis of respondent characteristics, and in relation to other as yet unidentified variables. All of these could potentially influence mental model assimilation, dependent upon the organisation and the mental model under consideration.

This thesis and research has identified with learning as an experiential process. Others (Schmitt and Klimoski 1991; Roth and Senge 1996) suggest that research is itself a process of learning through experience, and this is an assertion that my own experiences, detailed above affirm. The root of the word 'learning' (leis) was identified back at the start of Chapter Two as meaning a track or furrow, and this was linked to the idea that learning is something which can be experienced as a journey. Whilst a significant distance has been travelled above, and the terrain that the path passed through explored, in essence, this journey has only just begun.

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# APPENDICES

## APPENDIX A

### Organisational Learning Definitions

<i>Source</i>	<i>Definition</i>
Anderson Gustavsson & Merlin (1995: 31)	<ul style="list-style-type: none"> <li>• “Organisational learning occurs through shared insights, knowledge and mental models and builds on past knowledge and experience.”</li> </ul>
Argyris & Schon (1978: 19)	<ul style="list-style-type: none"> <li>• “Organisational learning occurs when individuals, acting from their own images and maps, detect a match or mismatch of outcomes to expectation which confirms or disconfirms organisational theory-in-use.”</li> </ul>
Argyris (1977a: 116)	<ul style="list-style-type: none"> <li>• “Organisational learning is a process of detecting and correcting error.”</li> </ul>
Bain (1998: 420)	<ul style="list-style-type: none"> <li>• “Organisational learning is to do with growth of capacity and growth and is inseparable from the co-evolution of the ‘organisational container’ and ‘contained.’”</li> </ul>
Cangelosi & Dill (1965: 200)	<ul style="list-style-type: none"> <li>• “Organisational learning must be viewed as a series of interactions between adaptation at the individual or subgroup level and adaptation at the organisational level. Adaptation occurs as the result of three kinds of stress, one of which stimulates subsystem learning, one total-system learning, and one both subsystem and total system learning.”</li> </ul>
Cook & Yarrow (1993: 384)	<ul style="list-style-type: none"> <li>• “...the acquiring, sustaining, or changing of intersubjective meanings through the artifactual vehicles of their expression and transmission and (through) the collective actions of the group.”</li> </ul>
Dodgson (1993: 377)	<ul style="list-style-type: none"> <li>• “Learning...relates to firms and encompasses both processes and outcomes. It can be described as the ways firms build, supplement and organise knowledge and routines around their activities and within their cultures, and adopt and develop organisational efficiency by improving the use of the broad skills of their workforces.”</li> </ul>
Dixon (1994: 5)	<ul style="list-style-type: none"> <li>• “...the intentional use of learning processes at the individual, group and system level to continuously transform the organisation in a direction that is increasingly satisfying to its stakeholders.”</li> </ul>
Duncan & Weiss (1979: 84)	<ul style="list-style-type: none"> <li>• “Organisational learning is the process within the organisation by which knowledge about action-outcome relationships and the effect of the environment on these relationships is developed.”</li> </ul>
Edmondson & Moingeon (1998: 12)	<ul style="list-style-type: none"> <li>• “...a process in which an organisations members actively use data to guide behaviour in such a way as to promote the ongoing adaption of the organisation.”</li> </ul>
Fiol & Lyles (1985: 803)	<ul style="list-style-type: none"> <li>• “Organisational learning means the process of improving actions through better knowledge and understanding.”</li> </ul>

**Organisational Learning Definitions (2 of 3)**

<i>Source</i>	<i>Definition</i>
Foijt (1995b: 5)	<ul style="list-style-type: none"> <li>• “Organisational learning is a set of processes to help people create new knowledge, share understanding and continuously improve themselves and the company.”</li> </ul>
Glynn Lant & Milliken (1994: 44-45)	<ul style="list-style-type: none"> <li>• “Organisational learning is the process by which organisations notice, interpret, and manage their experience. The key components of organisational learning - goals, attention and search rules, routines, shared understandings, and organisational beliefs - are the same as those traditionally used to define organisational systems.”</li> </ul>
Glynn Lant & Milliken (1994: 44)	<ul style="list-style-type: none"> <li>• “Organisational learning is the process by which organisations notice, interpret and manage their experience.”</li> </ul>
Hayes & Allinson (1998: 12)	<ul style="list-style-type: none"> <li>• “Organisational (collective) learning involves sampling the environment, including the effects of past behaviour, and using the information made available by this process to modify the mental models, schema or cognitive maps that guide behaviour.”</li> </ul>
Hedberg (1981: 3)	<ul style="list-style-type: none"> <li>• “Learning takes place when organisations interact with their environments: organisations increase their understanding of reality by observing the results of their acts.”</li> </ul>
Huber (1991: 89)	<ul style="list-style-type: none"> <li>• “An entity learns if, through its processing of information, the range of its potential behaviours is changed... An organisation learns if any of its units acquires knowledge that it recognises as potentially useful to the organisation.”</li> </ul>
Huber (1996: 822)	<ul style="list-style-type: none"> <li>• “An organisation learns when, through its processing of information, it increases the probability that its future actions will lead to improved performance.”</li> </ul>
Jones & Hendry (1994: 154)	<ul style="list-style-type: none"> <li>• “Organisational learning... is the sum total of learning taking place and its impact on the organisation and its activities.”</li> </ul>
Kim & Senge (1994: 277)	<ul style="list-style-type: none"> <li>• “By organisational learning we mean the development of new organisational capabilities. To learn for an individual, group, or larger organisation, is to enhance one’s capabilities in reliable and reproductive ways.”</li> </ul>
Lant & Mezias (1992: 48)	<ul style="list-style-type: none"> <li>• “Organisational change can be modelled as the result of a basic learning process... this process entails updating routines based on interpretations of experience.”</li> </ul>
Lee Courtney & O’Keefe (1992: 23)	<ul style="list-style-type: none"> <li>• “Organisations learn as a result of interaction with their environments or by observing other organisations interact with similar environments.”</li> </ul>
Levitt & March (1988: 320)	<ul style="list-style-type: none"> <li>• “Organisations are seen as learning by encoding inferences from history into routines that guide behaviour. The generic term ‘routines’ includes the forms, rules procedures, conventions, strategies, and technologies around which organisations are constructed and through which they operate.”</li> </ul>
March & Olsen (1975: 168)	<ul style="list-style-type: none"> <li>• “Organisations and the people in them learning from their experience. They act, observe the consequences of their action, make inferences about those consequences, and draw implications for future action. The process is adaptively rational.”</li> </ul>

**Organisational Learning Definitions (3 of 3)**

<i>Source</i>	<i>Definition</i>
Miller (1996: 486)	<ul style="list-style-type: none"> <li>• “Organisational learning is the acquisition of new knowledge who are able and willing to apply that knowledge in making decisions or influencing others in the organisation.”</li> </ul>
Nicolini & Meznar (1995: 727)	<ul style="list-style-type: none"> <li>• “... a social construction which transforms acquired cognition into accountable abstract knowledge.”</li> </ul>
Price (1995: 299)	<ul style="list-style-type: none"> <li>• “Organisational evolution (learning) can be considered as a selection process between mental replicators. It is enhanced by punctuation of mental equilibria and by management capabilities analogous to those of adaptive genes.”</li> </ul>
Probst & Buchel (1997: 15)	<ul style="list-style-type: none"> <li>• “Organisational learning is the process by which the organisations knowledge and value base changes, leading to improved problem-solving ability and capacity for action.”</li> </ul>
Shrivastava (1981: 15)	<ul style="list-style-type: none"> <li>• “Organisational learning refers to the process by which the organisational knowledge base is developed and shaped.”</li> </ul>
Simon (1969: 26)	<ul style="list-style-type: none"> <li>• “...the growing insights and successful restructuring of organisational problems by individuals reflected in the structural elements and outcomes of the organisation itself.”</li> </ul>
Simon (1991: 125)	<ul style="list-style-type: none"> <li>• “All learning takes place inside individual human heads; an organisation learns in only two ways: (a) by the learning of its members, or (b) by ingesting new members who have knowledge the organisation didn't previously have.”</li> </ul>
Snell & Chak (1996: 6)	<ul style="list-style-type: none"> <li>• “Organisational Learning entails <i>meaningful change in the processes, structures, assumptions</i> or concerns connecting individual members.”</li> </ul>
Snyder & Cummings (1998: 875)	<ul style="list-style-type: none"> <li>• “Learning is organisational to the extent that: (1) it is done to achieve organisation purposes; (2) it is shared or distributed among members of the organisation; and (3) learning outcomes are embedded in the organisations systems, structures and culture.”</li> </ul>
Stata (1989: 64)	<ul style="list-style-type: none"> <li>• “Organisational Learning occurs through shared insights, knowledge and mental models ...(and) builds on past knowledge and experience - that is memory.”</li> </ul>
Stein & Vandenbosch (1996: 115)	<ul style="list-style-type: none"> <li>• “Higher -order organisational learning occurs when a company adopts new principles, assumptions and paradigms which often turn into competitive advantage.”</li> </ul>
Swieringa & Wierdsma (1992: 33)	<ul style="list-style-type: none"> <li>• “By the term ‘organisational learning’ we mean the changing of organisational behaviour.”</li> </ul>

## APPENDIX B: Organisational Learning Typologies

<i>Author(s)</i>	<i>Descriptors</i>	<i>Learning Forms</i>	<i>Core Ideas</i>	<i>Exemplar(s)</i>
Edmondson & Moingeon (1998)	4 Forms of Research	• Accountability	• Organisational improvement gained through developing individuals mental models.	• Senge (1990a); Argyris (1993).
		• Participation	• Organisational improvement gained through intelligent activity of individual members.	• Hayes Wheelwright & Clark (1988).
		• Communities	• Organisations as collections of individuals who can learn and develop.	• Pedler Burgoyne & Boydell (1990).
		• Residues	• Organisations as residues of past learning.	• Levitt & March (1988).
Easterby-Smith (1997)	6 Disciplines	• Psychology & Organisational Development	• Hierarchical organisations; importance of context; cognition; underlying values; learning styles; dialogue.	• Bateson (1973); Kolb Rubin & McIntyre (1973); Honey and Mumford (1992); Argyris (1986; 1992); Dixon (1994).
		• Management Science	• Knowledge; memory; holism; error correction; informing; single and double loop.	• Argyris & Schon (1978); March & Olsen (1989); Senge (1990a); Huber (1991)
		• Sociology & Organisation Theory	• Effects of power structure and hierarchy; conflict is normal, ideology and rhetoric; interests of actors.	• Shrivastava (1983); Easterby-Smith (1990); Brown & Duguid (1991); Coopey (1995).
		• Strategy	• Organisation-environment interface; levels of learning progressively more desirable; networks; importance of direct experience; population-level learning.	• Fiol & Lyles (1985); Dodgson (1991); Parke (1991) Hamel & Prahalad (1993).
		• Production Management	• Importance of productivity; learning curves; endogenous and exogenous sources of learning; links to production design.	• Argote Beckman & Epple (1990); Adler (1993); Garvin (1993).
		• Cultural Anthropology	• Culture as cause and effect of organisational learning; beliefs; potential cultural superiority?	• Lave & Wenger (1990); Hedlund & Nonaka (1993); Carroll (1995).

### Organisational Learning Typologies (2 of 4)

<i>Author(s)</i>	<i>Descriptors</i>	<i>Learning Forms</i>	<i>Core Ideas</i>	<i>Exemplar(s)</i>
Miller (1996)	6 Paradigms	<ul style="list-style-type: none"> <li>Analytic Learning</li> <li>Structural Learning</li> <li>Experimental Learning</li> <li>Synthetic Learning</li> <li>Interactive Learning</li> <li>Institutional Learning</li> </ul>	<ul style="list-style-type: none"> <li>Learning occurs through information gathering, environmental scanning and opportunity analysis; methodical thought and action with few constraints.</li> <li>Methodical, with both thought and action constrained; learning is guided through organisational routines.</li> <li>Learning occurs through the performance and monitoring of small experiments; methodical thought and action and action constrained.</li> <li>Combination of knowledge and information in new ways to create novel relationships or patterns; few constraints and emergent thought and action.</li> <li>Learning-by-doing; occurs through the trading and exchange of information; emergent thought and action and action constrained.</li> <li>Learning as an inductive process by which organisations assimilate values, ideologies and practises from their environments and their elite members; emergent with both thought and action constrained.</li> </ul>	<ul style="list-style-type: none"> <li>Ansoff (1965); Allison (1971); Steiner (1979).</li> <li>March &amp; Simon (1958); Nelson &amp; Winter (1982).</li> <li>Weick (1979); March (1991).</li> <li>Mintzberg (1989); Miller (1990); Senge (1990a).</li> <li>Lindblom (1959); Cyert &amp; March (1963).</li> <li>Selznik (1957); DiMaggio &amp; Powell (1983).</li> </ul>
Glynn Lant & Milliken (1994)	2 Theoretical Approaches	<ul style="list-style-type: none"> <li>Adaptive Learning</li> <li>Knowledge Development</li> </ul>	<ul style="list-style-type: none"> <li>Behavioural changes in organisational routines, goals and structures; often the antecedents, effects and functionality of learned behaviours.</li> <li>Development of and changes in knowledge structures, causal maps, and the understanding of cause-effect relationships.</li> </ul>	<ul style="list-style-type: none"> <li>Levinthal &amp; March (1988); Herriott, Levinthal &amp; March (1985); Lant &amp; Mezias (1990).</li> <li>Argyris &amp; Schon (1978); Jelinek (1979); Miles &amp; Randolph (1980); Epple Argote &amp; Devadas (1991).</li> </ul>

### Organisational Learning Typologies (3 of 4)

<i>Author(s)</i>	<i>Descriptors</i>	<i>Learning Forms</i>	<i>Core Ideas</i>	<i>Exemplar(s)</i>
Huber (1991)	4 Contributing Structures & Processes	<ul style="list-style-type: none"> <li>Knowledge Acquisition</li> <li>Information Distribution</li> <li>Information Interpretation</li> <li>Organisational Memory</li> </ul>	<ul style="list-style-type: none"> <li>Formal and informal organisational behaviours directed toward obtaining information or knowledge; includes experimental and experienced-based learning</li> <li>Determinant of both occurrence and breadth of learning; leads to broader learning</li> <li>Development of shared understanding, cognitive maps conceptual schemes through the translation of events and information.</li> <li>Storage and retrieval of knowledge and information in individuals minds, operating procedures, routines, scripts, and computers.</li> </ul>	<ul style="list-style-type: none"> <li>Argyris and Schon (1974; 1978); March &amp; Olsen (1979); Jelinek (1979); Levitt &amp; March (1988); Tushman &amp; Moore (1988)</li> <li>Porter &amp; Roberts (1976); Huber (1982); Huber &amp; Daft (1987).</li> <li>Daft &amp; Weick (1984); Isabella (1990); March Sproull &amp; Tamuz (1991).</li> <li>Nisbett &amp; Ross (1980); Nelson &amp; Winter (1982); Gioia &amp; Poole (1984); Huber (1990).</li> </ul>
Shrivastava (1983)	4 Perspectives	<ul style="list-style-type: none"> <li>Adaptive Learning</li> <li>Assumption Learning</li> <li>Development of Knowledge Base</li> <li>Institutionalised Experience Effects</li> </ul>	<ul style="list-style-type: none"> <li>Organisations adapt to changes in their environment by readjusting their goals, attention rules and search rules.</li> <li>Learning through changes in organisational theories-in-use.</li> <li>Learning as the process by which knowledge about action-outcome relations is developed.</li> <li>Learning curve effects extended to managerial decision making.</li> </ul>	<ul style="list-style-type: none"> <li>Cyert &amp; March (1963); Cangelosi &amp; Dill (1965); March &amp; Olsen (1975).</li> <li>Argyris &amp; Schon (1978); Mitroff &amp; Emshoff (1979); Mason &amp; Mitroff (1981).</li> <li>Duncan &amp; Weiss (1979); Dutton &amp; Duncan (1981).</li> <li>Boston Consulting Group (1968); Abernathy &amp; Wayne (1974); Yelle (1979).</li> </ul>

### Organisational Learning Typologies (4 of 4)

<i>Author(s)</i>	<i>Descriptors</i>	<i>Learning Forms</i>	<i>Core Ideas</i>	<i>Exemplar(s)</i>
Hedberg (1981)	3 Modes	<ul style="list-style-type: none"> <li>• Adjustment Learning</li> <li>• Turnover Learning</li> <li>• Turnaround Learning</li> </ul>	<ul style="list-style-type: none"> <li>• Routinised adjustment of parameters or rule to overcome minor, reversible changes in the environment.</li> <li>• Unlearning and replacement of behaviours in response to significant, partial, and irreversible changes in the environment.</li> <li>• Change in underlying theory of action in response to substantial irreversible change.</li> </ul>	<ul style="list-style-type: none"> <li>• Cyert &amp; March (1963); Thompson (1967).</li> <li>• Jonsson Lundin &amp; Sjoberg (1974); Hedberg (1975).</li> <li>• Weick (1969); Beer (1972); Argyris and Schon (1978)</li> </ul>
Crossan et al. (1995)	6 Forms	<ul style="list-style-type: none"> <li>• Integrated Learning</li> <li>• Experimental Learning</li> <li>• Anticipatory Learning</li> <li>• Forced Learning</li> <li>• Blocked Learning</li> <li>• No Learning</li> </ul>	<ul style="list-style-type: none"> <li>• Learning that incorporates both cognitive and behavioural change.</li> <li>• Learning that incorporates behavioural change and can lead to cognitive change.</li> <li>• Learning that incorporates cognitive change and can lead to behavioural change.</li> <li>• Learning that incorporates behavioural change, but not cognitive change. Behavioural change is likely to be short lived.</li> <li>• Learning that incorporates cognitive change, but not behavioural change. Cognitive change is likely to be short lived.</li> <li>• No behavioural or cognitive change.</li> </ul>	<ul style="list-style-type: none"> <li>• Constructed Theoretically, based on the view that organisational learning varies across fundamental cognitive and behavioural dimensions, classifies papers on this basis but provides no specific examples.</li> </ul>



## APPENDIX C

### Research Proposal & Supporting Letters

#### THE ROLE OF MENTAL MODELS IN INDIVIDUAL AND ORGANISATIONAL LEARNING

##### OUTLINE

Business leaders and academics have suggested that an ability to learn is an essential characteristic for successful organisations in today's rapidly changing business environment. The desire to create and maximise learning in organisations has led to the growth of the concept of the 'learning organisation'. This can be characterised as an organisation which recognises the need for change, and promotes learning at all levels within it. Research in Britain and the USA has identified mental models as an essential element of a learning organisation. Crucial to learning and success is the development of 'shared mental models,' allowing that organisation's individuals to co-operate, communicate and innovate more effectively.

Mental models can be seen as simplifications or representations of understanding. These can vary from a simple image or picture in the mind to more complex conceptual understanding built through more detailed knowledge. This project seeks to further organisational learning research, looking at the extent to which organisational learning characteristics and shared mental models exist within organisations, and at how the mental models of individuals develop within their organisational environment. The project is part of ongoing work at the University of Plymouth Business School looking at organisational learning, and is seeking collaborating organisations where the research can be undertaken, who wish to gain the benefits of participating in this exciting and original research.

##### RESEARCH OBJECTIVES

The project has four main objectives:

- identify and describe the shared mental model that exists within the organisation;
- assess the extent to which the organisation is a learning organisation;
- investigate the relationship between mental models and learning organisation characteristics;
- suggest ways in which the collaborating organisation may enhance its learning capacity.

##### RESEARCH PROCESS

Initial interviews with senior managers will be used to map individual mental models and produce a shared mental model. This will provide the collaborating organisation with a new and distinctive way of viewing itself. A questionnaire survey (tailored specifically to the organisation's own goals), will furnish the organisation with an invaluable insight into the extent to which the organisation is a 'learning organisation.' The results of this survey will be compared with the shared mental model obtained from the sample of senior managers, to assess the extent to which the individuals' learning matches the organisation's requirements. This exercise will also act as an developmental tool for those individuals who participate, providing them with an ongoing opportunity to reflect upon their learning.

##### COLLABORATING ORGANISATION REQUIREMENTS

The research project is supported and wholly funded by the University of Plymouth Business School, but in order to carry out the research we require access to organisations and individual employees. This will involve interviews with approximately six to eight senior managers, followed by a survey utilising a self-reported questionnaire administered to a representative sample of individuals across the collaborating organisation. Collaborating organisations will have the option of remaining totally anonymous and will receive results and feedback from the project on an ongoing basis, and a comprehensive report detailing the findings.

##### SUMMARY

This project presents organisations with a unique opportunity to participate in innovative and exciting research. The proposed exercise will be invaluable in aiding the collaborating organisation's assessment of the effectiveness of its learning processes and will provide an insight into the extent to which these processes enable individuals to align their activities with the organisation's mission, goals and strategy.

**LETTER 1**

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: dspicer@plymouth.ac.uk

Dear [Insert Name],

I am writing to present you and your organisation with the opportunity to participate in innovative and exciting research being undertaken by the University of Plymouth Business School. '*The Role of Mental Models in Individual and Organisational Learning*,' is an ongoing, extensive project looking at the transfer of knowledge and learning within and between organisations, which has the potential to improve organisational effectiveness in today's rapidly changing business environment.

The project is seeking access to a select group of organisations and individuals in order to undertake this research, and I would appreciate it if you could spare a few minutes to read the enclosed research proposal. If you and your organisation are interested in participating in this research or require any further information or have any questions, please contact the project leader David Spicer.

The University of Plymouth Business School recognises that any research activities which include collaborating partners, need to be driven by business needs, and I would be happy to discuss tailoring it to your specific requirements. I am confident you will find this research extremely beneficial to both your organisation and the employees who participate. Thank you for your time, I look forward to hearing from you.

Yours sincerely,

D. Spicer. Project Leader: 'The Role of Mental Models in Individual and Organisational Learning.'

**LETTER 2**

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: dspicer@plymouth.ac.uk

Dear [Insert Name],

I recently wrote to you regarding an opportunity to participate in a research project being undertaken by the University of Plymouth Business School, entitled '*The Role of Mental Models in Individual and Organisational Learning*,' and would like to represent you the opportunity to collaborate in this innovative and exciting research. This project aims to look at how individuals learn in the working environment, and can be tailored to consider specific issues within your own organisation.

A short research proposal is enclosed and I would be grateful if you could spare the time to review it, remembering that the research methodology has been designed to allow you to address your own business needs. If you and your organisation require any further information or have any questions, please contact the project leader David Spicer on 01752 232881 or 01752 500978.

Thank you for your time, I look forward to hearing from you.

Yours sincerely,

D. Spicer. Project Leader: 'The Role of Mental Models in Individual and Organisational Learning.'

## APPENDIX D

### Mental Model Characterisation and Analysis: Measures Used

#### Concept Measures

Three concept measures have been adopted:

1. '*Merged*': This identifies the number of individual interview participants who identified with a concept included in the shared mental model.
2. '*Domain*': Domain identifies the link density of a concept, and represents a count of the total number of links surrounding that concept. It is calculated by *Decision Explorer*, which provides a hierarchical domain analysis listing concepts in descending order of link density (Banxia 1994).
3. '*Centrality*': Analysis of centrality provides a weighted score for the number of concepts linked to a particular concept within a map up to a specified numbers of 'band levels' surrounding that concept. Band levels are the number of links between the central concept and those surrounding it. The Decision Explorer default settings were used for this analysis which calculates the centrality score from the first three band levels (i.e. those concepts which are within three links of a specific concepts, and uses diminishing weights (i.e. all concepts at level one are divided by one, concepts at level two are divided by two and concepts at level 3 are divided by three) (Banxia 1994). The resultant statistic is given as a centrality score from the total number of concepts traversed, the higher that score the greater the sphere of influence surrounding a concept.

#### Map Measures

Three measures derived from mathematical graph theory (Harary 1969) are identified:

1. '*Complexity*': Complexity ( $\beta$  Index) identifies the mean number of links serving each concept and differentiates simple maps (low  $\beta$ ) from complex (high  $\beta$ ) (Johnson, Gregory and Smith 1986), according to the formula:

$$\beta = l / c$$

Where:  $l$  = the total number of links in a map; and  $c$  = the total number of concepts in that map.

2. '*Density*': Map density ( $\gamma$  Index) represents the total number of links in a causal map divided by the theoretical maximum number of links, which is defined as the maximum possible number of links between a given number of concepts (Klein and Cooper 1982).  $\gamma$  is calculated according to the equation:

$$\gamma = l / c(c-1)$$

Where:  $l$  = the total number of links in a map; and  $c$  = the total number of concepts in that map. This provides a score ranging between 0 and 1, and as  $\gamma$  approaches one, the map's density increases and the more it approaches optimal connectivity.

3. '*Similarity*': The measure of similarity adopted here is derived from the ratio provided by McKeithan, Reitman, Rueter and Hirtle (1981), and calculates the 'proportion in common' between two maps, according to the calculation:

$$\text{Similarity} = \frac{\ln(\text{number of concepts in common between the two maps} + 1)}{\ln(\text{total number of concepts contained in both maps} + 1)}$$

The more concepts in common (identified in individual maps through the matching and merging process adopted), the higher the score, the greater the similarity between the maps in question, with identical maps scoring 1. The logarithmic transformation (natural log:  $\ln$ ) is used to eliminate the effects of the significant correlation between the total number of concepts and this ratio identified by McKeithan et al. (1981).

## APPENDIX E

### Cognitive Style Feedback Sheet

#### *YOUR COGNITIVE STYLE ASSESSMENT*

Your *Cognitive Style Index (CSI)*<sup>1</sup> score is:

This suggests that your dominant cognitive style is:

☐

*Intuitive*

☐

*Intermediate*

☐

*Analyst*

The *Cognitive Style Index (CSI)* is an assessment of how you think about problems and indicates how you typically process information. Your own *CSI* score will provide a basis for deciding what you can do to increase your flexibility; that is to improve your ability to adapt your approach to learning and problem solving to match the information processing requirements of different situations.

#### *Analysis and Intuition*

Many different Dimensions of cognitive style have been identified over the years; however it is generally agreed that the fundamental distinction between styles is a simple one. This can be best explained by using the workings of the human brain as a metaphor. Style can be thought of in terms of a continuum, the poles of which can be linked to the neurological activity associated with the two halves of the human brain.

The *CSI* has been designed to assess the position of an individual on this intuition-analysis dimension. The nearer the score is to the theoretical maximum of 76, the more analytical the respondent; the nearer the score is to the theoretical minimum of 0, the more intuitive the respondent. (The high score for analysis is merely a result of the way the *CSI* is scored - it does not suggest an analytic style is better or worse than an intuitive one).

*Intuitives* have scores in the range 0-35. They are more likely to adopt intuitive modes of information processing even when they may not be the most appropriate for the situation. Allinson and Hayes<sup>2</sup> state that Intuition 'refers to immediate judgement based on feelings and the adoption of a global perspective.' Intuitives tend to be relatively nonconformist, prefer an open ended approach to problem solving and rely on random methods of exploration. They would appear to work best with ideas that require an overall assessment and will remember spatial images most easily.

*Analysts* have scores in the range 49-76. They are more likely to adopt analytical modes, even when they may not be appropriate for the situation. Allison and Hayes state that Analysts 'tend to be more compliant, favour a structured approach to problem solving and depend on systematic methods of investigation.' Their recall of verbal material is most accessible and they are more able to handle ideas that require a step by step approach.

Those with *intermediate* scores in the range 36-48 tend to use a mix of approaches to process information, even when it might be most effective to rely heavily on either a more wholly analytical or wholly intuitive approach. They are the people who will experience least difficulty expanding their repertoire of information processing behaviours and developing a flexible approach to learning and problem solving.

Finally, I can take this opportunity to thank you for your help and participation in this research.

Dave Spicer

Group for Organisational Learning Development (GOLD), at the University of Plymouth Business School.

<sup>1</sup> The *Cognitive Style Index (CSI)* is copyright J. Hayes and C.W. Allinson, 1996.

<sup>2</sup> Allinson C.W. & Hayes J. "The Cognitive Style Index: A Measure of Intuition-Analysis for Organisational Research." *Journal of Management Studies*, Vol. 33 No. 1, January 1996, pp. 119-135.

## APPENDIX F

### Original Research Questionnaire (Version 1: *WBC*)

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# ***QUESTIONNAIRE: LEARNING IN WESTCOUNTRY BOROUGH COUNCIL***

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This questionnaire looks at three aspects of your working environment. Section 1, looks at your's and Westcountry's learning, Section 2: looks at the Service Planning Process, and Section 3 assesses your cognitive (thinking) style. Work quickly and carefully through the questionnaire responding to the statements in each section as appropriate. Your responses will be treated in total confidence. This research is being undertaken by David Spicer from the *Group for Organisational Learning Development (GOLD)* at the University of Plymouth Business School, and is fully supported by Westcountry Borough Council.

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## SECTION 1: LEARNING STYLE

Below are 36 statements about how you and your organisation learn. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "My own ways of working are efficient and do not need changing," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	1	2	3	4	5
2. My own ways of working are efficient and do not need changing.	1	2	3	4	5
3. As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	1	2	3	4	5
4. I share as much information as possible with my colleagues.	1	2	3	4	5
5. I am often on the lookout for new ideas from any source.	1	2	3	4	5
6. This organisation's strategy and policy are prescribed by senior managers. No one else really can have a say.	1	2	3	4	5
7. This organisation doesn't encourage or use feedback from employees or customers on how well it works.	1	2	3	4	5
8. I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	1	2	3	4	5
9. This organisation doesn't need to get new ideas from elsewhere - we find our own tried and tested ways of working are usually right for us.	1	2	3	4	5
10. I only feel able to put my ideas forward if they don't challenge the views and values of senior managers.	1	2	3	4	5
11. This is an open organisation and as much information as possible is made available to employees.	1	2	3	4	5
12. Risk taking and experimentation is encouraged by the organisation and sometimes rewarded.	1	2	3	4	5
13. I am often looking to improve my working practices in order to increase my efficiency and effectiveness.	1	2	3	4	5
14. I prefer to have strategy and policy handed down to me by rather than have a say in its creation.	1	2	3	4	5
15. This organisation has a limited range of very efficient working practices that it sticks to.	1	2	3	4	5
16. I dislike experimenting with new and novel ways of working.	1	2	3	4	5
17. I don't normally look for feedback from employees, colleagues or customers about the way I work.	1	2	3	4	5

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
18. Employees are discouraged from experimenting with new and novel ways of working.	1	2	3	4	5
19. Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	1	2	3	4	5
20. There is two way communication between employees of all levels about what this organisation's doing and where it's going.	1	2	3	4	5
21. This organisation is often on the lookout for new ideas from suppliers, customers and competitors.	1	2	3	4	5
22. The organisation's working practices are basically fixed - we never have any need to change them.	1	2	3	4	5
23. Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	1	2	3	4	5
24. I put forward ideas about policy, even if they challenge senior managers' views.	1	2	3	4	5
25. I try to communicate my decisions and their outcomes throughout the organisation.	1	2	3	4	5
26. The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	1	2	3	4	5
27. I work to a set regime, but I'm willing to change my ways of working when necessary, particularly if it leads to efficiency gains.	1	2	3	4	5
28. As an organisation we actively encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	1	2	3	4	5
29. I talk to my employees, colleagues and customers and encourage them to tell me about things I do wrong and let me know how I can improve.	1	2	3	4	5
30. I rarely need to change my plans once I've made them.	1	2	3	4	5
31. My working practices are fixed and I rarely have any need to change them.	1	2	3	4	5
32. My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	1	2	3	4	5
33. I continuously challenge the organisation's mission, values and assumptions.	1	2	3	4	5
34. As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	1	2	3	4	5
35. I regularly experiment with new ways of working.	1	2	3	4	5
36. This organisation allows its broad strategy to be continuously challenged and re-interpreted.	1	2	3	4	5

## SECTION 2: THE SERVICE PLANNING PROCESS

Below are 26 statements below about the Service Planning Process in Westcountry Borough Council. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "Service planning has helped improve the council's effectiveness," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. The service planning process has simplified the council's structure.	1	2	3	4	5
2. Service planning has helped improve the council's effectiveness.	1	2	3	4	5
3. Restructuring the council into service units has led to changes in working practices.	1	2	3	4	5
4. The service planning process has improved communications throughout the council.	1	2	3	4	5
5. Service planning has helped in the creation of mechanisms for performance management.	1	2	3	4	5
6. The service planning process requires commitment from all those involved in the process.	1	2	3	4	5
7. Service plans result in the development of clear aims and objectives for service units.	1	2	3	4	5
8. Commitment to the service planning process relies, in part, on the feedback provided by service units to the council.	1	2	3	4	5
9. The service planning process has required the council to draw up mission statements/ key principles/ position statements.	1	2	3	4	5
10. Commitment to service planning is demonstrated by the uptake of mission statements/ key principles/ position statements.	1	2	3	4	5
11. The service planning process has resulted in a higher quality of service provision.	1	2	3	4	5
12. The service planning process has led to performance reviews which help to maximise efficiency.	1	2	3	4	5
13. The service planning process requires support from everyone throughout the council.	1	2	3	4	5
14. Service planning has created shared resources which give the council the flexibility it requires to meet needs.	1	2	3	4	5



	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
15. A key part of the service planning process is the monitoring and evaluation of targets.	1	2	3	4	5
16. Creation of a shared purpose within the council is a key element of the service planning process.	1	2	3	4	5
17. The service planning process is 'owned' by all members of the council.	1	2	3	4	5
18. Important principles (such as openness and honesty) are recognised by everyone in the service planning process.	1	2	3	4	5
19. The service planning process requires all the interested parties (both within and beyond the council) to be consulted about a particular issue.	1	2	3	4	5
20. The service planning process has made the council more responsive to change.	1	2	3	4	5
21. In terms of its outcomes, the benefits of the service planning process outweigh any problems or difficulties.	1	2	3	4	5
22. One of the key benefits of the service planning process is that it has fostered learning throughout the council.	1	2	3	4	5
23. Service planning has improved my own working environment.	1	2	3	4	5
24. Politics within the council have had a significant influence on the service planning process.	1	2	3	4	5
25. Service planning is aimed at ensuring the council maximises benefits for all members of the community.	1	2	3	4	5
26. Pressure to provide 'Best Value' is an important driver of the service planning process.	1	2	3	4	5

27. If you would like to add any further comments about the service planning process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.

### SECTION 3: COGNITIVE STYLE

People differ in the ways they think and in the ways they structure and use knowledge and information. Below are 38 statements designed to identify your thinking style (sometimes called 'cognitive style'). If you think that a statement is true about yourself, answer *T*. If you think that its false, answer *F*. If you are uncertain whether it is true or false, answer *?*. Again, there are no right or wrong answers, be honest and give the answer that comes closest to your own opinion of yourself. Work quickly through it by ticking the appropriate box next to each statement.

<i>T = true; ? = uncertain; F = false</i>	<i>T</i>	<i>?</i>	<i>F</i>
1. In my opinion rational thought is the only realistic basis for making decisions.			
2. To solve a problem, I have to study each part of it in detail.			
3. I'm most effective when my work involves a clear sequence of tasks to be performed.			
4. I have difficulty in working with people who 'dive in at the deep end' without considering the finer aspects of the problem.			
5. I am careful to follow rules and regulations.			
6. I avoid taking a course of action if the odds are against its success.			
7. I am inclined to scan through written documents rather than read them in detail.			
8. My understanding of a problem tends to come more from thorough analysis than flashes of insight (i.e. seeing the answer quickly and easily).			
9. I try to keep a regular routine in my work.			
10. The kind of work I like best is that which requires a logical, step by step approach.			
11. I rarely make 'off the top of the head decisions'.			
12. I prefer chaotic action to orderly inaction.			
13. Given enough time, I would consider every situation from all angles			
14. To be successful in my work, I find that it is important to avoid hurting other people's feelings.			
15. The best way for me to understand a problem is to break it down into its constituent parts.			
16. I find that adopting a careful, analytical approach to making decisions takes too long.			
17. I make the most progress when I take calculated risks.			
18. I find that it is possible to be too organised when performing certain kinds of tasks.			
19. I always pay attention to detail before I reach a conclusion.			
20. I make many of my decisions on the basis of intuition (i.e. feelings rather than facts).			
21. My philosophy is that it is better to be safe than sorry.			
22. When making a decision, I take my time and thoroughly consider all the relevant factors.			
23. I get on best with quiet thoughtful people.			

<i>T = true; ? = uncertain; F = false</i>	<i>T</i>	<i>?</i>	<i>F</i>
24. I would rather my life was unpredictable than it followed a regular pattern.			
25. Most people regard me as a logical thinker.			
26. To fully understand the facts I need a good theory.			
27. I work best with people who are spontaneous.			
28. I find detailed, methodical work satisfying.			
29. My approach to solving a problem is to focus on one part at a time.			
30. I am constantly on the look out for new experiences.			
31. In meetings I have more to say than most.			
32. My instinctive feelings are just as good a basis for decision making as careful analysis.			
33. I am the kind of person who casts caution to the wind.			
34. I make decisions and get on with things rather than analyse every last detail.			
35. I am always prepared to take a gamble.			
36. Formal plans are more of a hindrance than a help in my work.			
37. I prefer ideas rather than facts and figures.			
38. I find that 'too much analysis results in paralysis'.			

Cognitive style is an important aspect of how we learn. Many people have found a knowledge of their style to be very beneficial for their self development. Individual feedback on your style is available. If you would like to know what your cognitive (thinking) style is, please include your details in the box below. This will in no way affect the confidentiality of your responses and will only be used to return your cognitive style assessment.

NAME:
ADDRESS:
E-MAIL:

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**SECTION 4: RESPONDENT DETAILS**

1. What is your age? (Please tick)..... ☐ Under 30 ☐ 31-40  
☐ 41-50 ☐ 51-60 ☐ Over 60

2. What is your gender? (Please tick)..... ☐ Male ☐ Female

3. How many years have you worked for this organisation?.....

4. What is your department/ unit?.....

5. Job level?..... ☐ service unit manager ☐ supervisor  
☐ middle manager ☐ staff  
or:  (own description)

5. Finally, If you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.

**THANK YOU FOR TAKING THE TIME TO  
COMPLETE THIS QUESTIONNAIRE**

**Please return your questionnaire in the FREEPOST envelope provided  
to: David Spicer, University of Plymouth Business School, Drake Circus,  
Plymouth, PL1 1BR. Tel. 01752 232881 Fax. 01752 232853.**

## APPENDIX G: Letter Supporting Research Questionnaire (*WBC*)

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: d.spicer@plymouth.ac.uk

Dear Sir/Madam,

I am writing to ask for your help with the enclosed questionnaire which looks at learning in [organisation]. This questionnaire is the second part of ongoing research being conducted by the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School and [organisation] and we'd be grateful for your assistance. The questionnaire consists of three sections. Section 1 looks at how you feel you and [organisation] learn, Section 2 looks at the [organisation's issue], and Section 3 will assess your cognitive (or thinking) style. An assessment of these issues will be beneficial to [organisation]'s development and continued success, and your opinions are important to this. There is also an opportunity for you to get feedback on your own cognitive style, an awareness of which will be beneficial to your personal development.

The questionnaire should take around 20 minutes to complete, and your responses will be entirely confidential. A Freepost envelope is enclosed for you to return your completed questionnaire.

If you have any questions, please contact me. Thank you in advance for your time and help.

Yours sincerely,

David Spicer.

*Group for Organisational Learning Development* (GOLD), University of Plymouth Business School.

## APPENDIX H: Letter Supporting Pilot Questionnaire

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: d.spicer@plymouth.ac.uk

Dear [name],

You have been specially selected to participate in this research, and I am writing to ask for your help with the enclosed questionnaire which looks at learning in [organisation]. This questionnaire is the pilot a major piece of research being conducted by the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School and [organisation] and we'd be grateful for your assistance. The questionnaire consists of three sections. Section 1 looks at how you feel you and [organisation] learn, Section 2 looks at the [organisation's issue], and Section 3 will assess your cognitive (or thinking) style. An assessment of these issues will be beneficial to [organisation]'s development and continued success, and your opinions are important to this. By completing and returning this pilot questionnaire you will help us ensure that this work is effective and appropriate to [organisation]. There is also an opportunity for you to get feedback on your own cognitive style, an awareness of which will be beneficial to your personal development.

The questionnaire should take around 20 minutes to complete, and your responses will be entirely confidential. A Freepost envelope is enclosed for you to return your completed questionnaire.

If you have any questions, please contact me. Thank you in advance for your time and help.

Yours sincerely,

David Spicer.

*Group for Organisational Learning Development* (GOLD), University of Plymouth Business School.

## APPENDIX I

### Revised Research Questionnaire (Version 1.1: *WBC*)

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# ***QUESTIONNAIRE: LEARNING IN WESTCOUNTRY BOROUGH COUNCIL***

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This questionnaire looks at three aspects of your working environment. Section 1, looks at your's and Westcountry's learning, Section 2: looks at the Service Planning Process, and Section 3 assesses your cognitive (thinking) style. Work quickly and carefully through the questionnaire responding to the statements in each section as appropriate. Your responses will be treated in total confidence. This research is being undertaken by David Spicer from the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School, and is fully supported by Westcountry Borough Council.

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## SECTION 1: LEARNING STYLE

Below are 36 statements about how you and your organisation learn. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "My own ways of working are efficient and do not need changing," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	1	2	3	4	5
2. My own ways of working are efficient and do not need changing.	1	2	3	4	5
3. As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	1	2	3	4	5
4. I share as much information as possible with my colleagues.	1	2	3	4	5
5. I am often on the lookout for new ideas from any source.	1	2	3	4	5
6. This organisation's strategy and policy are prescribed by senior managers. No one else really can have a say.	1	2	3	4	5
7. This organisation doesn't encourage or use feedback from employees or customers on how well it works.	1	2	3	4	5
8. I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	1	2	3	4	5
9. This organisation doesn't need to get new ideas from elsewhere - we find our own tried and tested ways of working are usually right for us.	1	2	3	4	5
10. I only feel able to put my ideas forward if they don't challenge the views and values of senior managers.	1	2	3	4	5
11. This is an open organisation and as much information as possible is made available to employees.	1	2	3	4	5
12. Risk taking and experimentation is encouraged by the organisation and sometimes rewarded.	1	2	3	4	5
13. I am often looking to improve my working practices in order to increase my efficiency and effectiveness.	1	2	3	4	5
14. I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	1	2	3	4	5
15. This organisation has a limited range of very efficient working practices that it sticks to.	1	2	3	4	5
16. I dislike experimenting with new and novel ways of working.	1	2	3	4	5
17. I don't normally look for feedback from employees, colleagues or customers about the way I work.	1	2	3	4	5

5 = strongly agree					
4 = agree					
3 = neutral (neither agree or disagree)					
2 = disagree					
1 = strongly disagree					
18. Employees are discouraged from experimenting with new and novel ways of working.	1	2	3	4	5
19. Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	1	2	3	4	5
20. There is two way communication between employees of all levels about what this organisation's doing and where it's going.	1	2	3	4	5
21. This organisation is often on the lookout for new ideas from suppliers, customers and competitors.	1	2	3	4	5
22. The organisation's working practices are basically fixed - we never have any need to change them.	1	2	3	4	5
23. Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	1	2	3	4	5
24. I put forward ideas about policy, even if they challenge senior managers' views.	1	2	3	4	5
25. I try to communicate my decisions and their outcomes throughout the organisation.	1	2	3	4	5
26. The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	1	2	3	4	5
27. I work to a set regime, but I'm willing to change my ways of working when necessary, particularly if it leads to efficiency gains.	1	2	3	4	5
28. As an organisation we actively encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	1	2	3	4	5
29. I talk to my employees, colleagues and customers and encourage them to tell me about things I do wrong and let me know how I can improve.	1	2	3	4	5
30. I rarely need to change my plans once I've made them.	1	2	3	4	5
31. My working practices are fixed and I rarely have any need to change them.	1	2	3	4	5
32. My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	1	2	3	4	5
33. I continuously challenge the organisation's mission, values and assumptions.	1	2	3	4	5
34. As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	1	2	3	4	5
35. I regularly experiment with new ways of working.	1	2	3	4	5
36. This organisation allows its broad strategy to be continuously challenged and re-interpreted.	1	2	3	4	5

Please continue to Section 2 below.



## SECTION 2: THE SERVICE PLANNING PROCESS

Below are 26 statements below about the Service Planning Process in Westcountry Borough Council. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "Service planning has helped improve the council's effectiveness," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. The service planning process has simplified the council's structure.	1	2	3	4	5
2. Service planning has not helped improve the council's effectiveness.	1	2	3	4	5
3. Restructuring the council into service units has not led to changes in working practices.	1	2	3	4	5
4. The service planning process has improved communications throughout the council.	1	2	3	4	5
5. Service planning has not helped the council create of mechanisms for performance management.	1	2	3	4	5
6. The service planning process does not requires commitment from all those involved in the process.	1	2	3	4	5
7. Service plans result in the development of clear aims and objectives for service units.	1	2	3	4	5
8. Commitment to the service planning process relies, in part, on the feedback provided by service units to the council.	1	2	3	4	5
9. The service planning process has required the council to draw up mission statements/ key principles/ position statements.	1	2	3	4	5
10. Commitment to service planning is demonstrated by the uptake of mission statements/ key principles/ position statements.	1	2	3	4	5
11. The service planning process has not resulted in a higher quality of service provision.	1	2	3	4	5
12. The service planning process has led to performance reviews which help to maximise efficiency.	1	2	3	4	5
13. The service planning process does not require support from everyone throughout the council.	1	2	3	4	5
14. Service planning has created shared resources which give the council the flexibility it requires to meet needs.	1	2	3	4	5

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
15. A key part of the service planning process is the monitoring and evaluation of targets.	1	2	3	4	5
16. Creation of a shared purpose within the council is not a key element of the service planning process.	1	2	3	4	5
17. The service planning process is 'owned' by all members of the council.	1	2	3	4	5
18. Important principles (such as openness and honesty) are recognised by everyone in the service planning process.	1	2	3	4	5
19. The service planning process does not require all the interested parties (both within and beyond the council) to be consulted about a particular issue.	1	2	3	4	5
20. The service planning process has not made the council more responsive to change.	1	2	3	4	5
21. In terms of its outcomes, the benefits of the service planning process outweigh any problems or difficulties.	1	2	3	4	5
22. One of the key benefits of the service planning process is that it has fostered learning throughout the council.	1	2	3	4	5
23. Service planning has not improved my own working environment.	1	2	3	4	5
24. Politics within the council have not had a significant influence on the service planning process.	1	2	3	4	5
25. Service planning is aimed at ensuring the council maximises benefits for all members of the community.	1	2	3	4	5
26. Pressure to provide 'Best Value' is not an important driver of the service planning process.	1	2	3	4	5

27. If you would like to add any further comments about the service planning process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.

Please continue to Section 3 below.

### SECTION 3: COGNITIVE STYLE

People differ in the ways they think and in the ways they structure and use knowledge and information. Below are 38 statements designed to identify your thinking style (sometimes called 'cognitive style'). If you think that a statement is true about yourself, answer *T*. If you think that its false, answer *F*. If you are uncertain whether it is true or false, answer *?*. Again, there are no right or wrong answers, be honest and give the answer that comes closest to your own opinion of yourself. Work quickly through it by ticking the appropriate box next to each statement.

<i>T</i> – true; <i>?</i> = uncertain; <i>F</i> = false	<i>T</i>	<i>?</i>	<i>F</i>
1. In my opinion rational thought is the only realistic basis for making decisions.			
2. To solve a problem, I have to study each part of it in detail.			
3. I'm most effective when my work involves a clear sequence of tasks to be performed.			
4. I have difficulty in working with people who 'dive in at the deep end' without considering the finer aspects of the problem.			
5. I am careful to follow rules and regulations.			
6. I avoid taking a course of action if the odds are against its success.			
7. I am inclined to scan through written documents rather than read them in detail.			
8. My understanding of a problem tends to come more from thorough analysis than flashes of insight (i.e. seeing the answer quickly and easily).			
9. I try to keep a regular routine in my work.			
10. The kind of work I like best is that which requires a logical, step by step approach.			
11. I rarely make 'off the top of the head decisions'.			
12. I prefer chaotic action to orderly inaction.			
13. Given enough time, I would consider every situation from all angles			
14. To be successful in my work, I find that it is important to avoid hurting other people's feelings.			
15. The best way for me to understand a problem is to break it down into its constituent parts.			
16. I find that adopting a careful, analytical approach to making decisions takes too long.			
17. I make the most progress when I take calculated risks.			
18. I find that it is possible to be too organised when performing certain kinds of tasks.			
19. I always pay attention to detail before I reach a conclusion.			
20. I make many of my decisions on the basis of intuition (i.e. feelings rather than facts).			
21. My philosophy is that it is better to be safe than sorry.			
22. When making a decision, I take my time and thoroughly consider all the relevant factors.			
23. I get on best with quiet thoughtful people.			

<i>T = true; ? = uncertain; F = false</i>	<i>T</i>	<i>?</i>	<i>F</i>
24. I would rather my life was unpredictable than it followed a regular pattern.			
25. Most people regard me as a logical thinker.			
26. To fully understand the facts I need a good theory.			
27. I work best with people who are spontaneous.			
28. I find detailed, methodical work satisfying.			
29. My approach to solving a problem is to focus on one part at a time.			
30. I am constantly on the look out for new experiences.			
31. In meetings I have more to say than most.			
32. My instinctive feelings are just as good a basis for decision making as careful analysis.			
33. I am the kind of person who casts caution to the wind.			
34. I make decisions and get on with things rather than analyse every last detail.			
35. I am always prepared to take a gamble.			
36. Formal plans are more of a hindrance than a help in my work.			
37. I prefer ideas rather than facts and figures.			
38. I find that 'too much analysis results in paralysis'.			

Cognitive style is an important aspect of how we learn. Many people have found a knowledge of their style to be very beneficial for their self development. Individual feedback on your style is available. If you would like to know what your cognitive (thinking) style is, please include your details in the box below. This will in no way affect the confidentiality of your responses and will only be used to return your cognitive style assessment.

NAME:
ADDRESS:
E-MAIL:

Please continue to Section 4 below.

---

**SECTION 4: RESPONDENT DETAILS**

1. What is your age? (Please tick)..... ☐ Under 31 ☐ 31-40  
☐ 41-50 ☐ 51-60 ☐ Over 60

2. What is your gender? (Please tick)..... ☐ Male ☐ Female

3. How many years have you worked for this organisation?.....

4. What is your department/ unit?.....

5. Job level? (Please tick)..... ☐ senior manager ☐ first line manager  
☐ middle manager ☐ staff

or:  (own description)

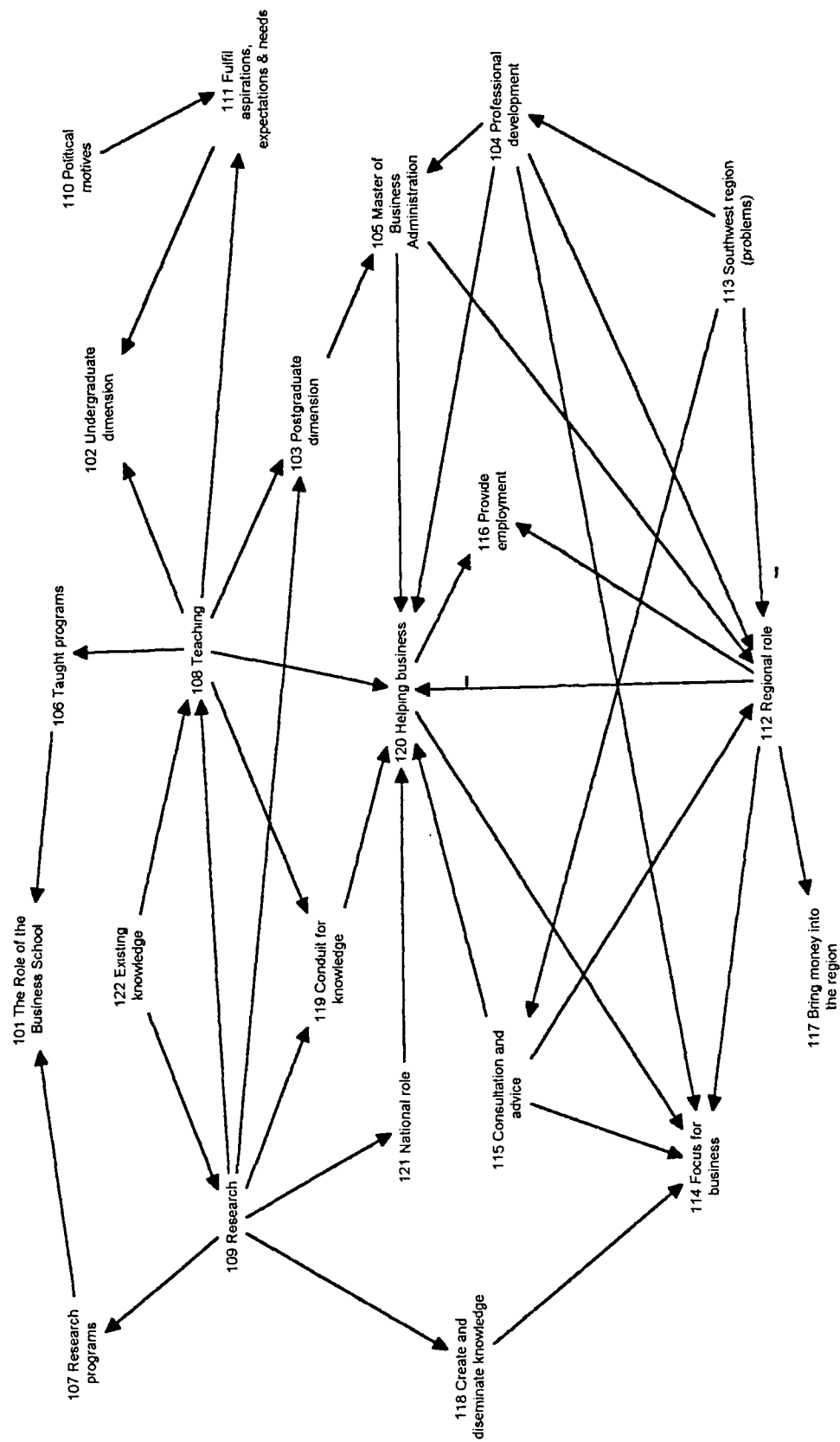
6. Finally, If you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.

**THANK YOU FOR TAKING THE TIME TO  
COMPLETE THIS QUESTIONNAIRE**

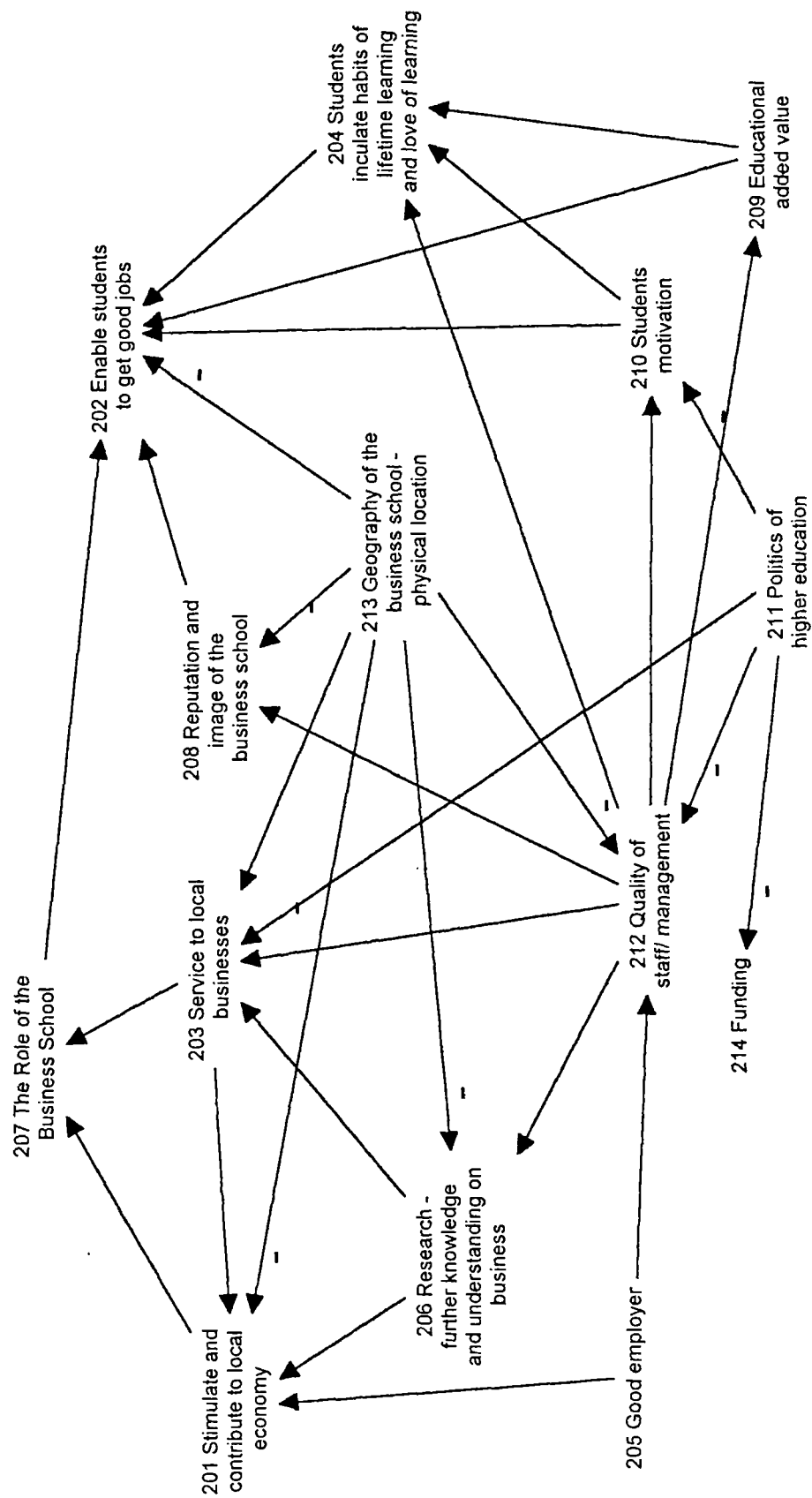
**Please return your questionnaire in the FREEPOST envelope provided  
to: David Spicer, University of Plymouth Business School, Drake Circus,  
Plymouth, PL1 1BR. Tel. 01752 232881 Fax. 01752 232853.**

## APPENDIX J

# ***UPBS: Individual Mental Models***

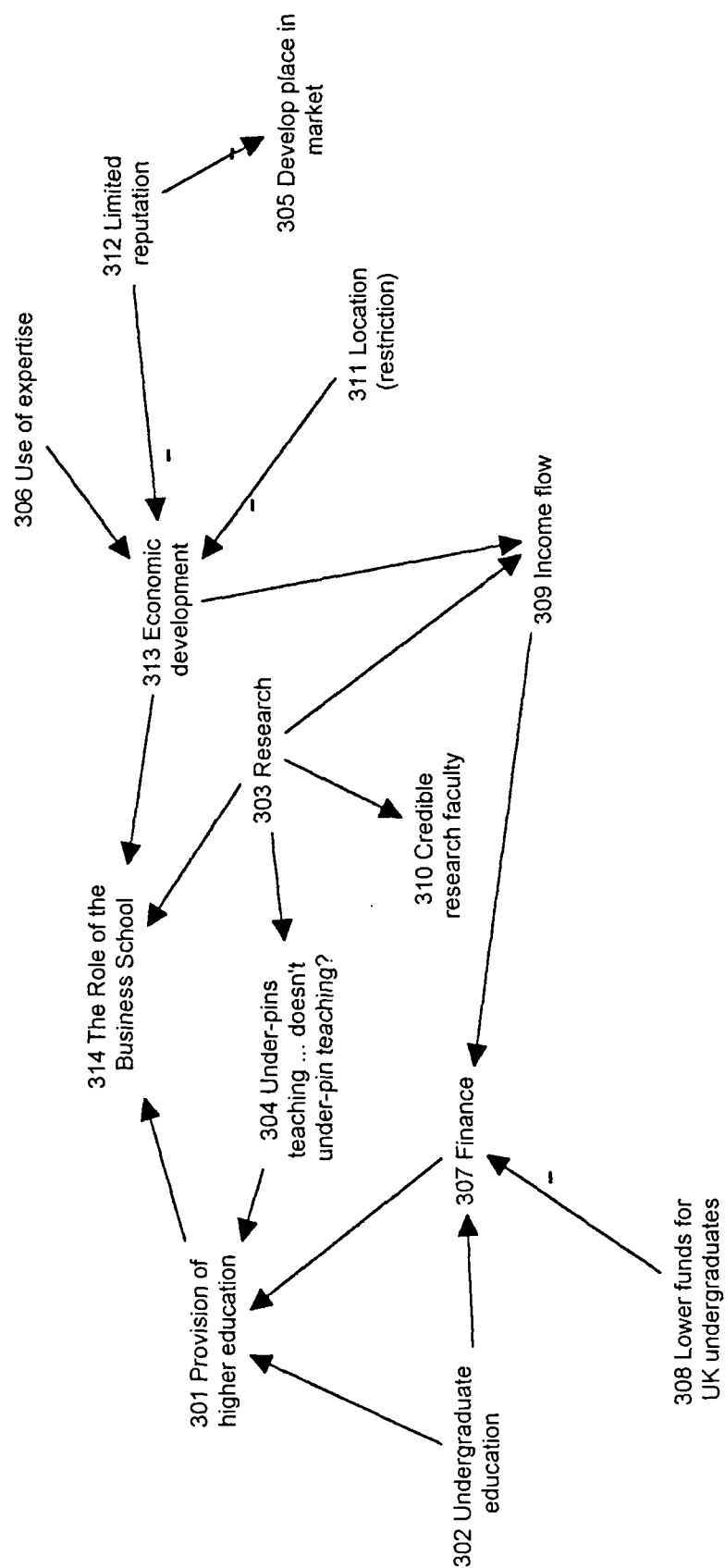


### J1:UPBS Respondent One: 'The Role of the Business School'

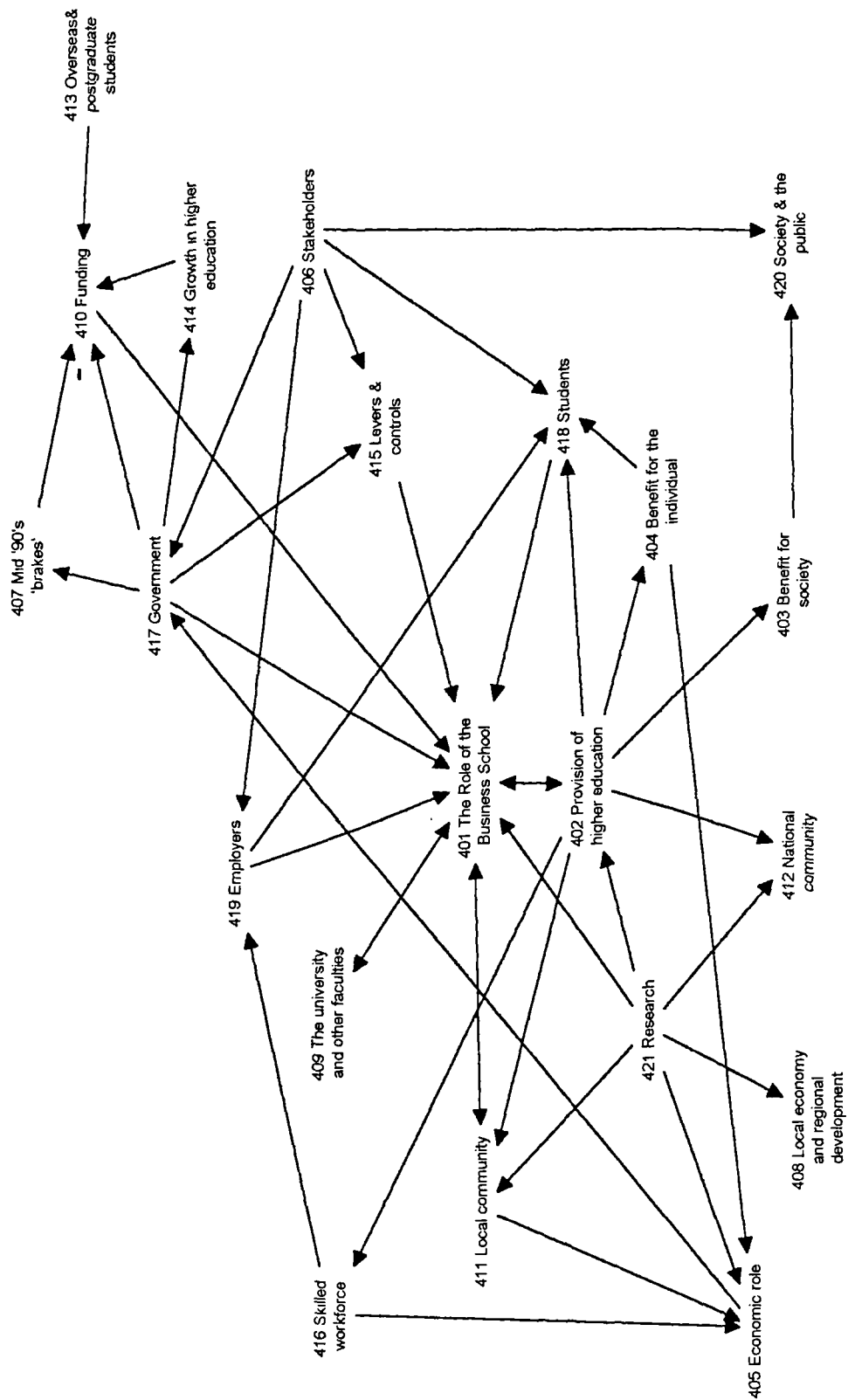


J2: UPBS Respondent Two: 'The Role of the Business School'

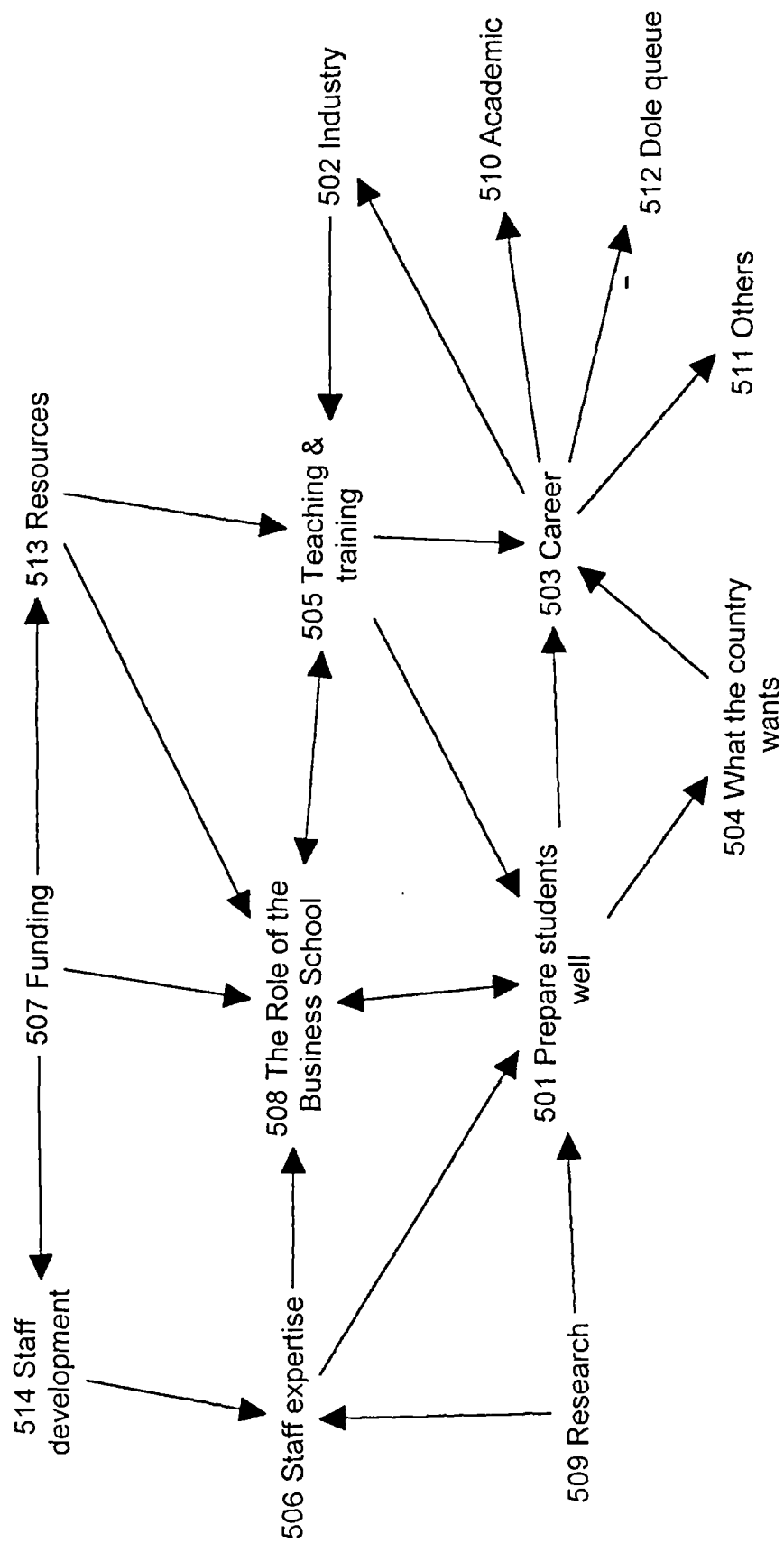




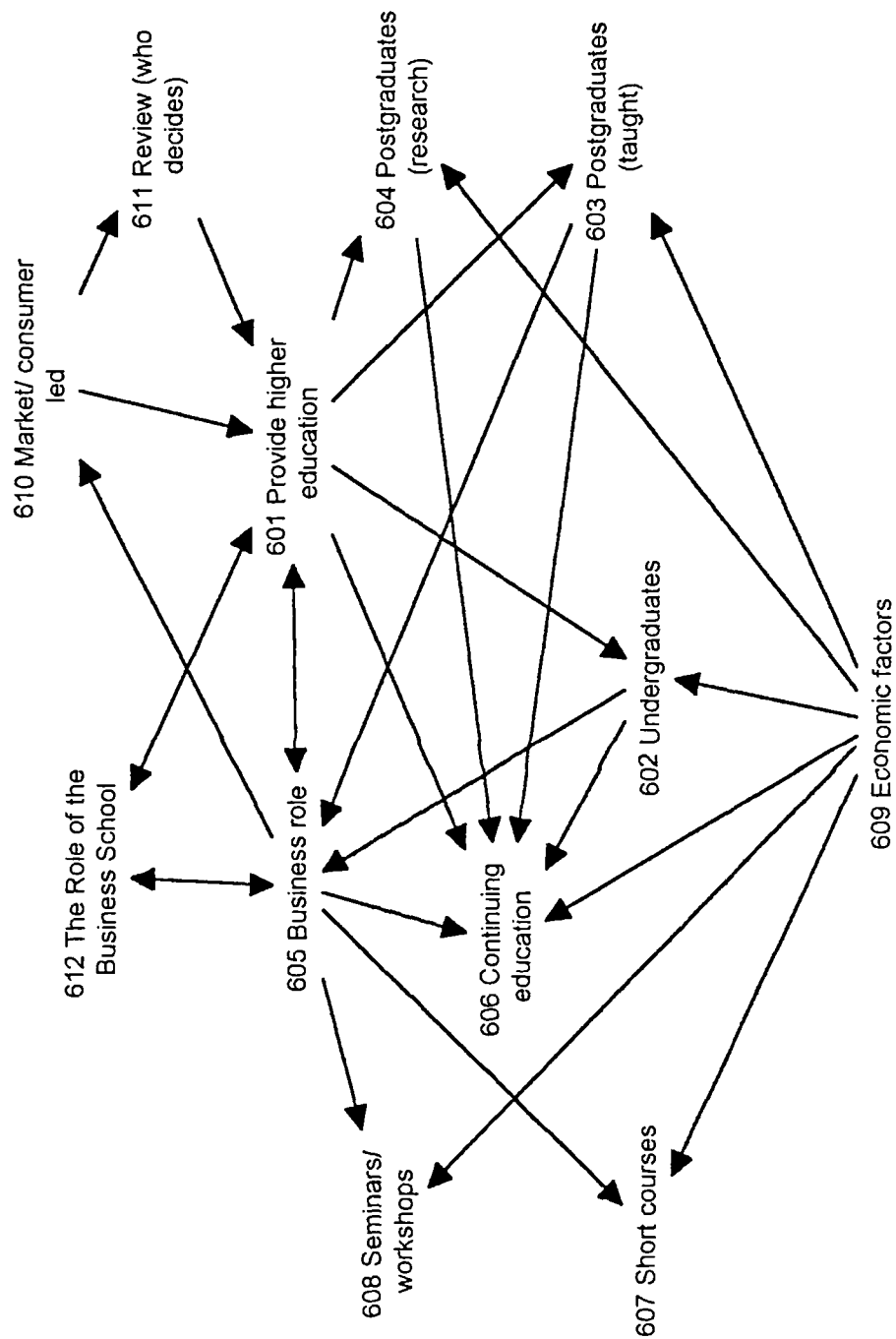
J3: UPBS Respondent Three: 'The Role of the Business School'



J4: UPBS Respondent Four: 'The Role of the Business School'



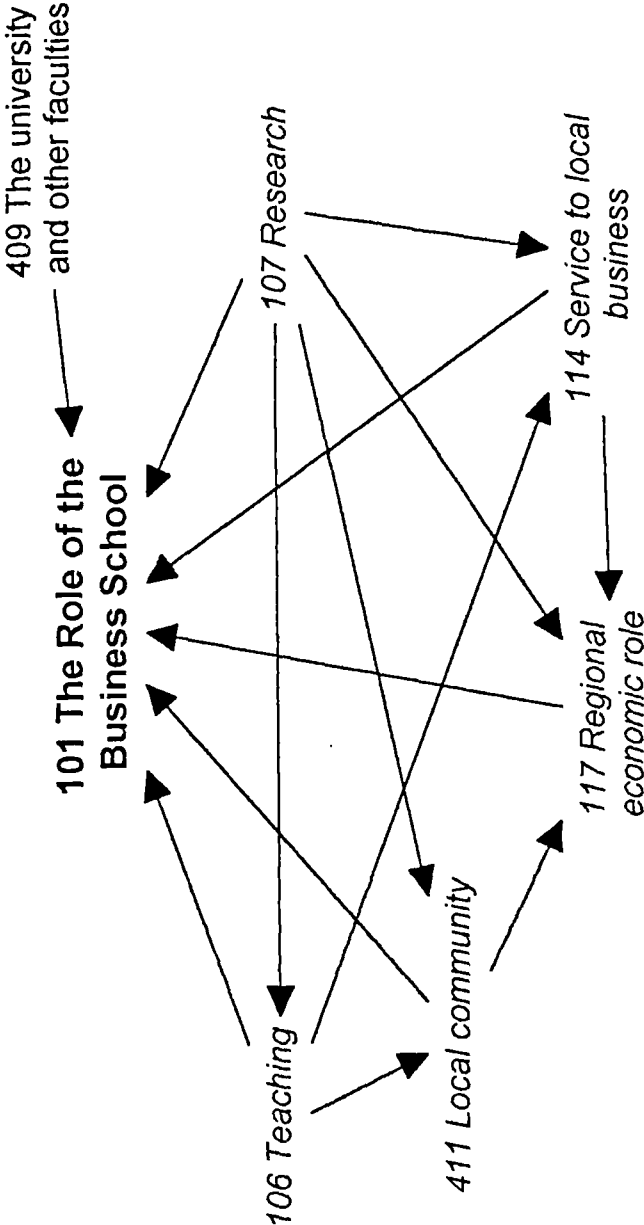
**J5: UPBS Respondent Five: 'The Role of the Business School'**



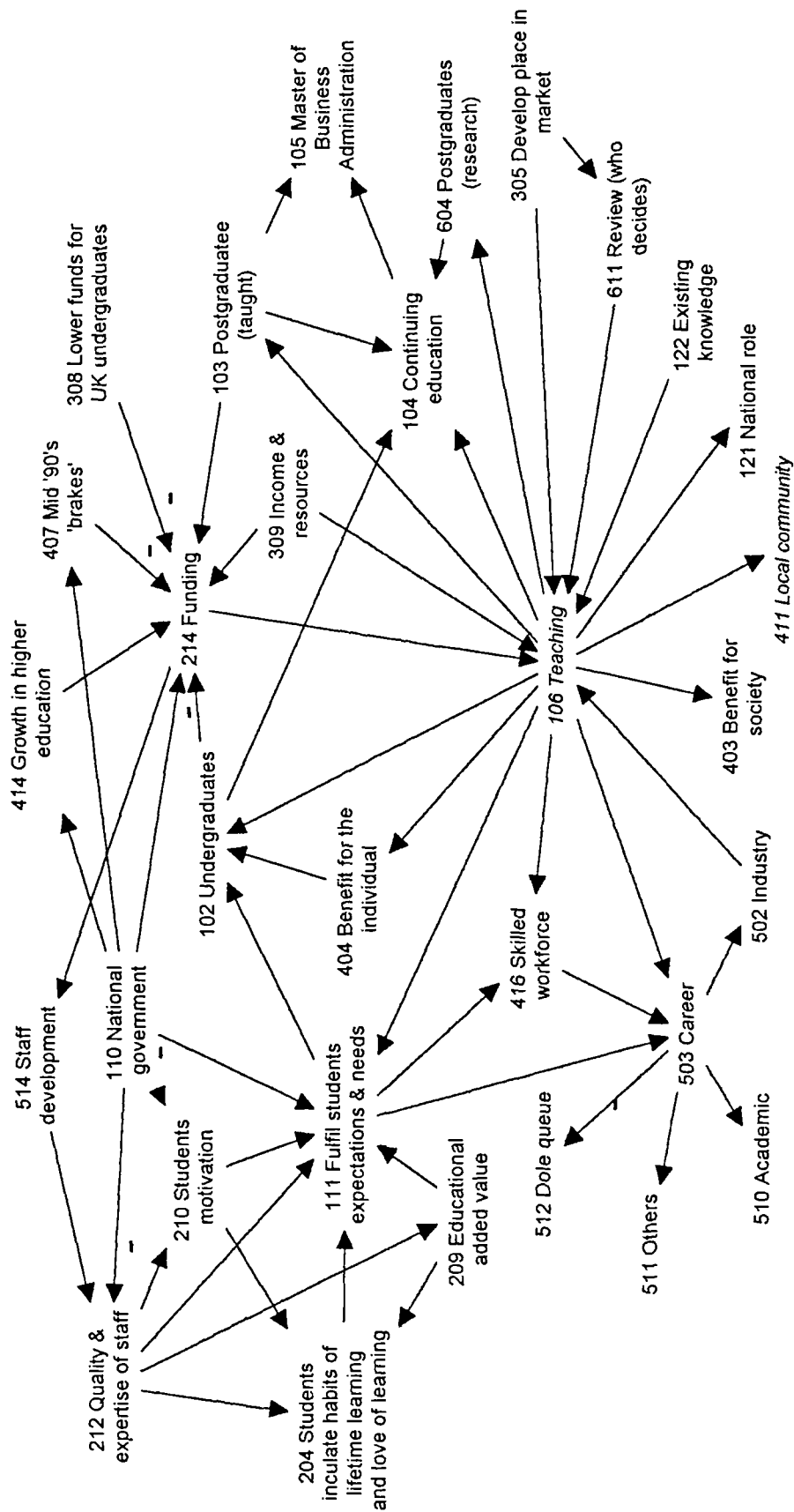
J6: UPBS Respondent Six: 'The Role of the Business School'

## APPENDIX K

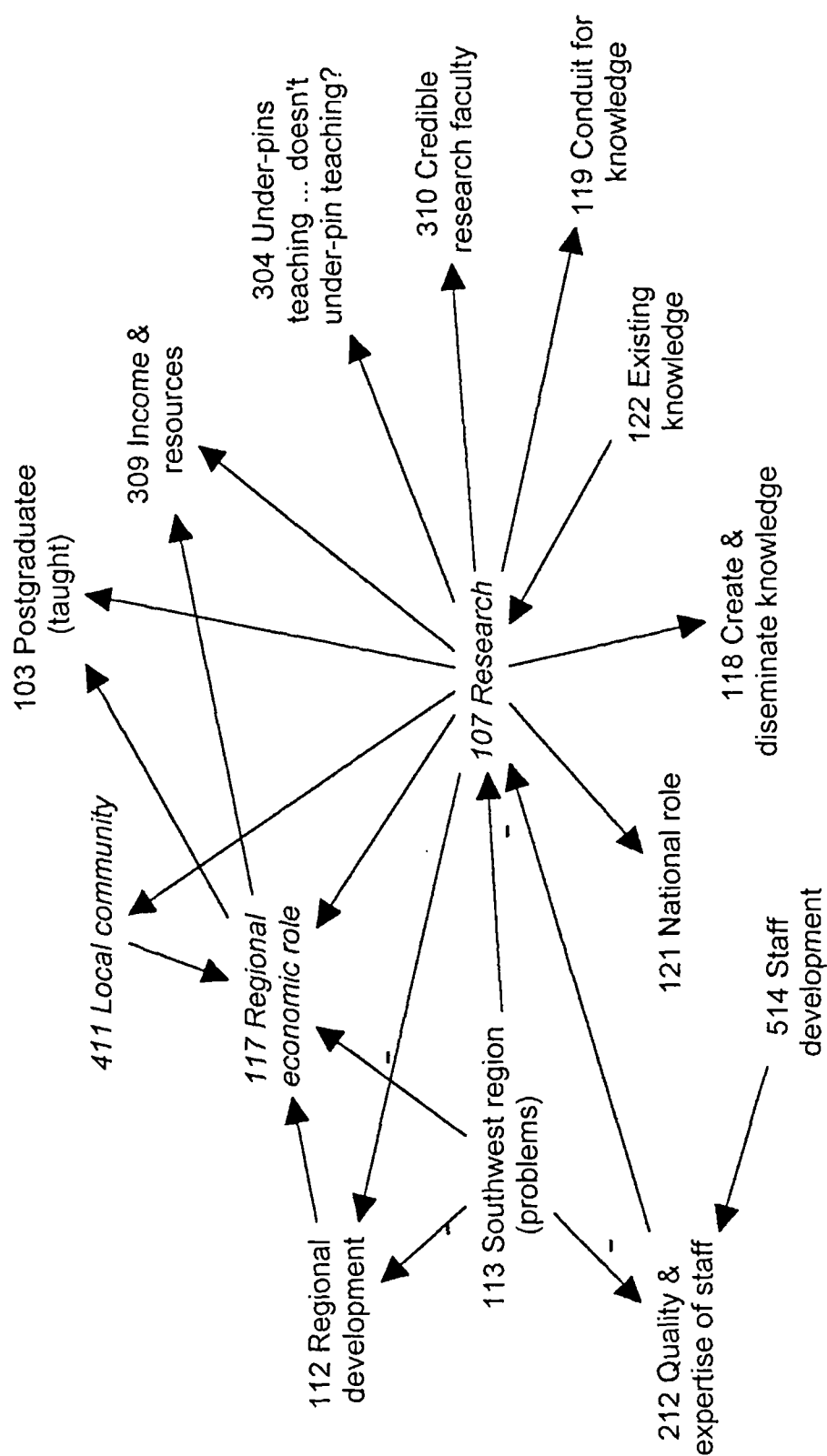
# ***UPBS: Shared Mental Model & Merged Concept Summary***



K1: UPBS Shared Mental Model: 'The Role of the Business School - Core'

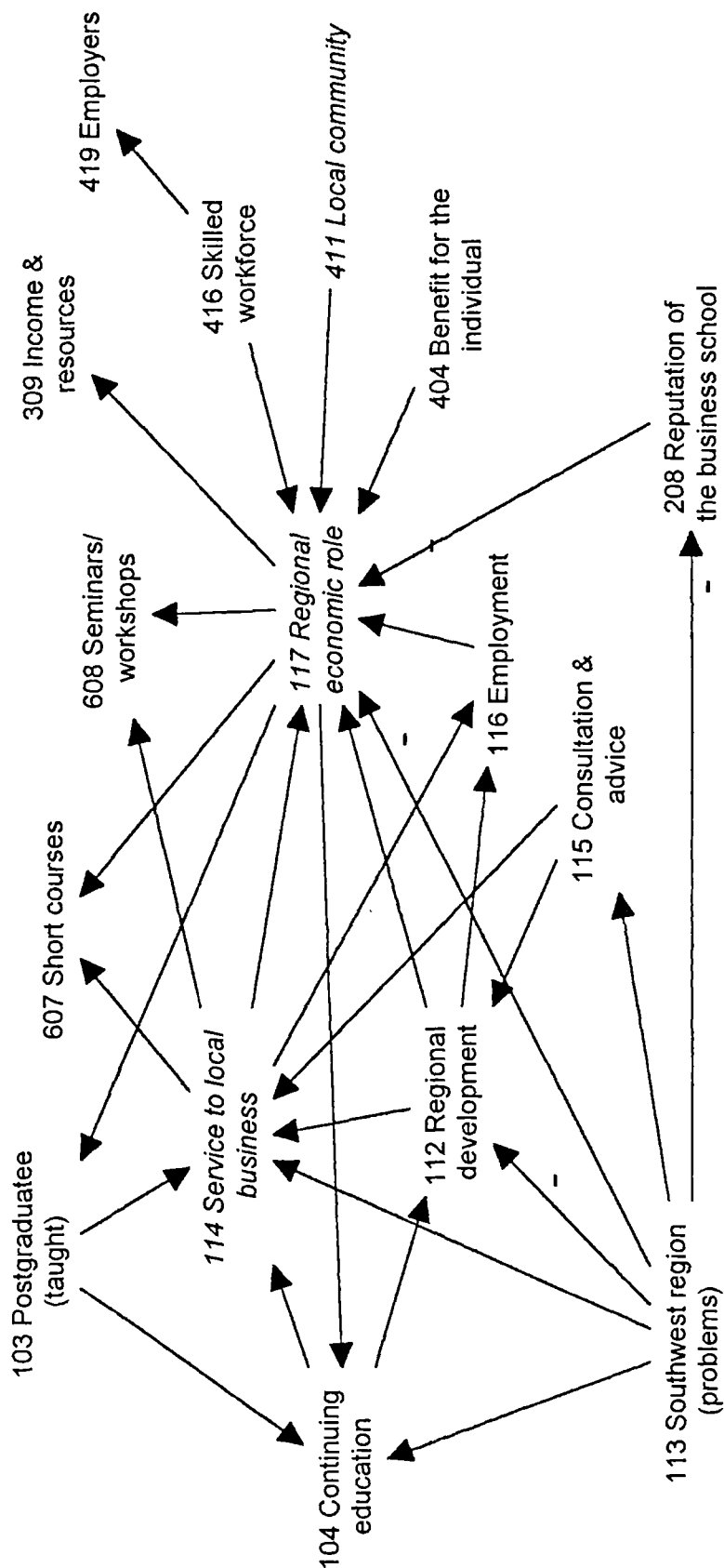


## K2: UPBS Shared Mental Model: 'The Role of the Business School - Teaching'

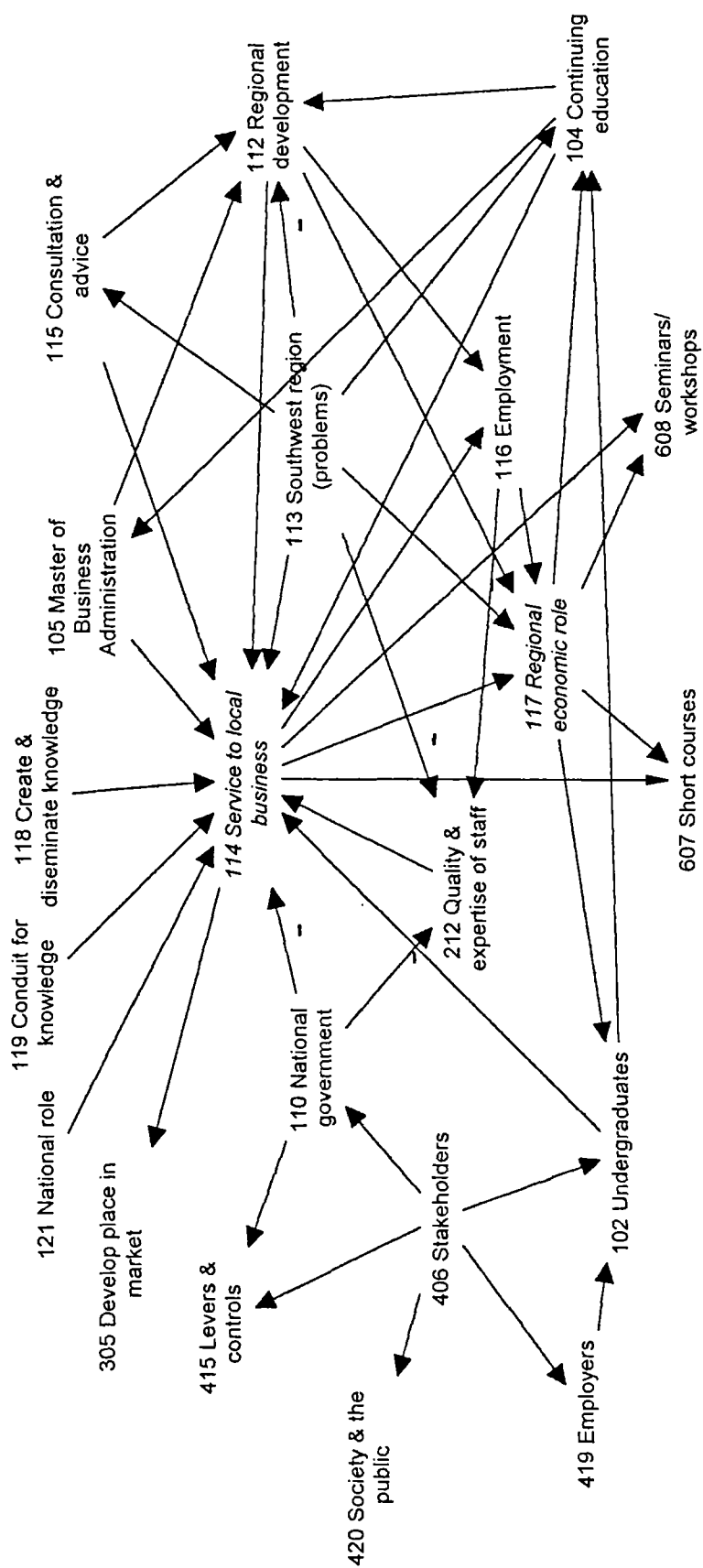


K3: UPBS Shared Mental Model: 'The Role of the Business School - Research'





K4: UPBS Shared Mental Model: 'The Role of the Business School - External'



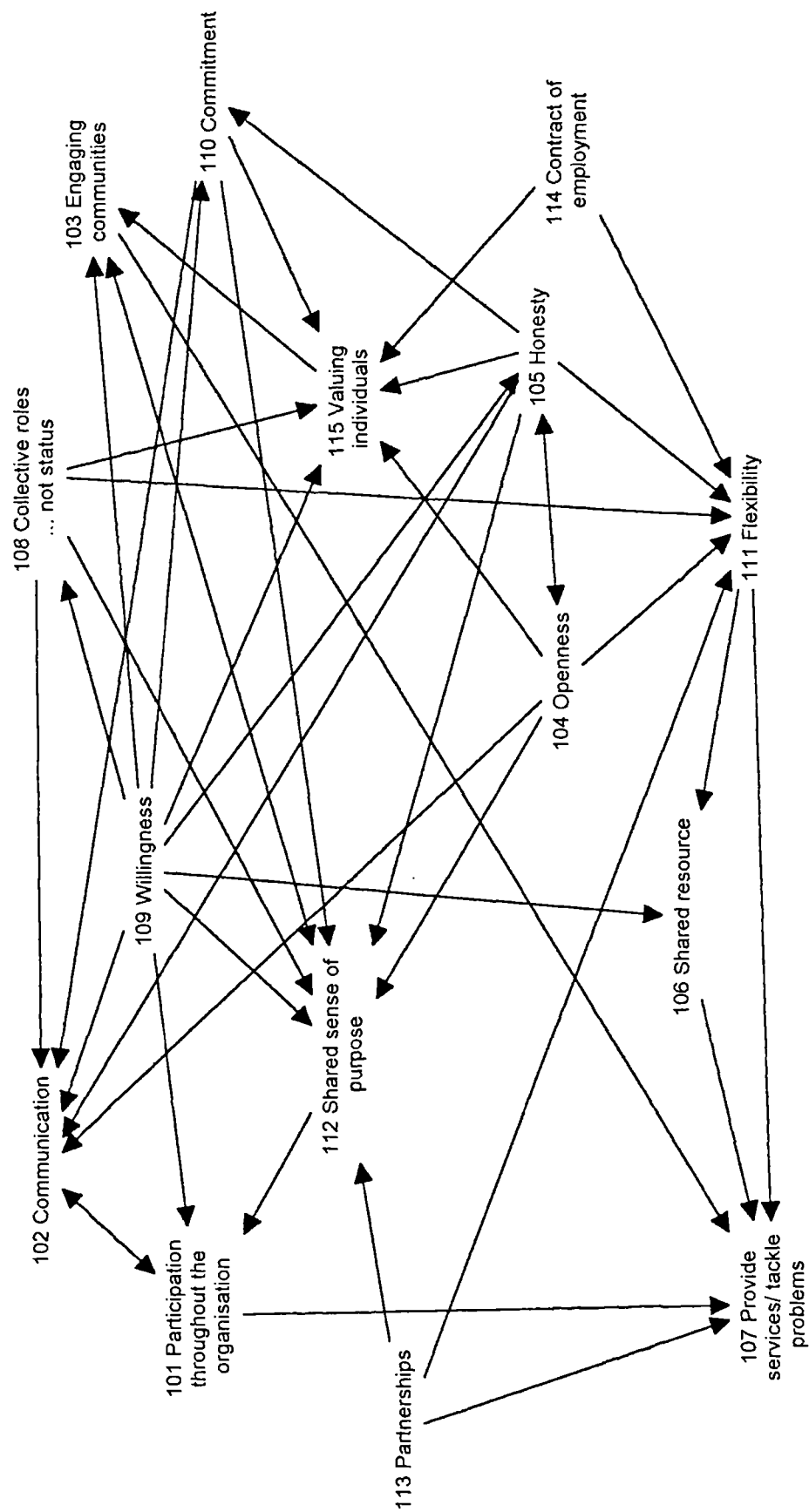
**K5: UPBS Shared Mental Model: ‘The Role of the Business School - Economic’**

### **UPBS: Merged Concept Summary**

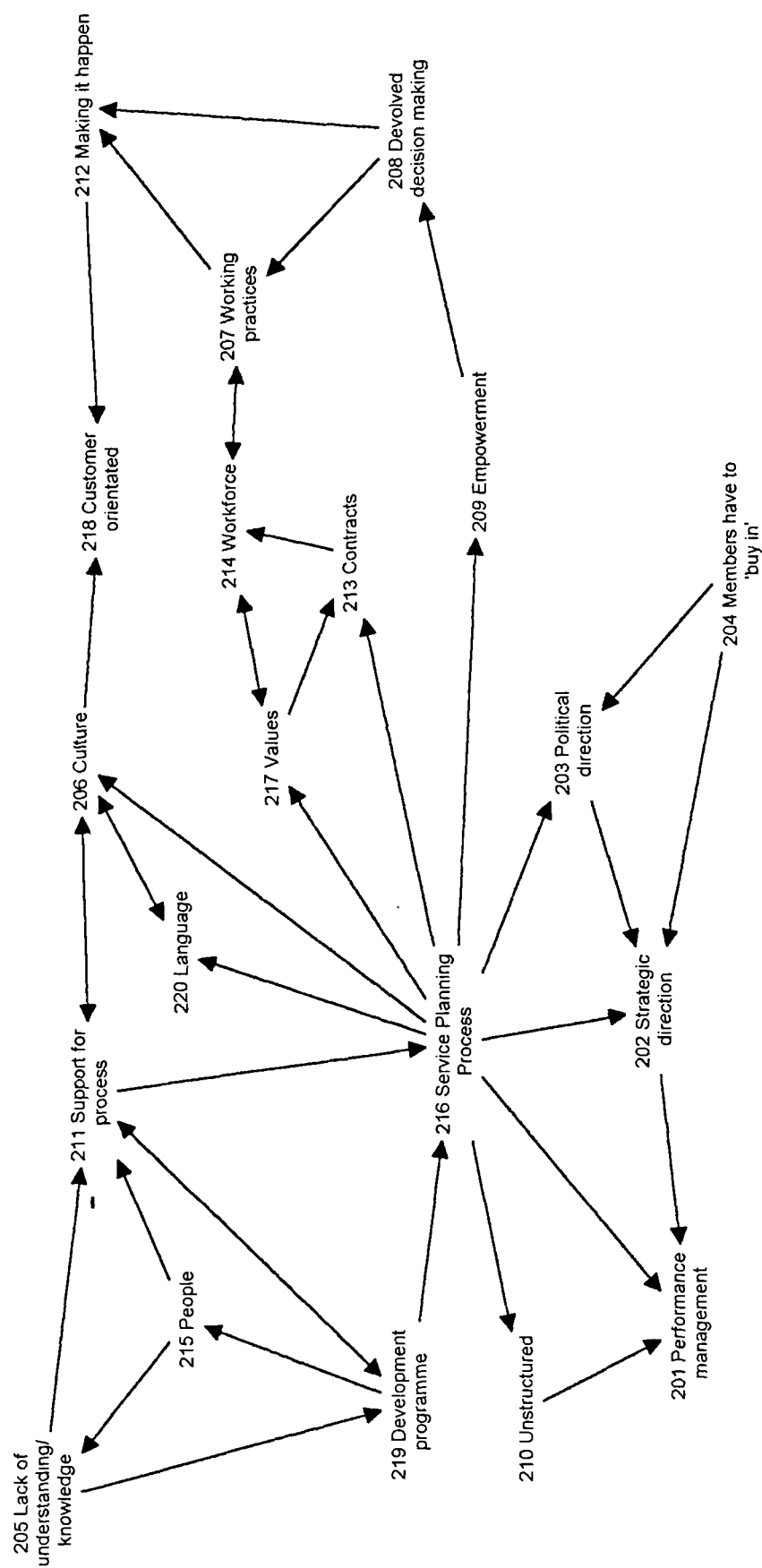
<i>Merged Concept Code</i>	<i>Merged Concept Label</i>	<i>Individual Concepts Included</i>
101	Role of the Business School	101; 207; 314; 401; 508; 612
102	Undergraduates	102; 302; 418; 602
103	Postgraduates (taught)	103; 413; 603
104	Continuing education	104; 606
106	Teaching	106; 108; 301; 402; 505; 601
107	Research	107; 109; 206; 303; 421; 509
110	National Government	110; 211; 417
111	Fulfil students expectations and needs	111; 202; 501
112	Regional development	112; 408
113	Southwest region (problems)	113; 213; 311
114	Service to local business	114; 120; 203; 605
116	Employment	116; 205
117	Regional economic role	117; 201; 313; 405; 609
121	National role	121; 412
208	Reputation of the business school	208; 312
212	Quality and expertise of staff	212; 306; 506
214	Funding	214; 307; 410; 507
305	Develop place in market	305; 610
309	Income and resources	309; 513
406	Skilled workforce	416; 504

## **APPENDIX L**

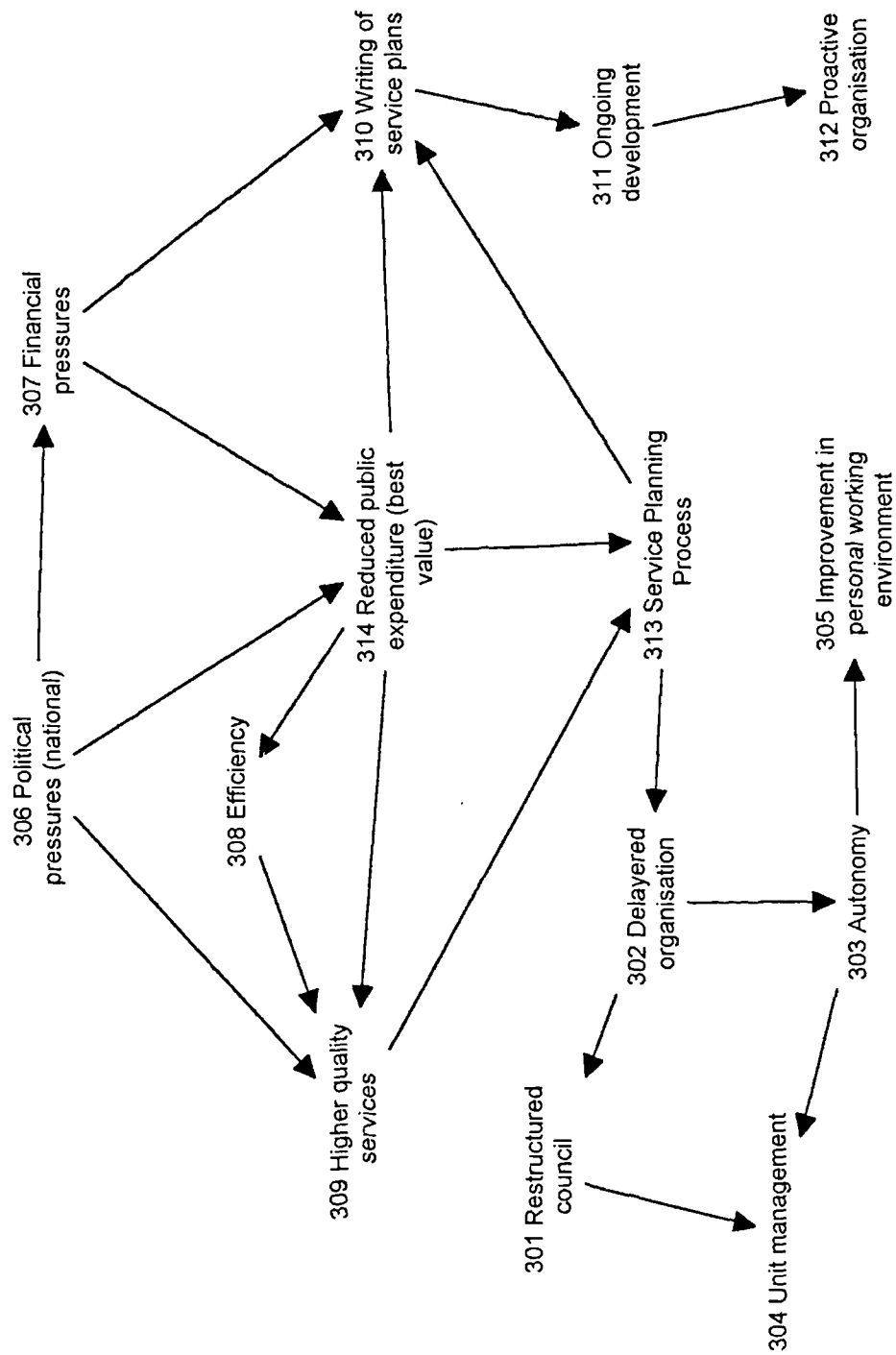
# ***WBC: Individual Mental Models***



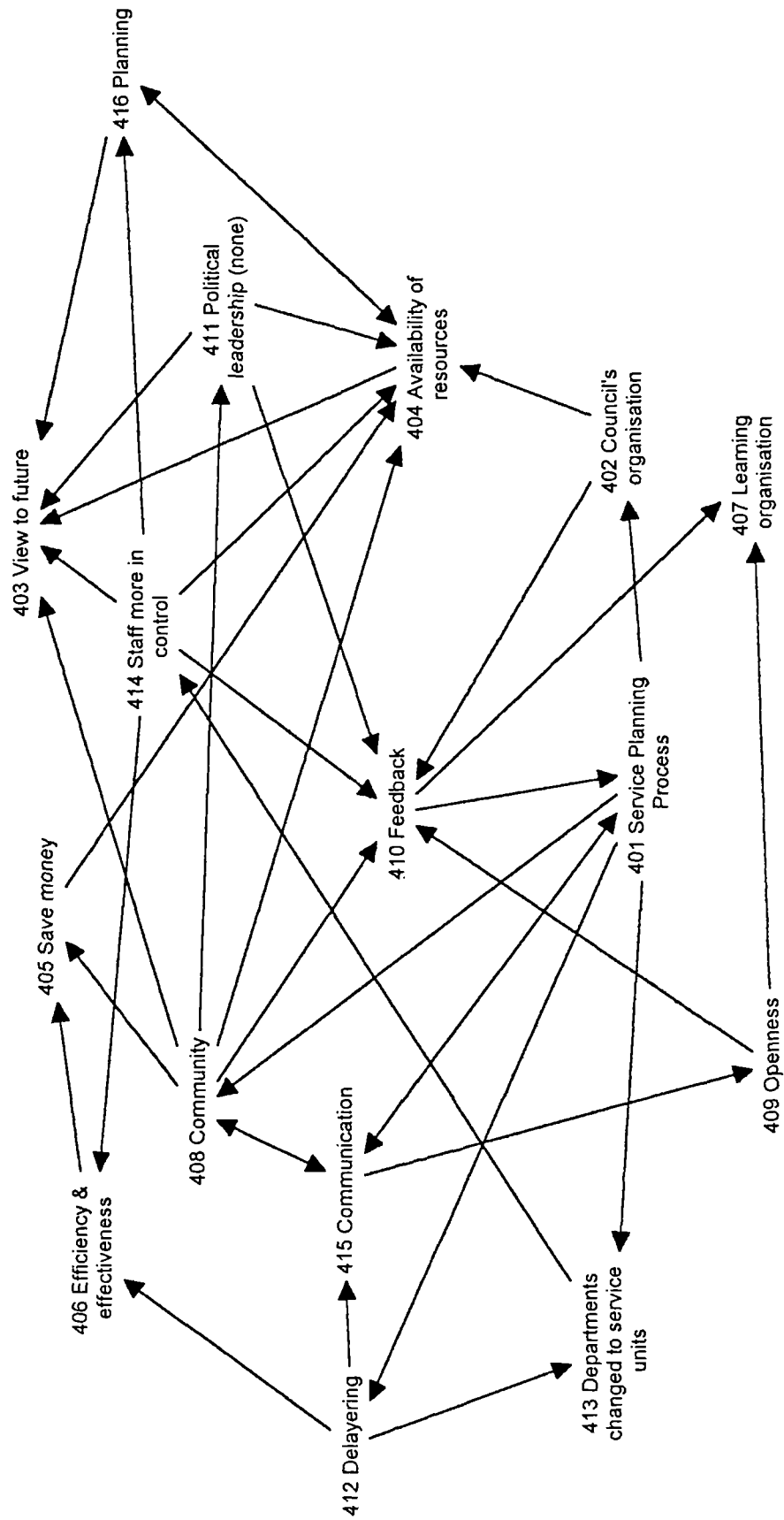
**L1: WBC Respondent One: 'The Service Planning Process'**



L2: WBC Respondent Two: 'The Service Planning Process'

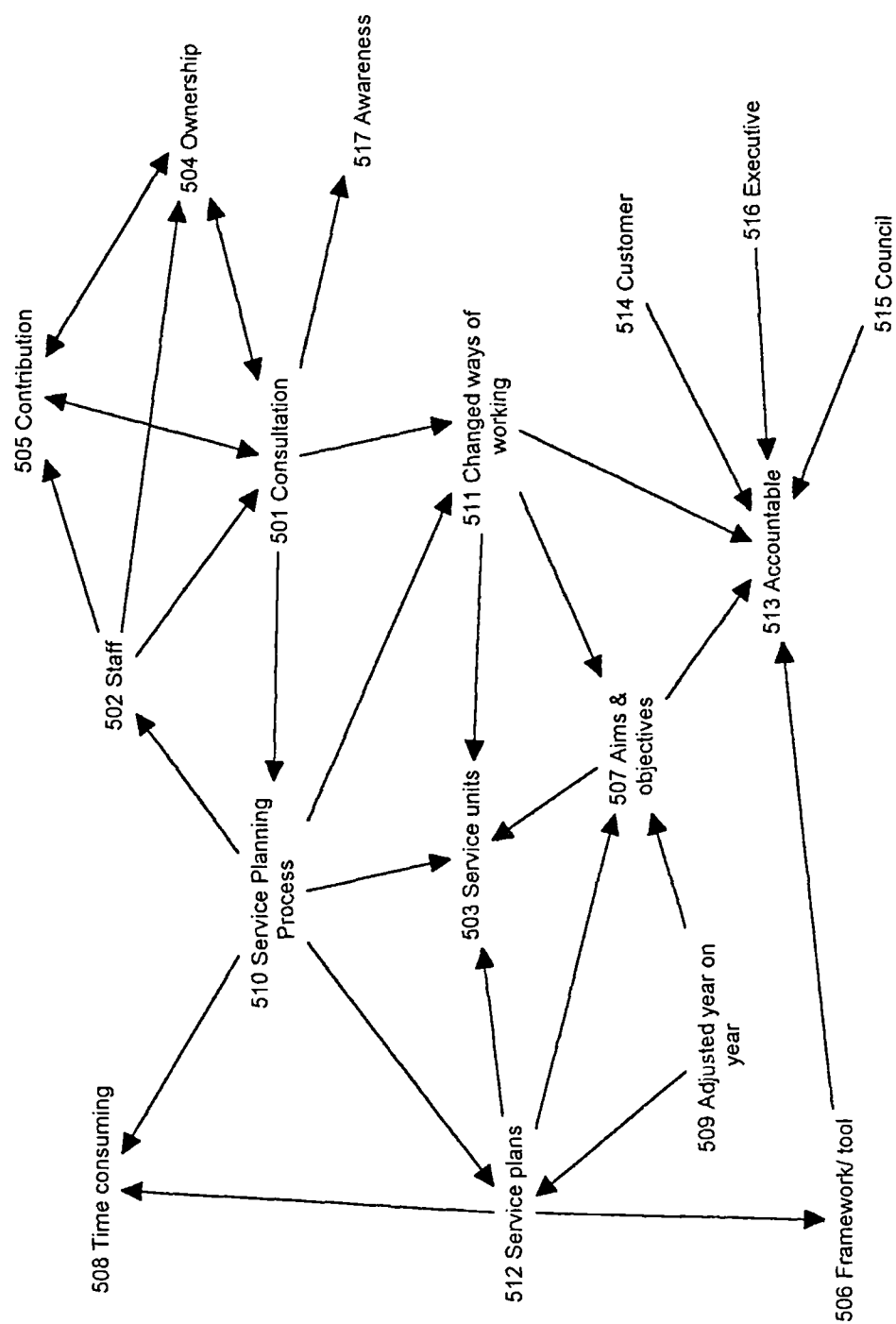


L3: WBC Respondent Three: 'The Service Planning Process'

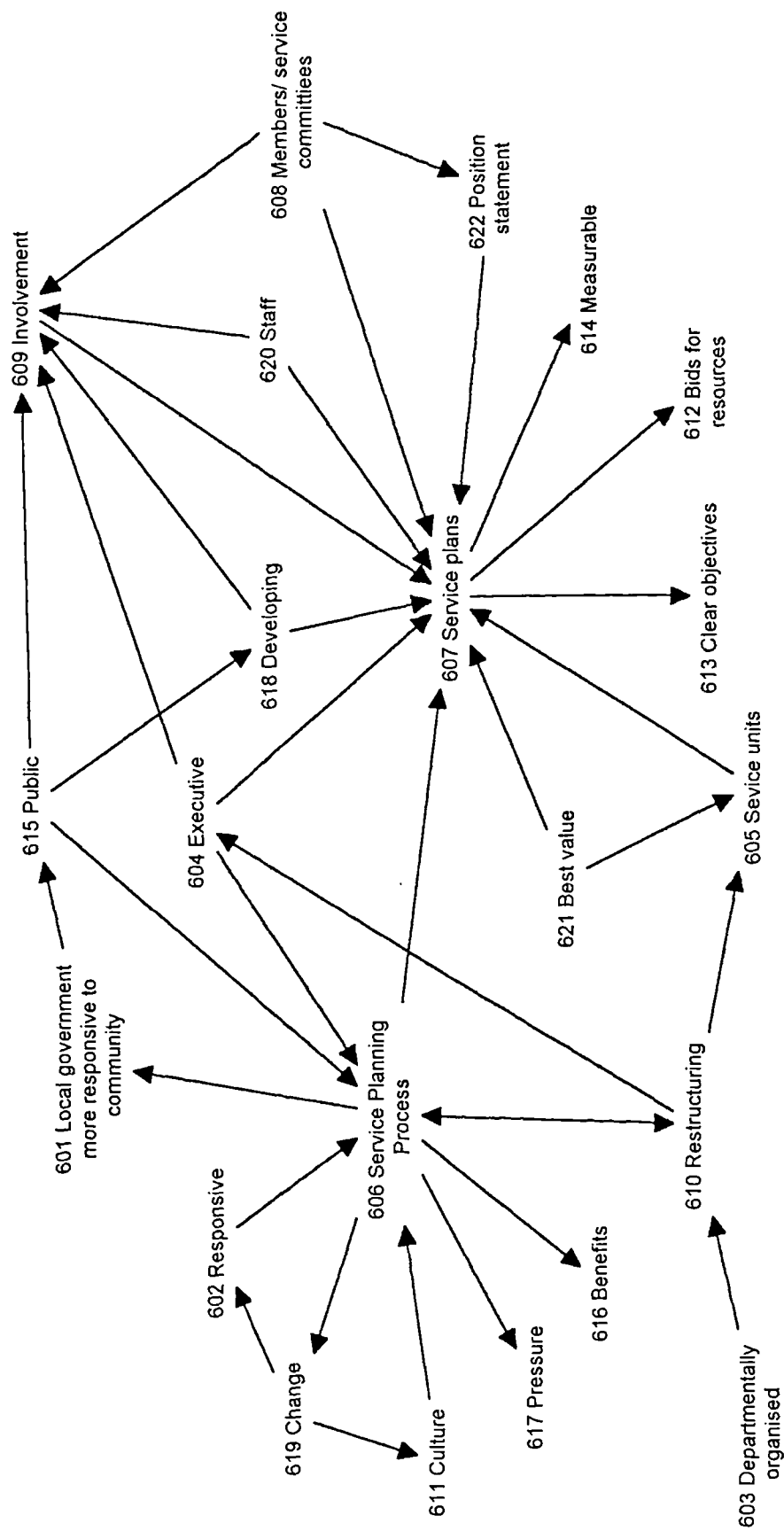


L4: WBC Respondent Four: 'The Service Planning Process'

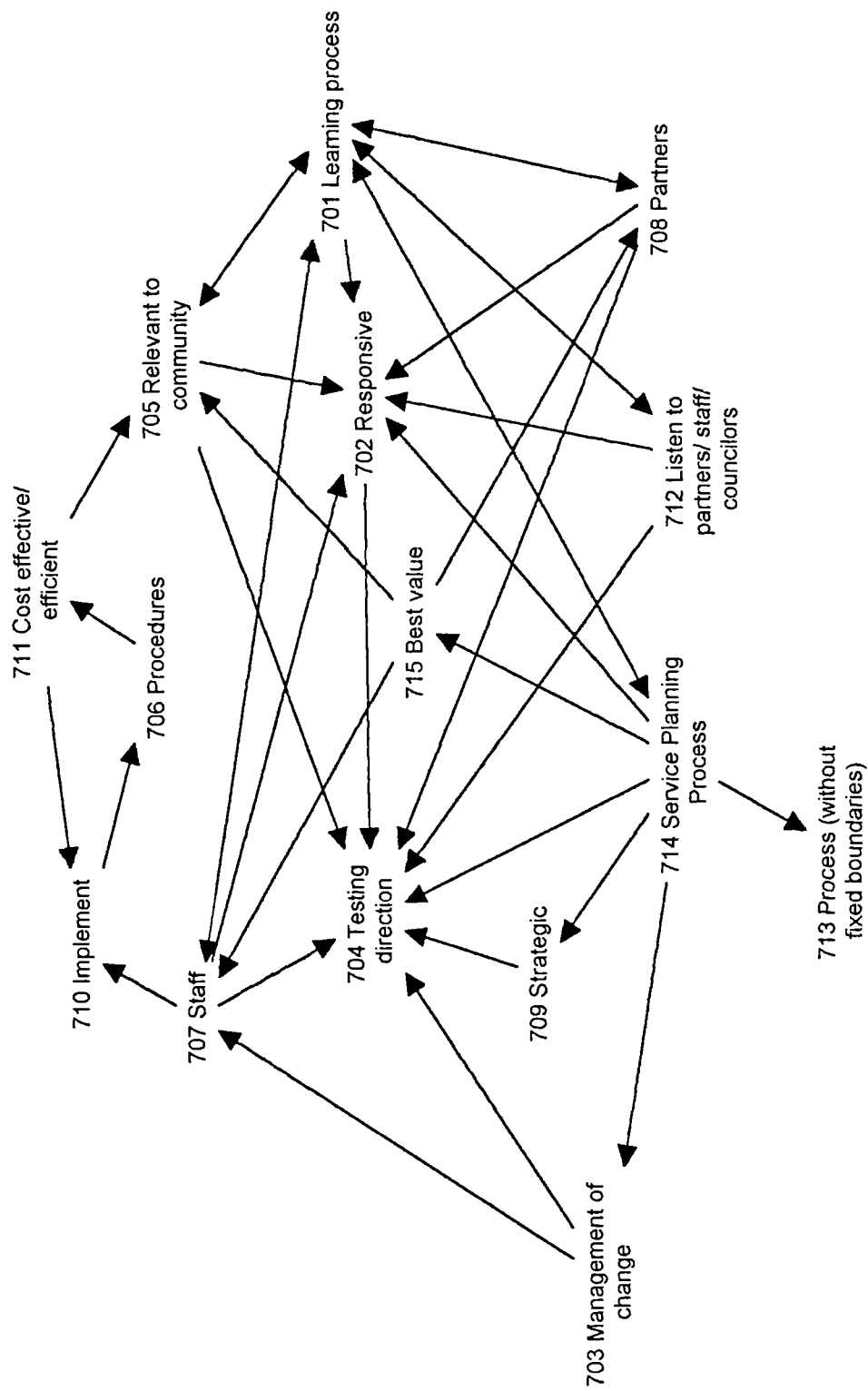




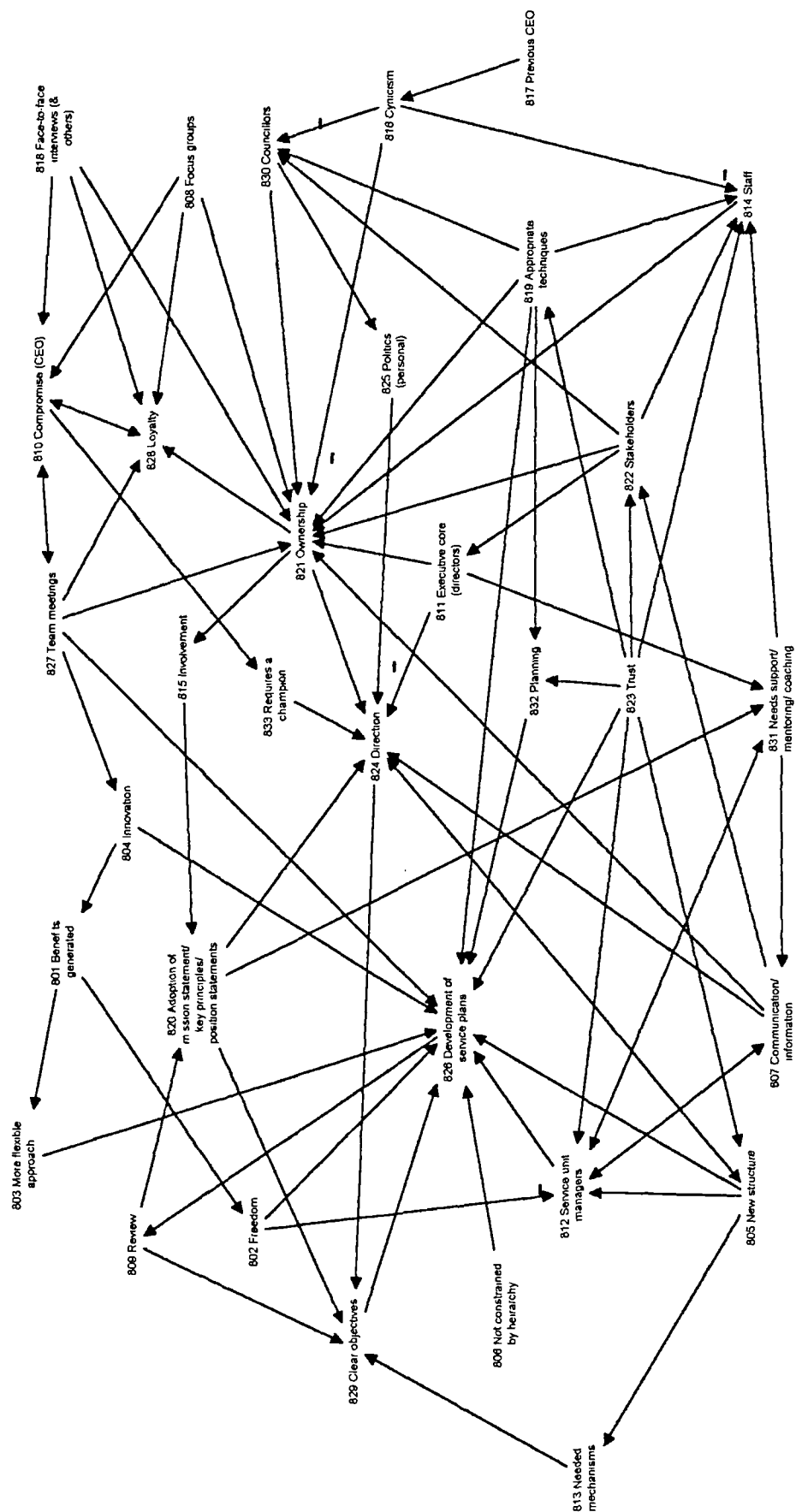
L5: WBC Respondent Five: 'The Service Planning Process'



L6: WBC Respondent Six: 'The Service Planning Process'



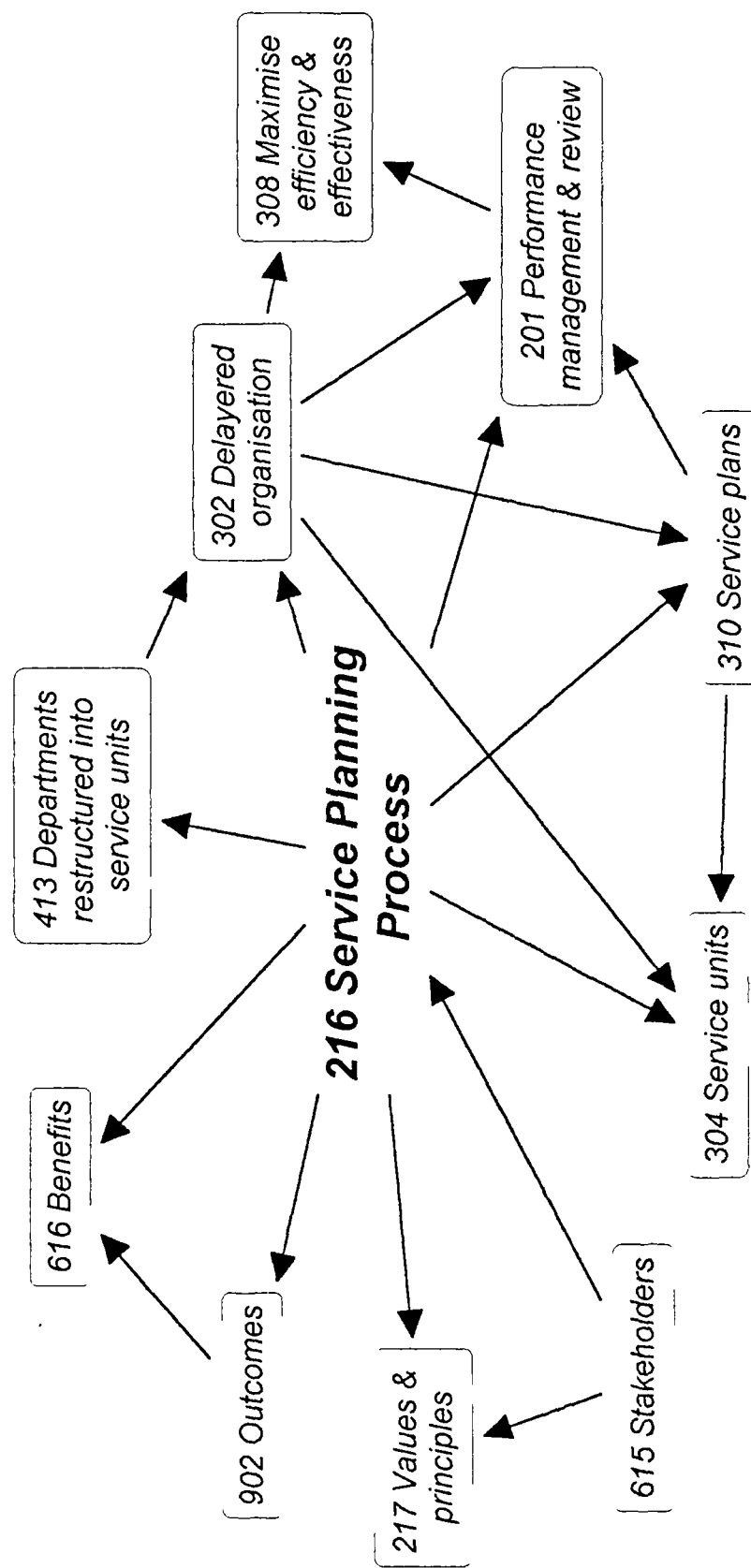
### **L7: WBC Respondent Seven: 'The Service Planning Process'**



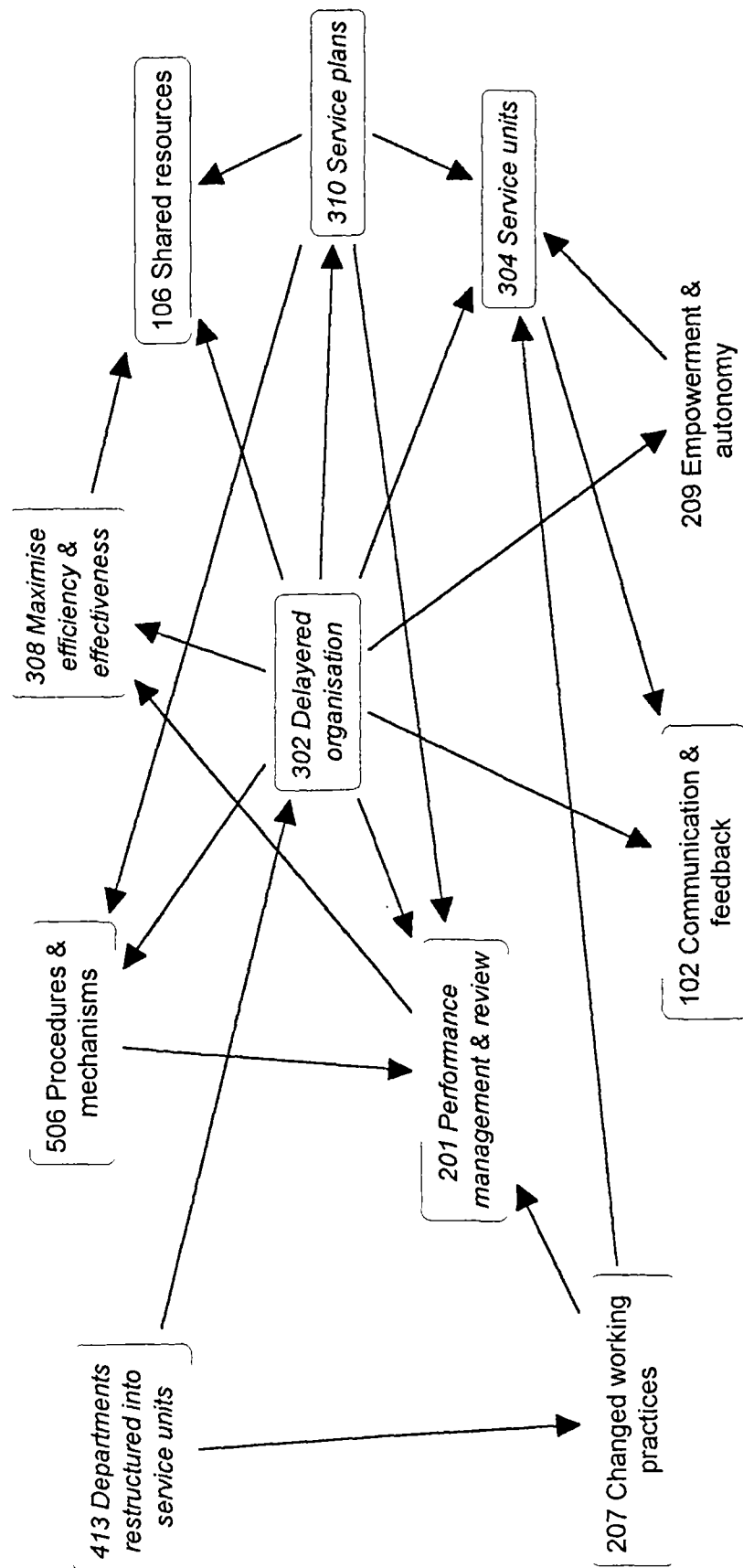
**L8: WBC Respondent Eight: 'The Service Planning Process'**

## APPENDIX M

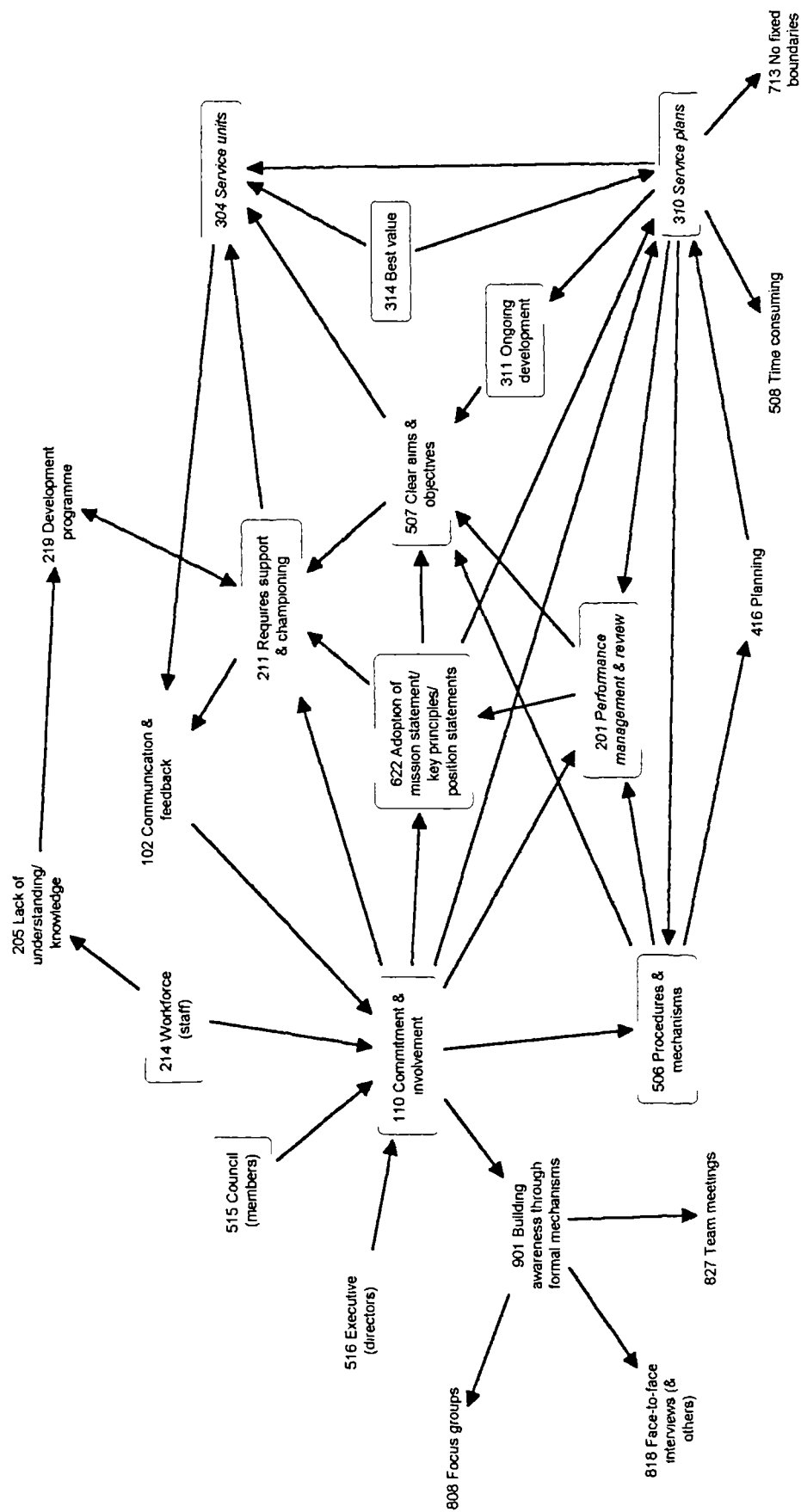
# ***WBC: Shared Mental Model & Merged Concept Summary***



**M1: WBC Shared Mental Model: 'The Service Planning Process - Core'**

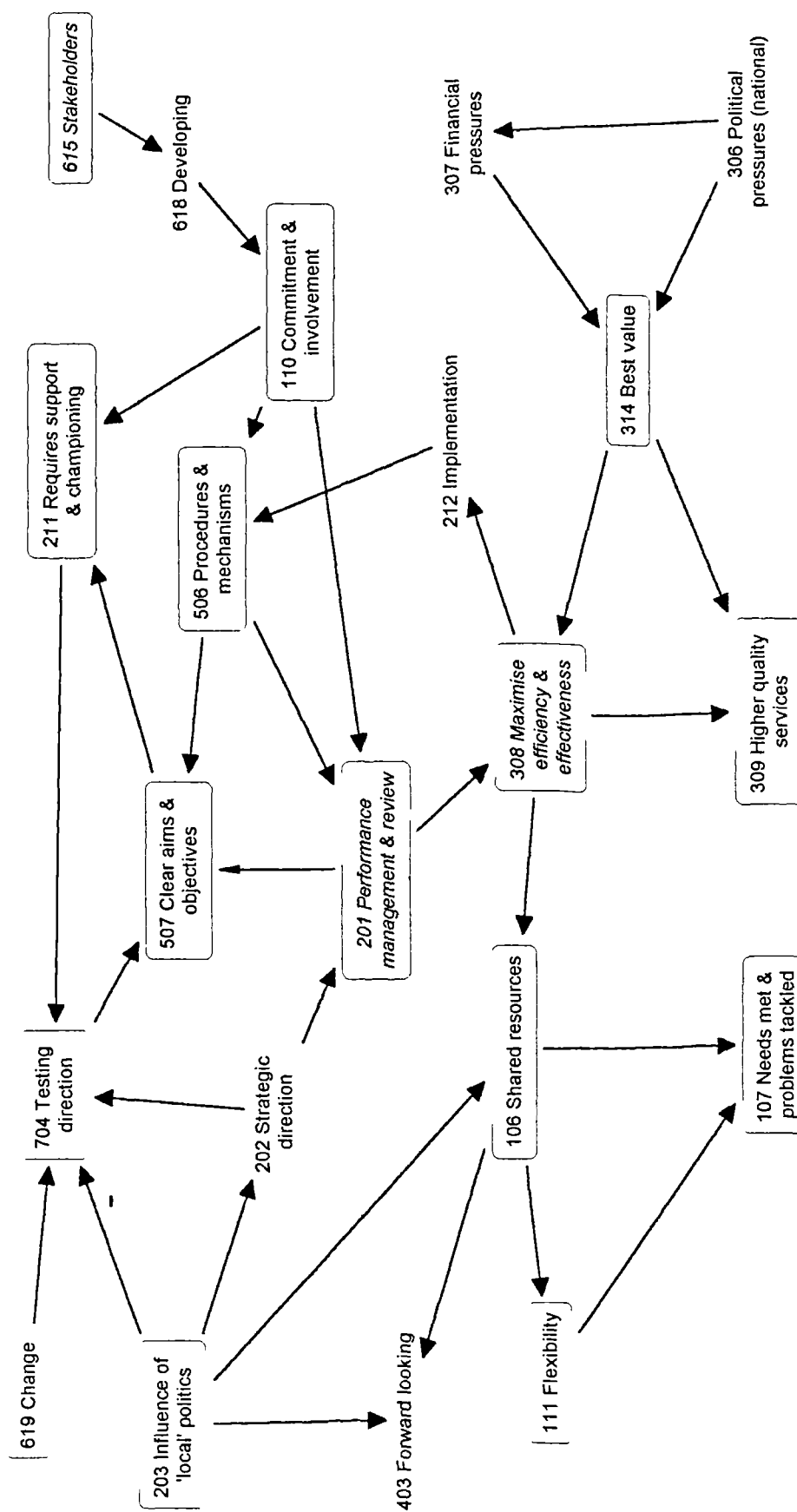


**M2: WBC Shared Mental Model: 'The Service Planning Process - Restructuring'**

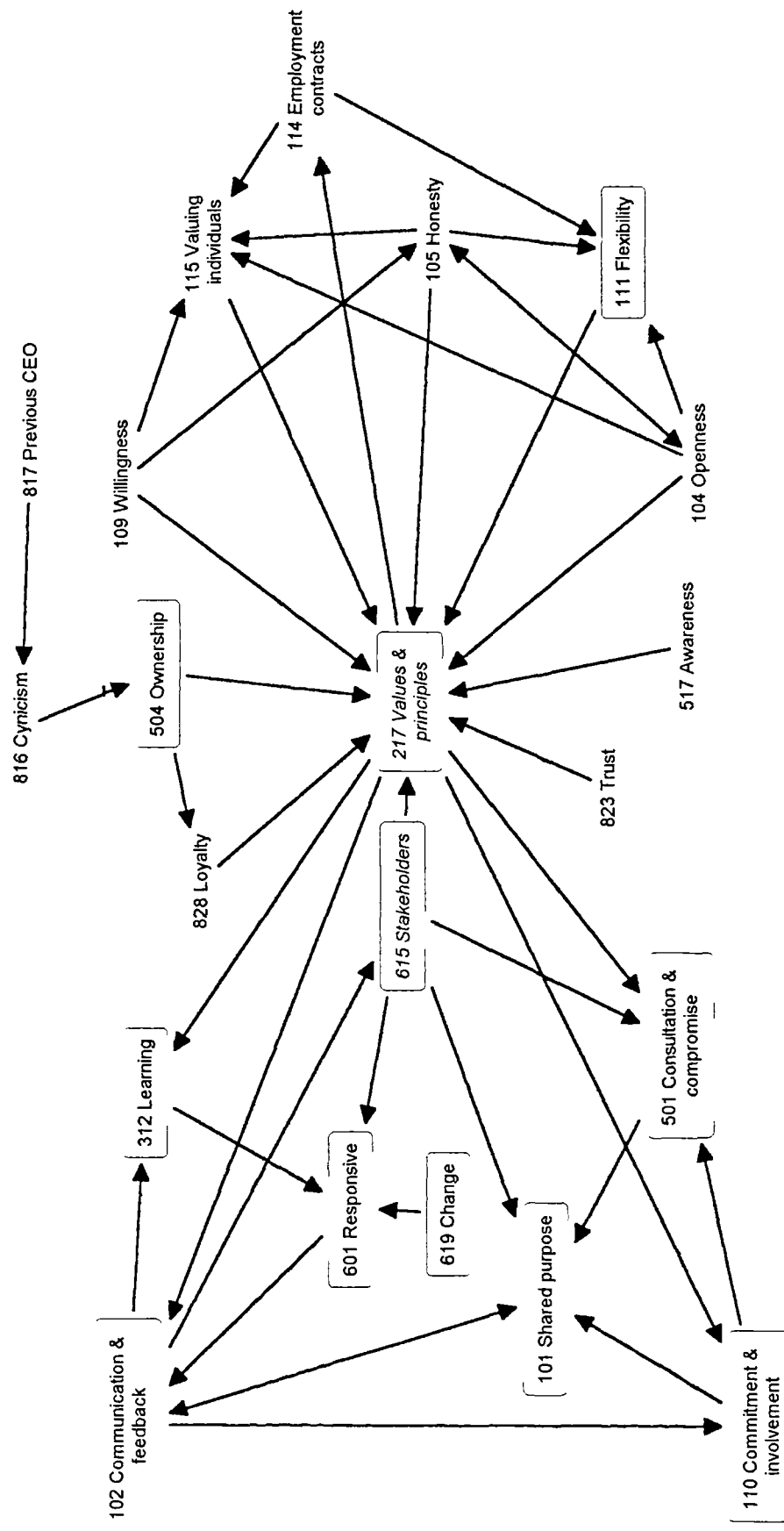


M3: WBC Shared Mental Model: 'The Service Planning Process - Process'

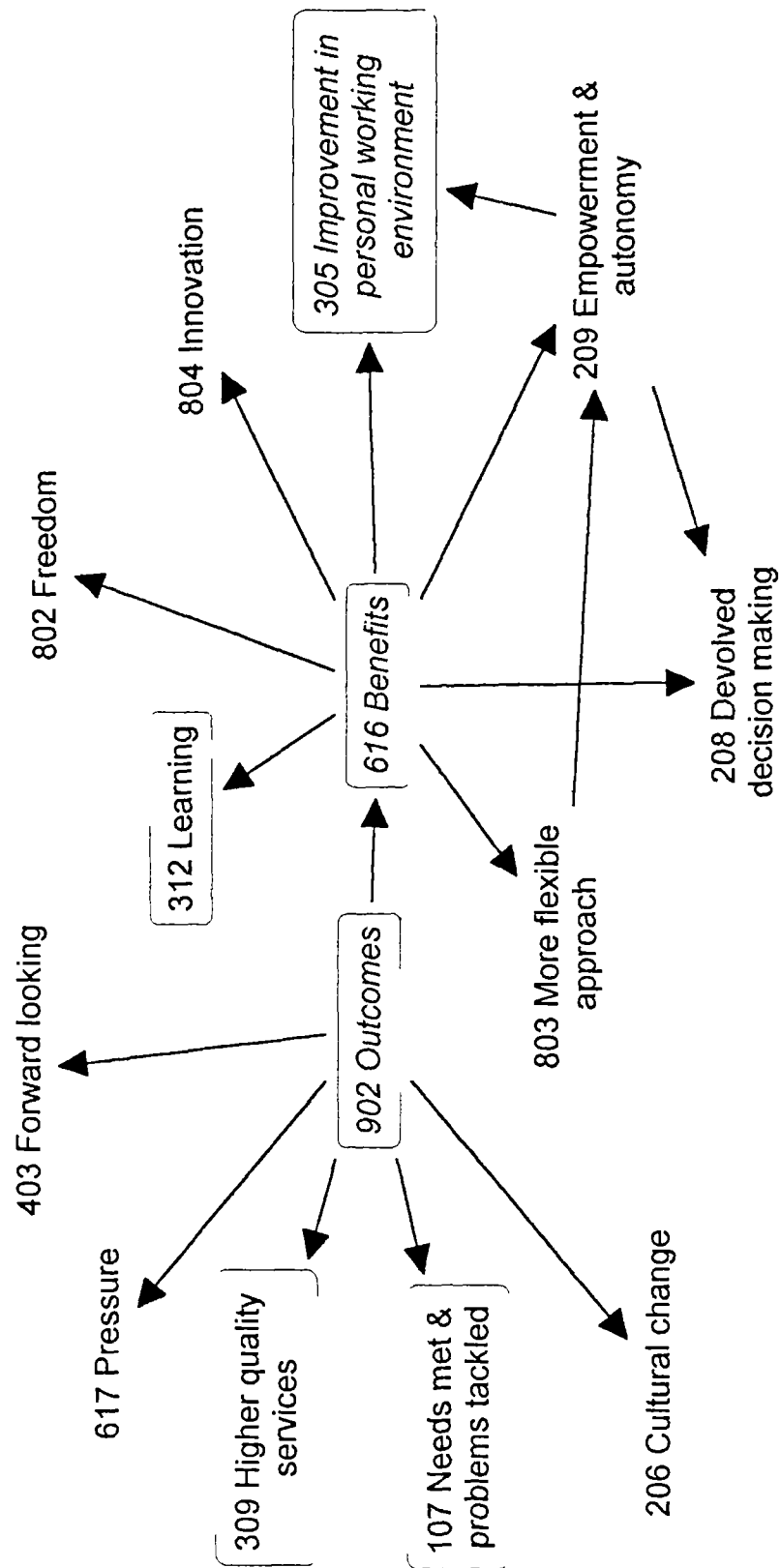




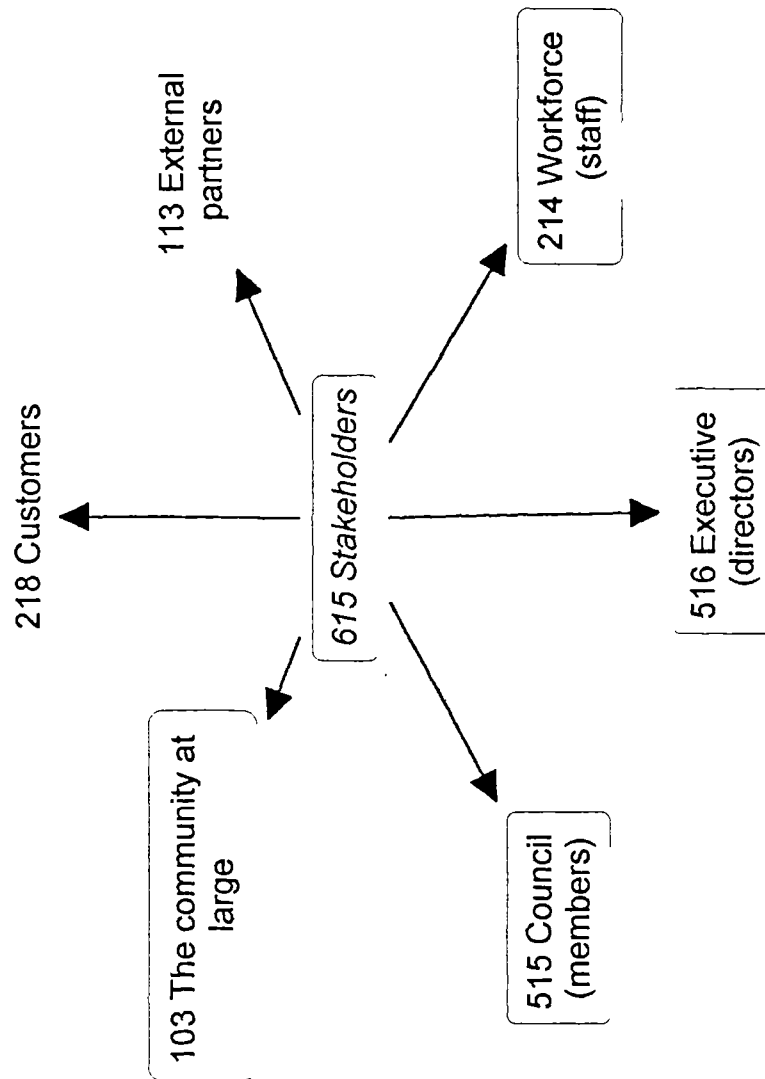
M4: WBC Shared Mental Model: 'The Service Planning Process - Review'



M5: WBC Shared Mental Model: 'The Service Planning Process - Values'



**M6: WBC Shared Mental Model: 'The Service Planning Process - Outcomes'**



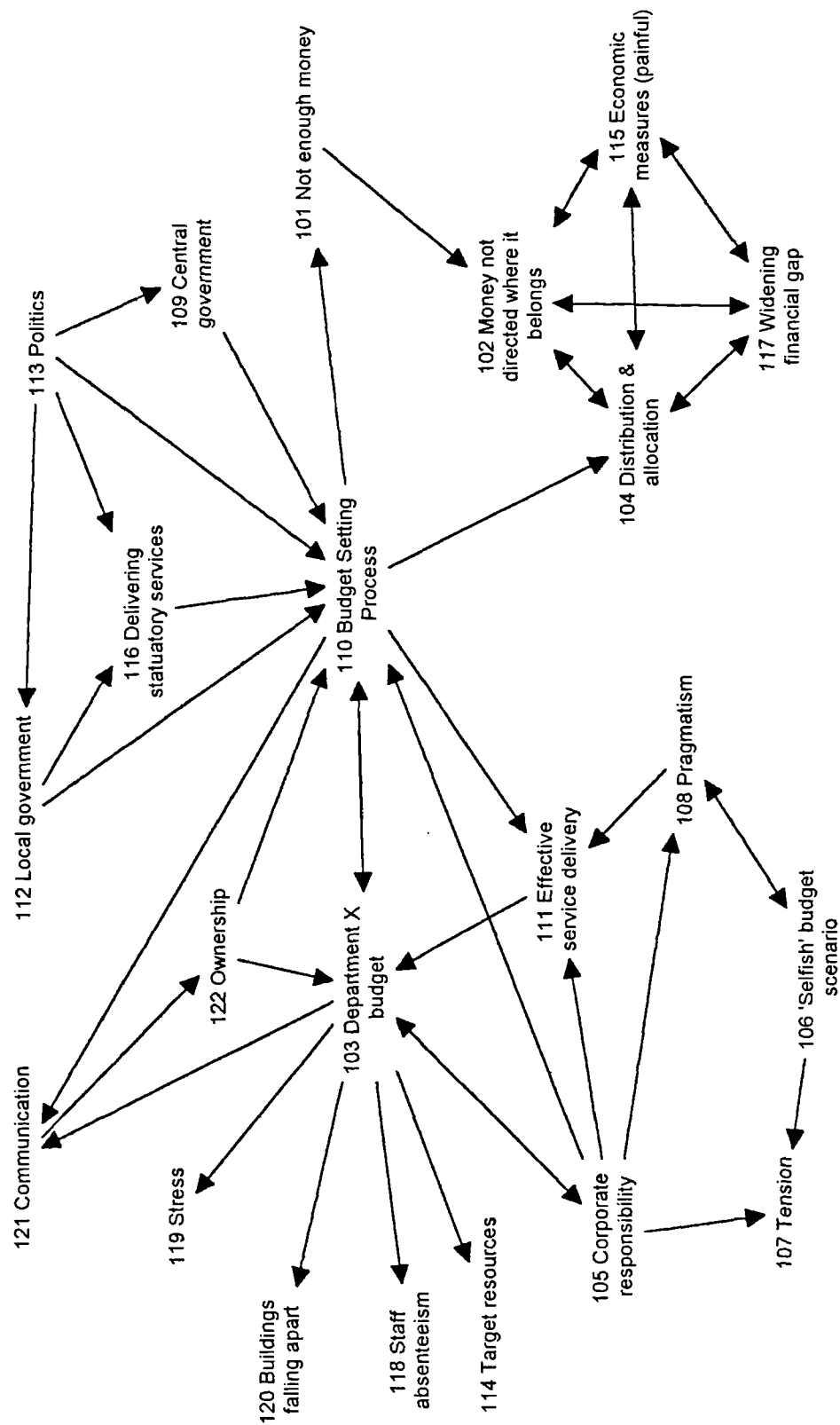
**M7: WBC Shared Mental Model: 'The Service Planning Process - Stakeholders'**

## ***WBC: Merged Concept Summary***

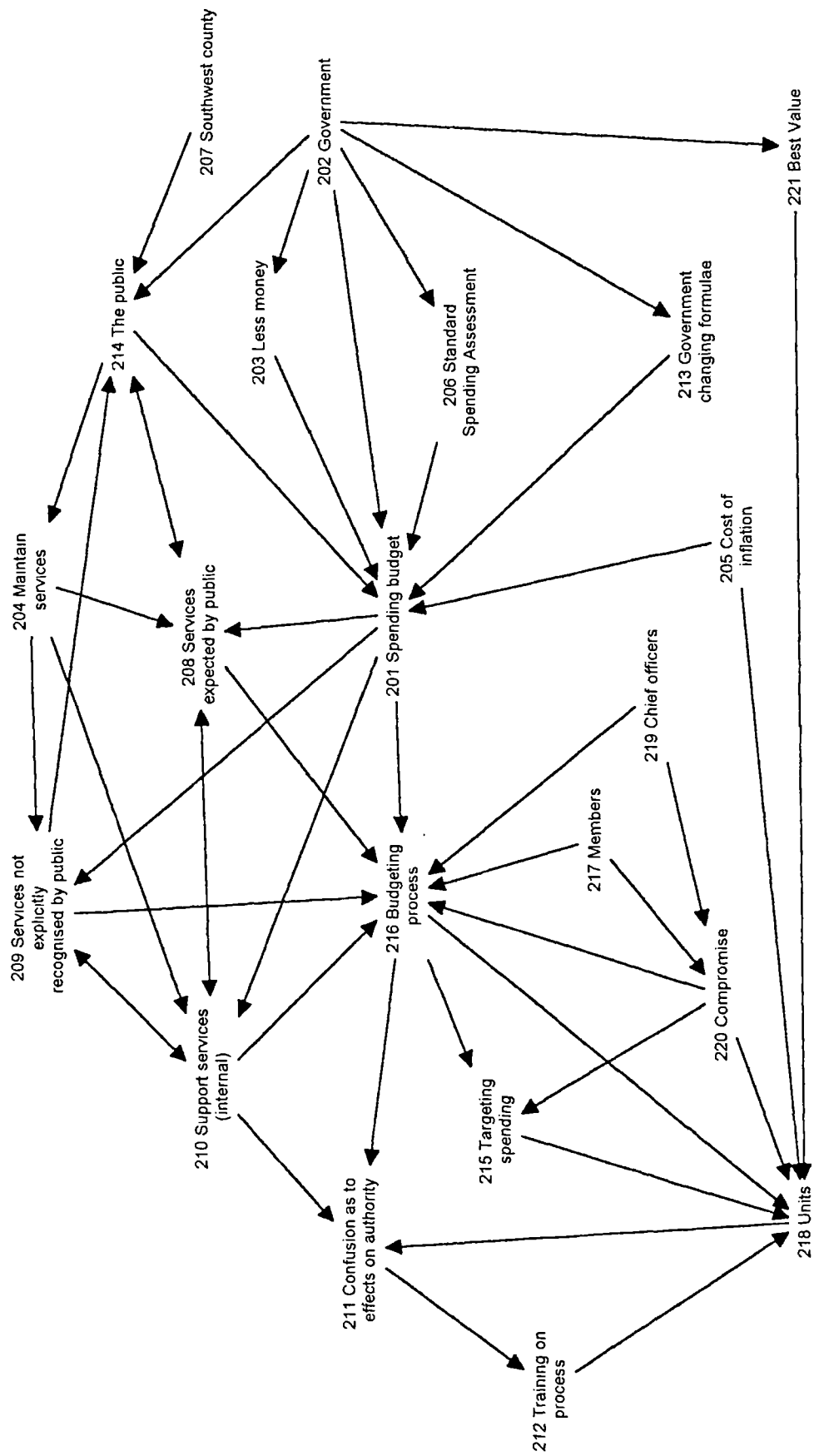
<i>Merged Code</i>	<i>Merged Concept Label</i>	<i>Individual Concepts Included</i>
101	Shared purpose	101; 108; 112
102	Communication and feedback	102; 410; 415; 712; 807
103	The community at large	103; 408; 705
104	Openness	104; 409
106	Shared resource	106; 404; 612
110	Commitment and involvement	110; 505; 609; 815
113	External partners	113; 708
114	Employment contracts	114; 213
201	Performance management and review	201; 513; 614; 809
201	Consultation and compromise	501; 810
202	Strategic direction	202; 709
203	Influence of local politics	203; 204; 411; 825
206	Cultural change	206; 220; 611
207	Changed working practices	207; 511
209	Empowerment and Autonomy	209; 303
211	Requires support and championing	211; 831; 833
212	Implementation	212; 710
214	The Workforce (Staff)	214; 215; 414; 502; 620; 707; 814
216	Service Planning Process	216; 313; 401; 510; 606; 714
218	Customers	218; 514
302	Delayed organisation	210; 301; 302; 402; 412; 610; 805
304	Service units	304; 503; 605; 812
308	Maximise efficiency and effectiveness	308; 405; 406; 711
310	Service plans	310; 512; 607; 826
311	Ongoing Development	311; 509
312	Learning	312; 407; 701
314	Best value	314; 621; 715
413	Departments restructured into service units	413; 603
416	Planning	416; 832
504	Ownership	504; 821
506	Procedures and mechanisms	506; 706; 813; 819
507	Clear aims and objectives	507; 613; 829
515	Council (Members)	515; 608; 830
516	Executive (Directors)	516; 604; 811
601	Responsive	601; 602; 702
615	Stakeholders	615; 822
616	Benefits	616; 801
619	Change	619; 703
622	Adoption of mission statement...	622; 820
704	Testing Direction	704; 824
713	No fixed boundaries	713; 806
901	Building awareness through formal...	808; 818; 827

## **APPENDIX N**

# ***SWCC: Individual Mental Models***

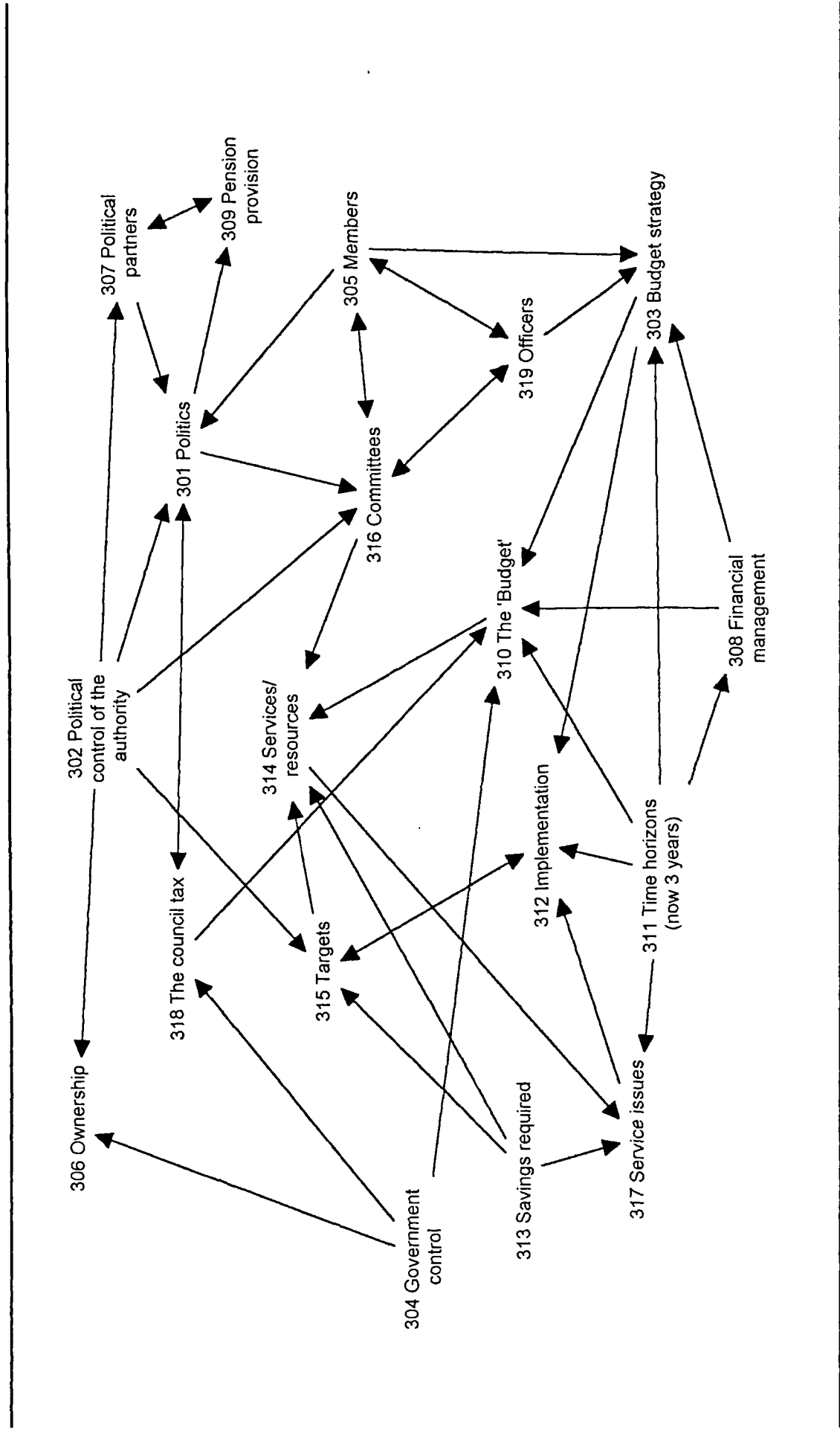


## N1: SWCC Respondent One: 'The Budget Setting Process'

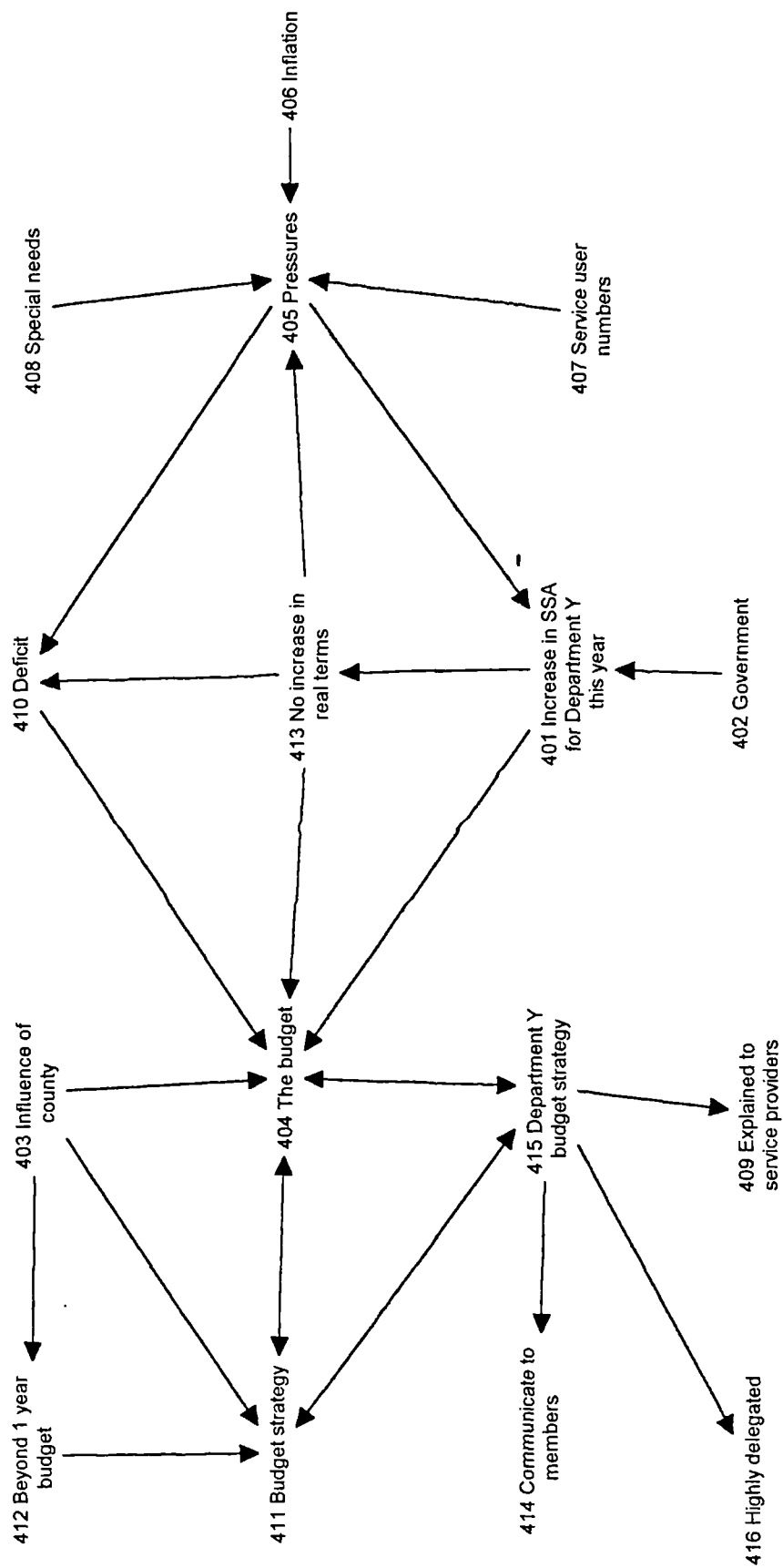


N2: SWCC Respondent Two: 'The Budget Setting Process'

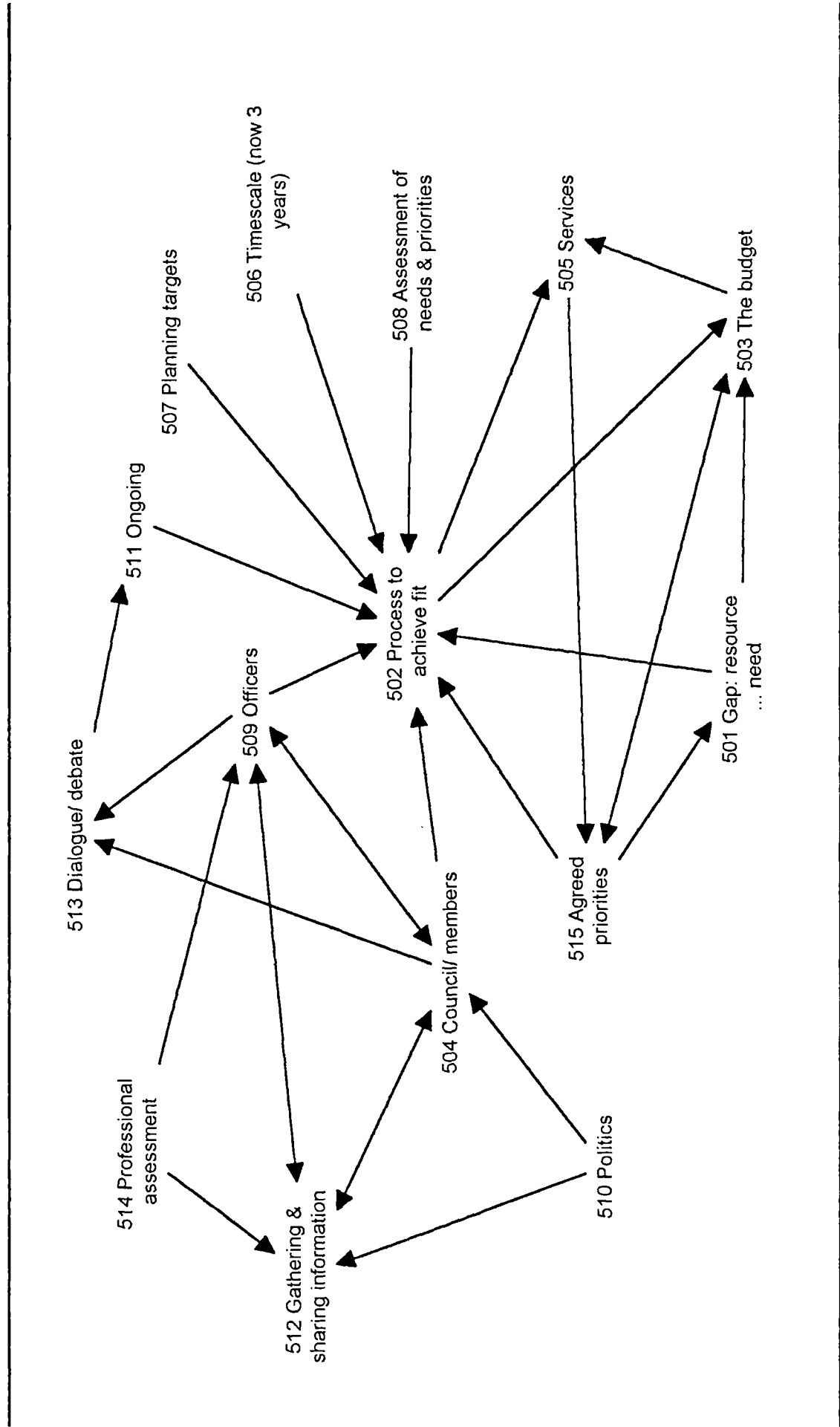




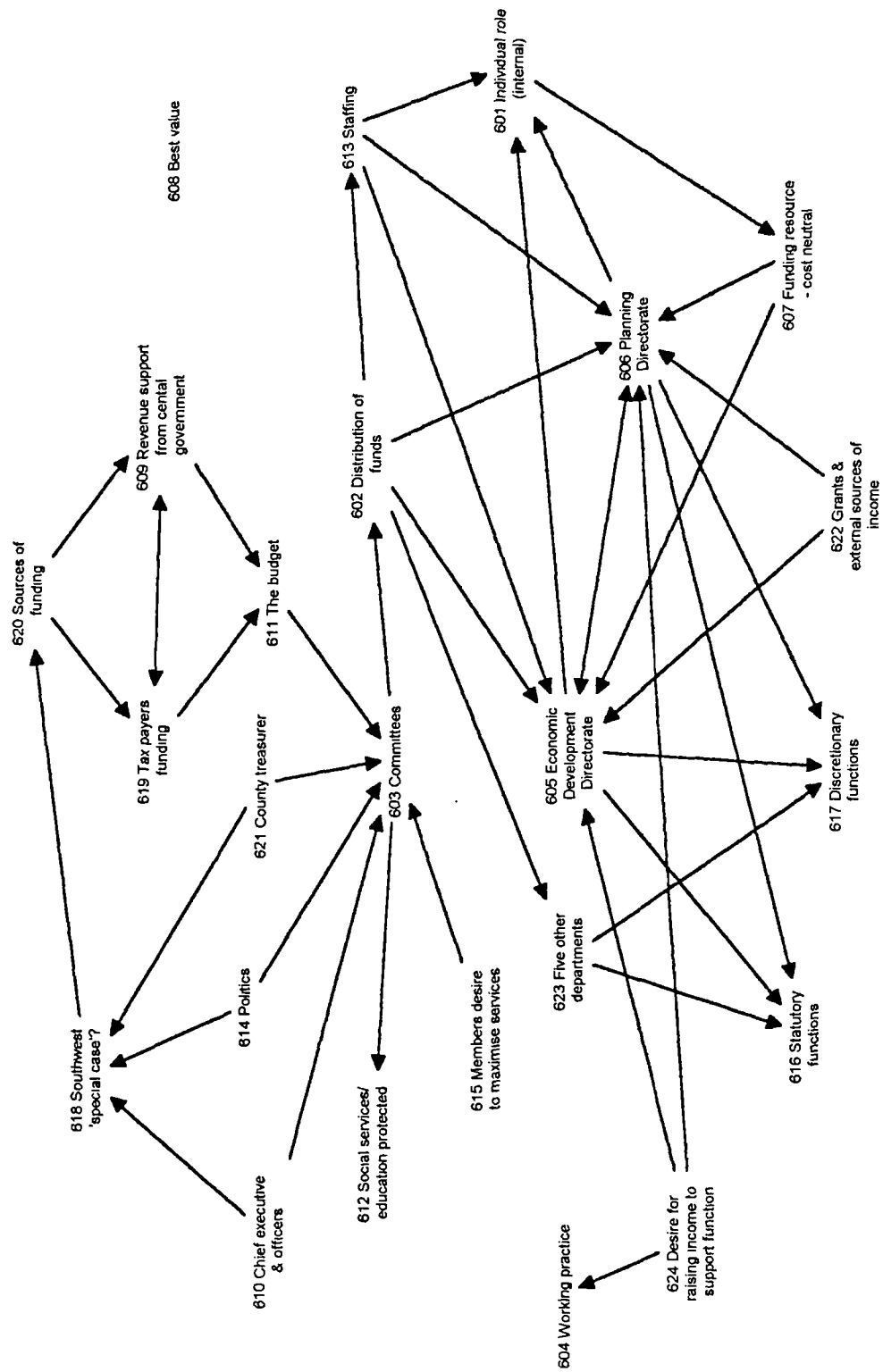
N3: SWCC Respondent Three: 'The Budget Setting Process'



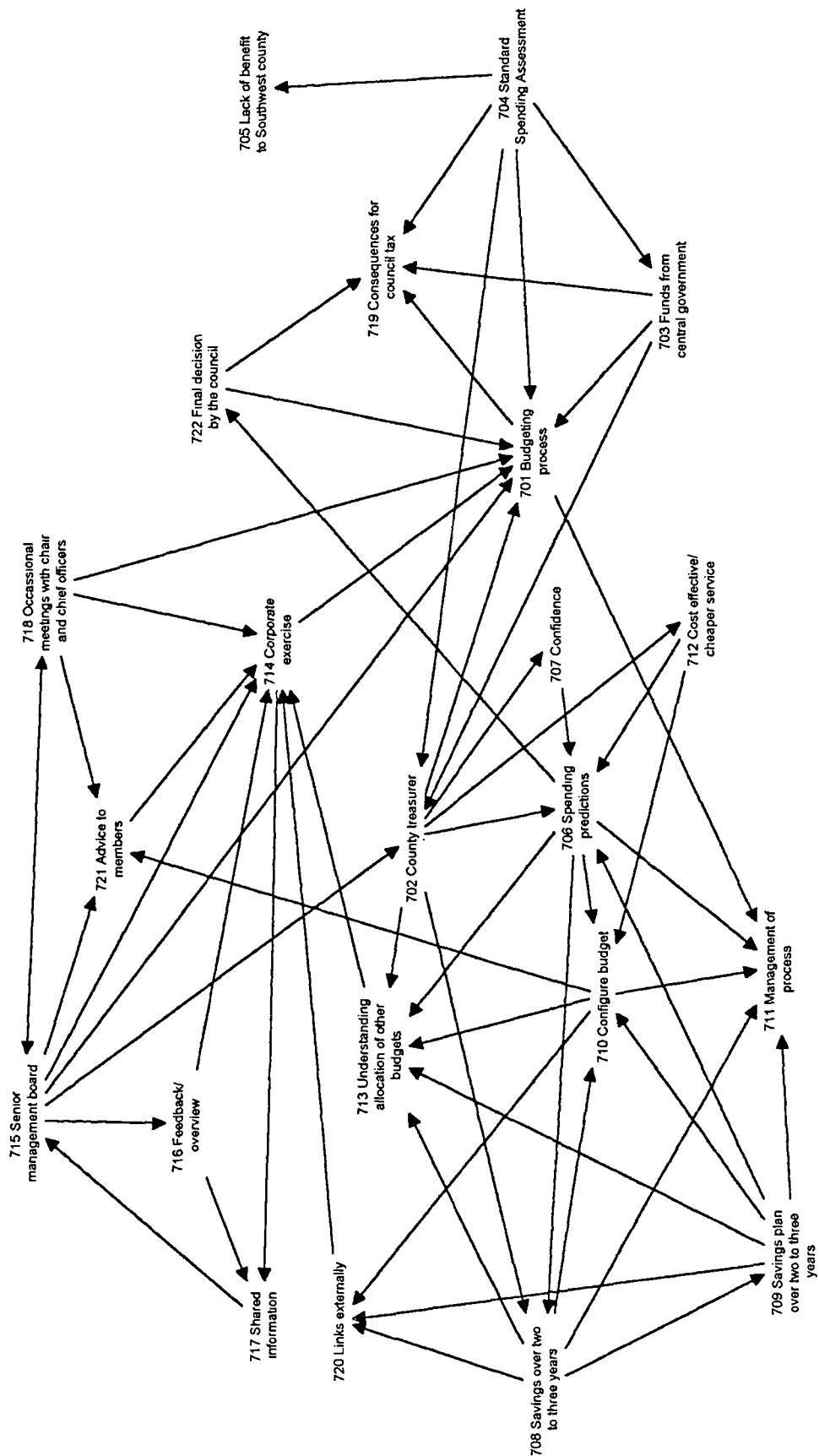
N4: SWCC Respondent Four: 'The Budget Setting Process'



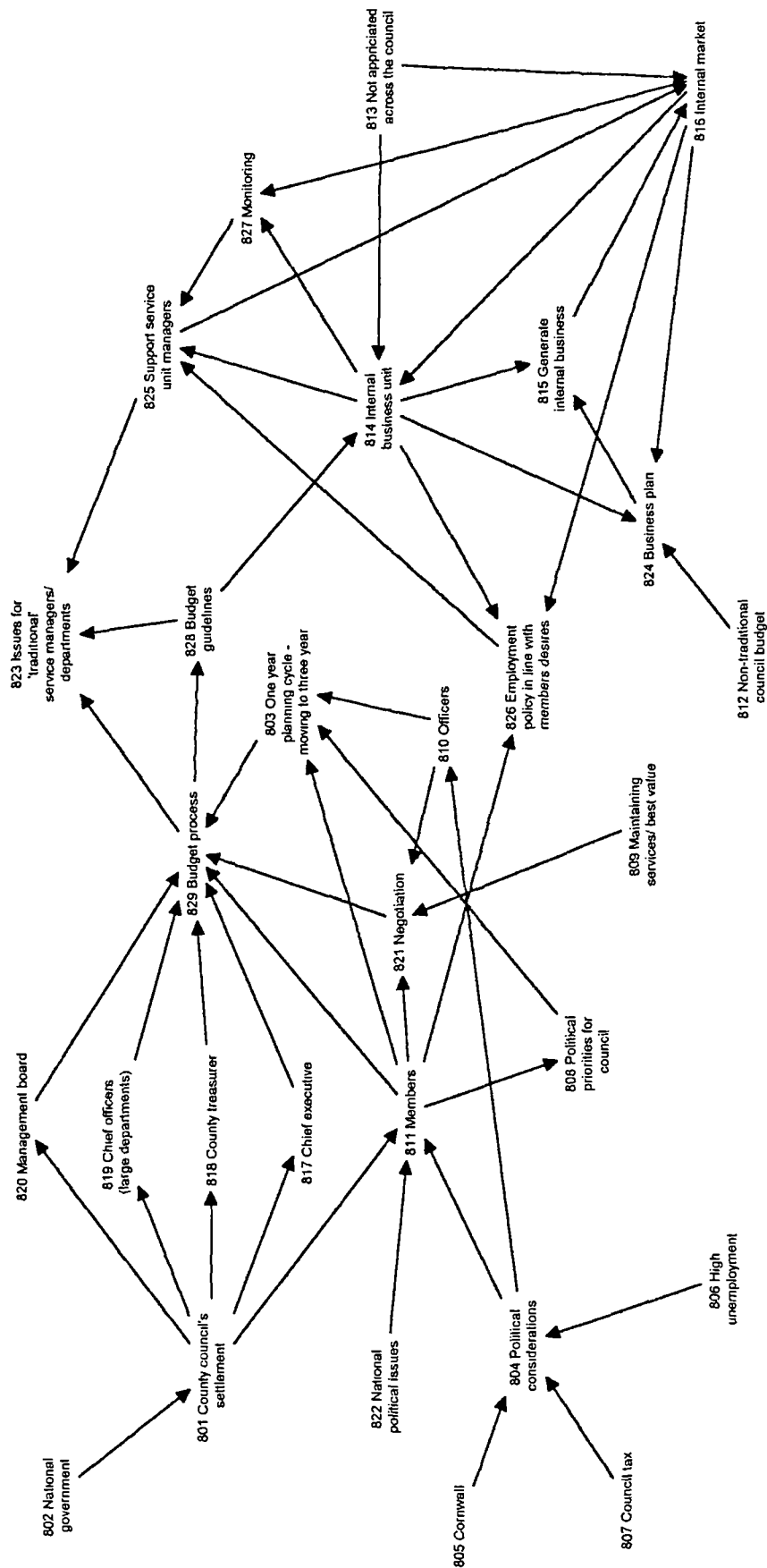
N5: SWCC Respondent Five: 'The Budget Setting Process'



N6: SW/CC Respondent Six: 'The Budget Setting Process'



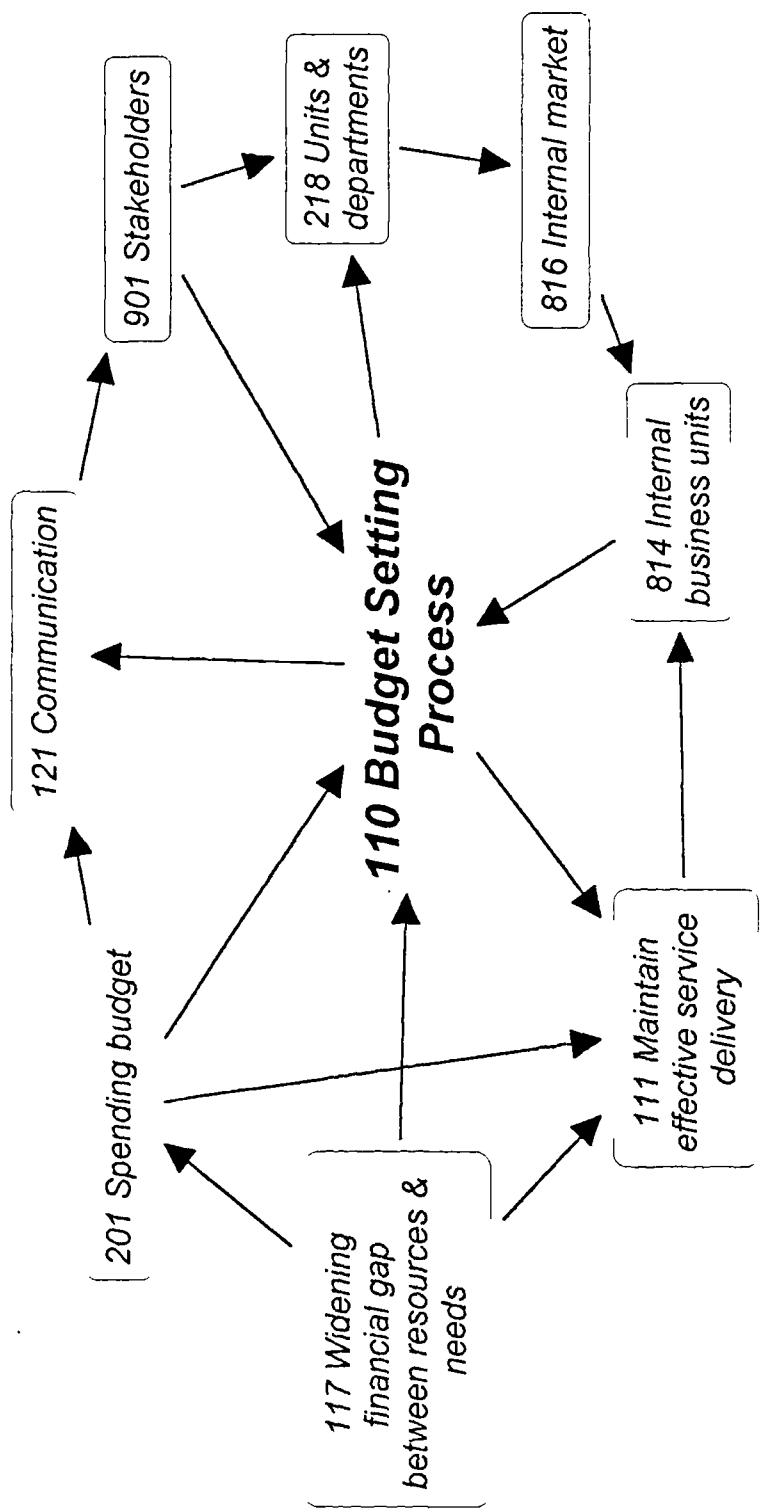
N7: SWCC Respondent Seven: 'The Budget Setting Process'



N8: SWCC Respondent Eight: 'The Budget Setting Process'

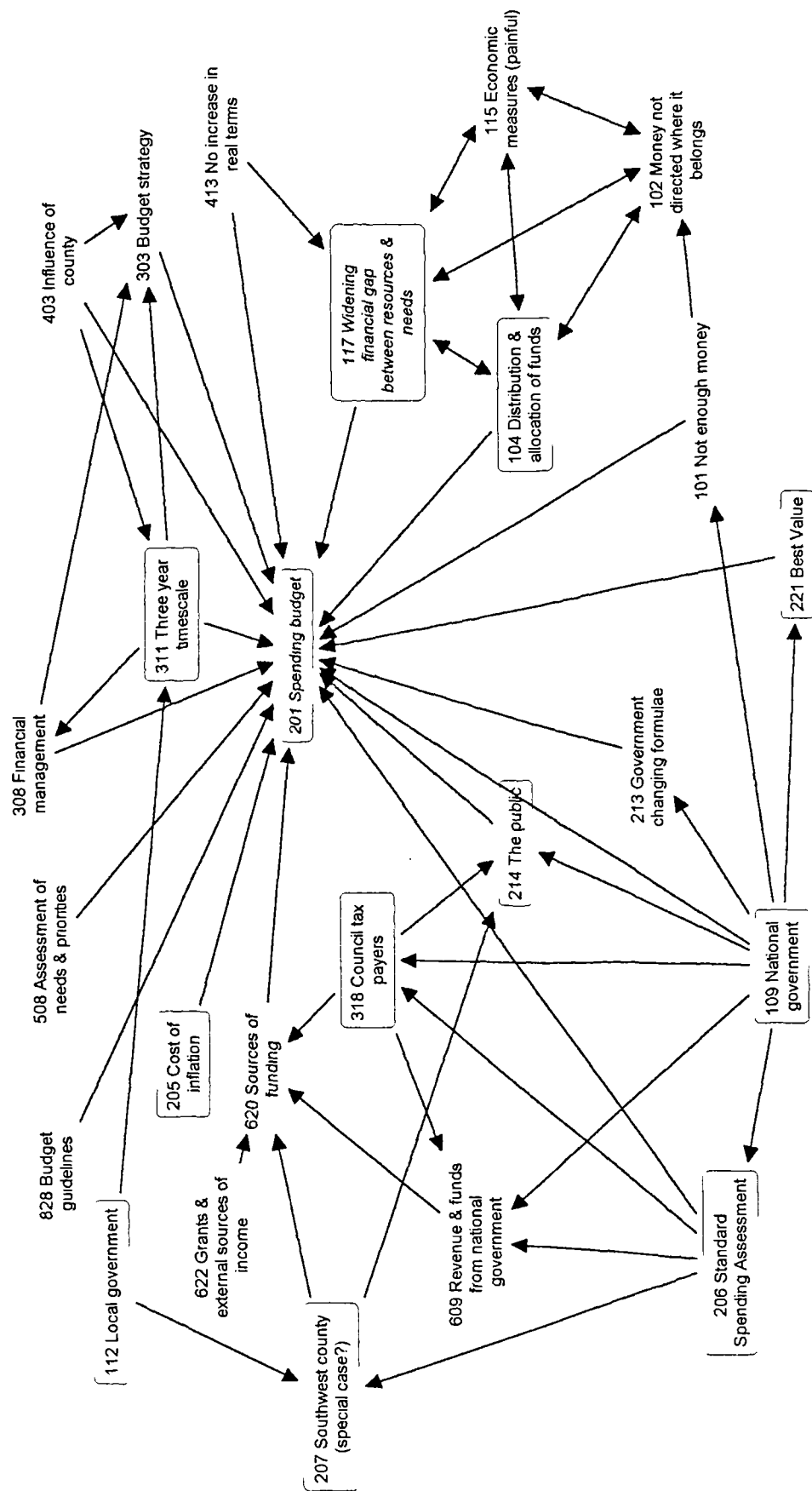
## **APPENDIX O**

# ***SWCC*: Shared Mental Model & Merged Concept Summary**

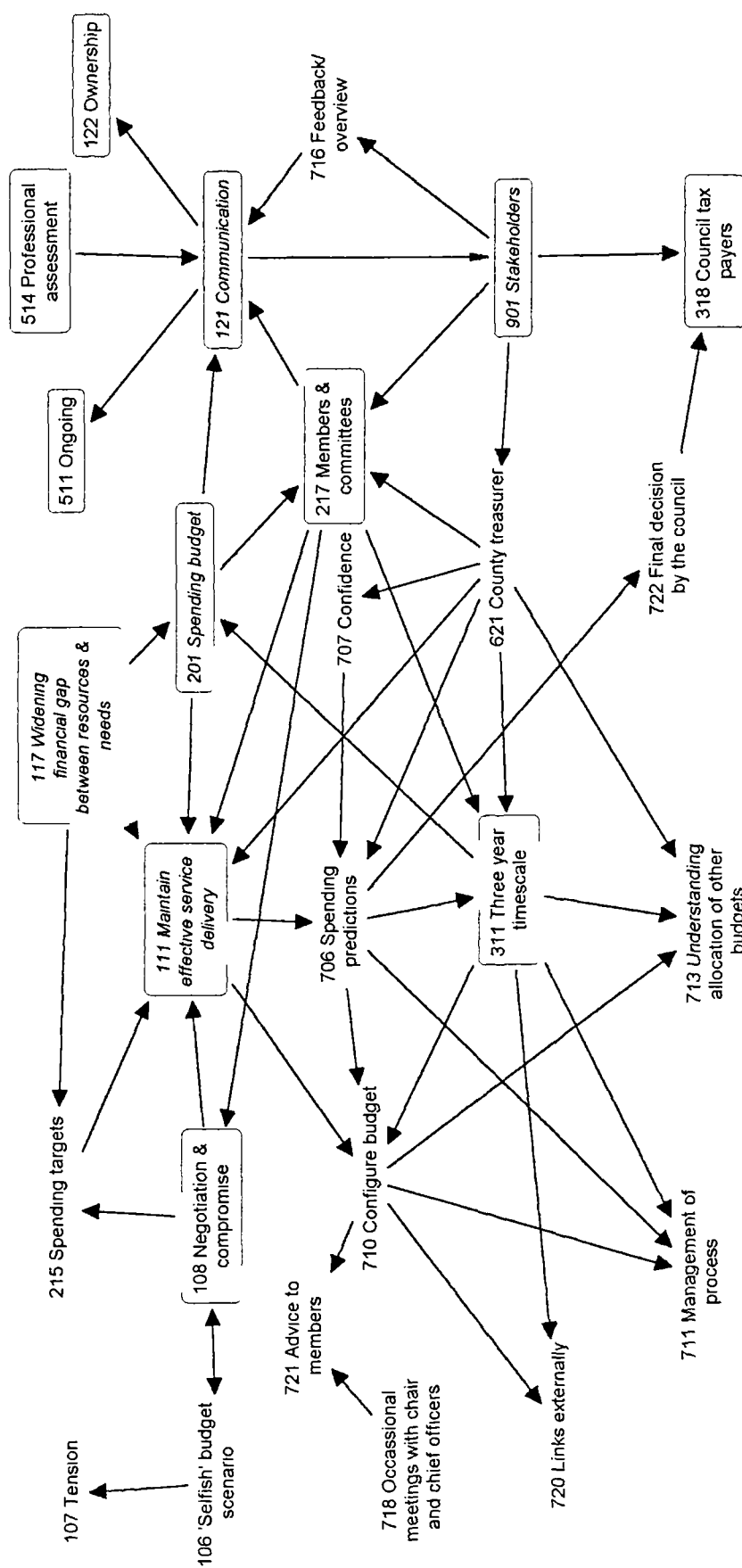


O1: SWCC Shared Mental Model: 'The Budget Setting Process - Core'

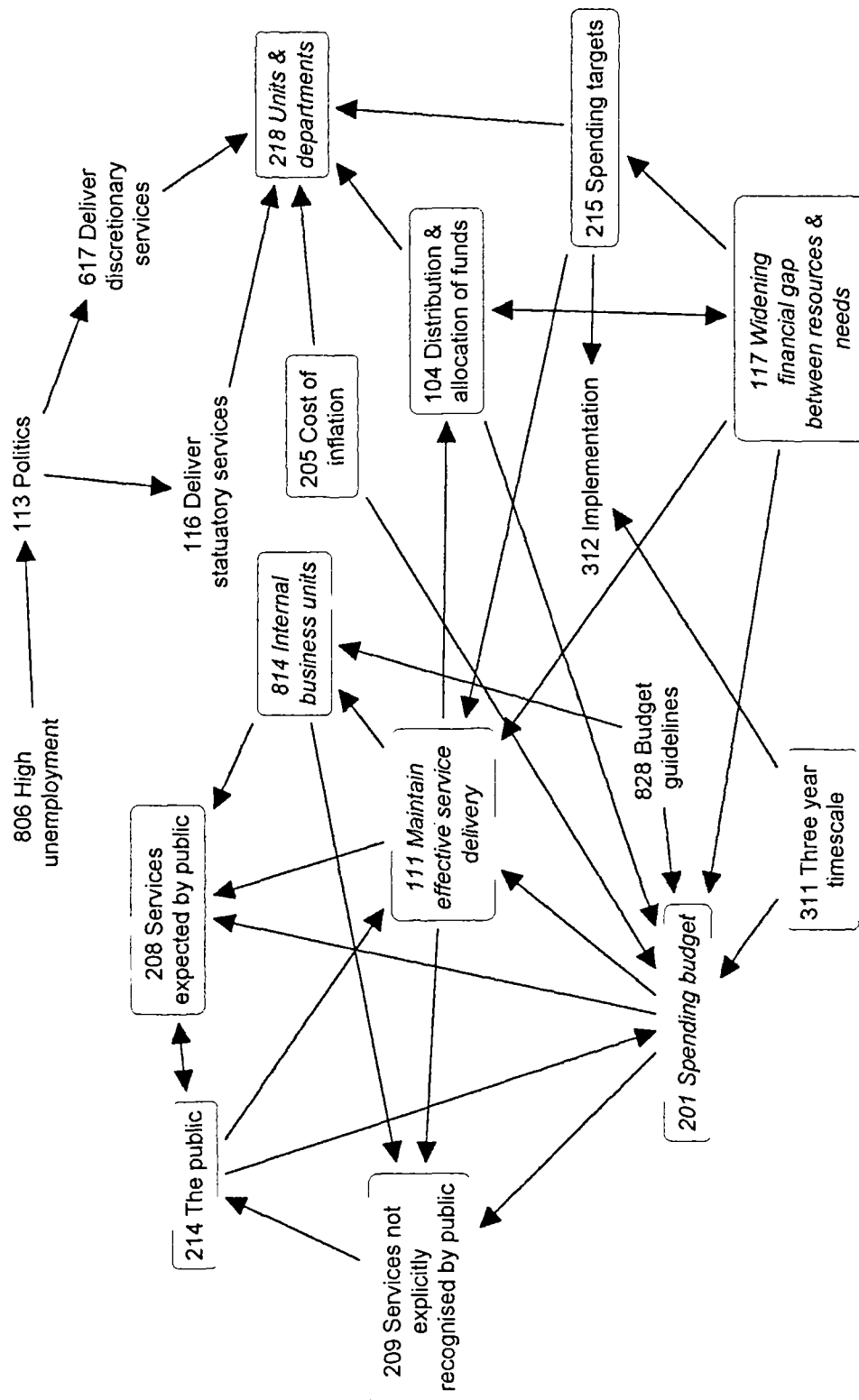




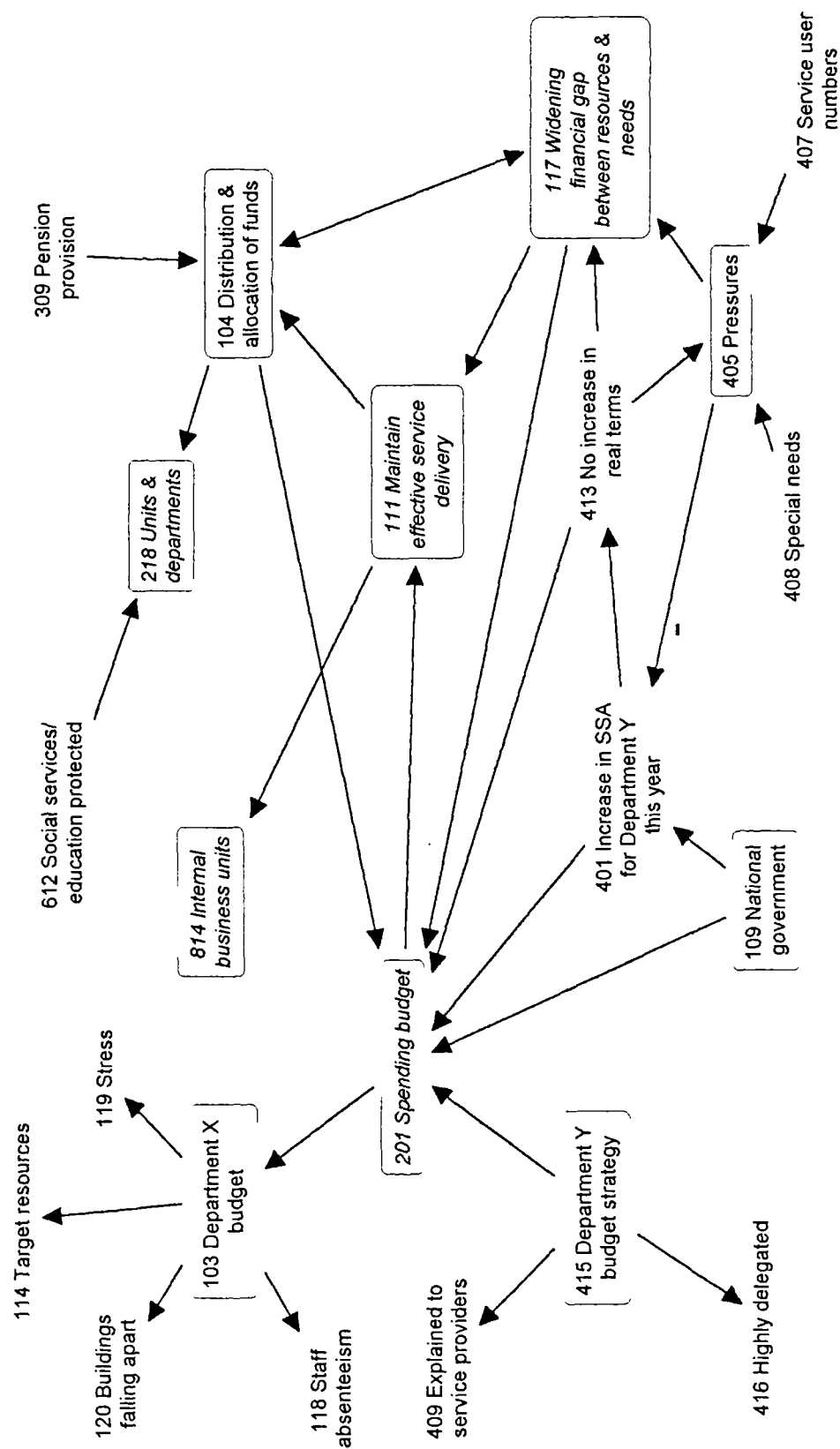
O2: SWCC Shared Mental Model: 'The Budget Setting Process - Spending Budget (in)'



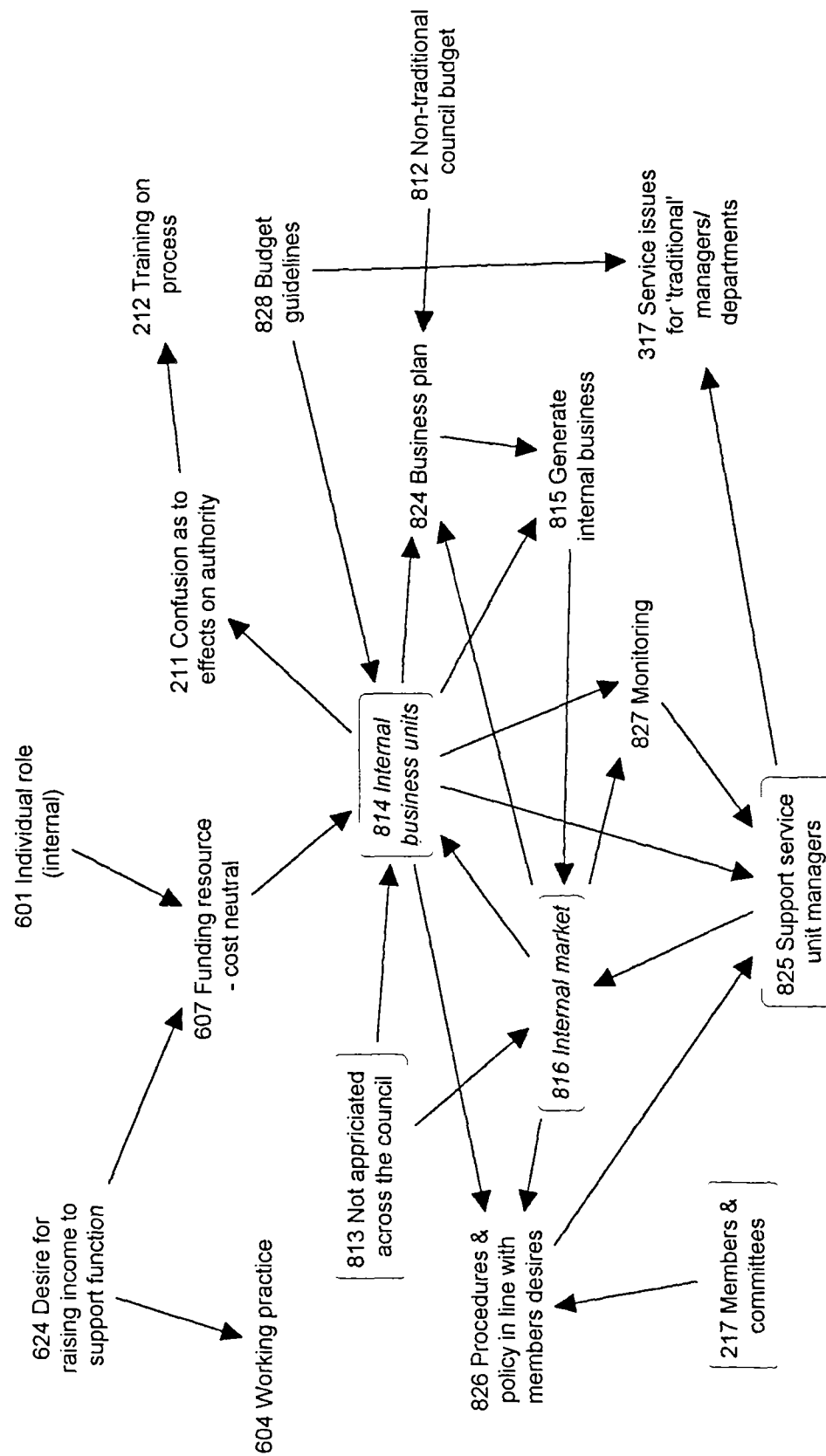
### O3: SW/CC Shared Mental Model: 'The Budget Setting Process - Spending Budget (out)'



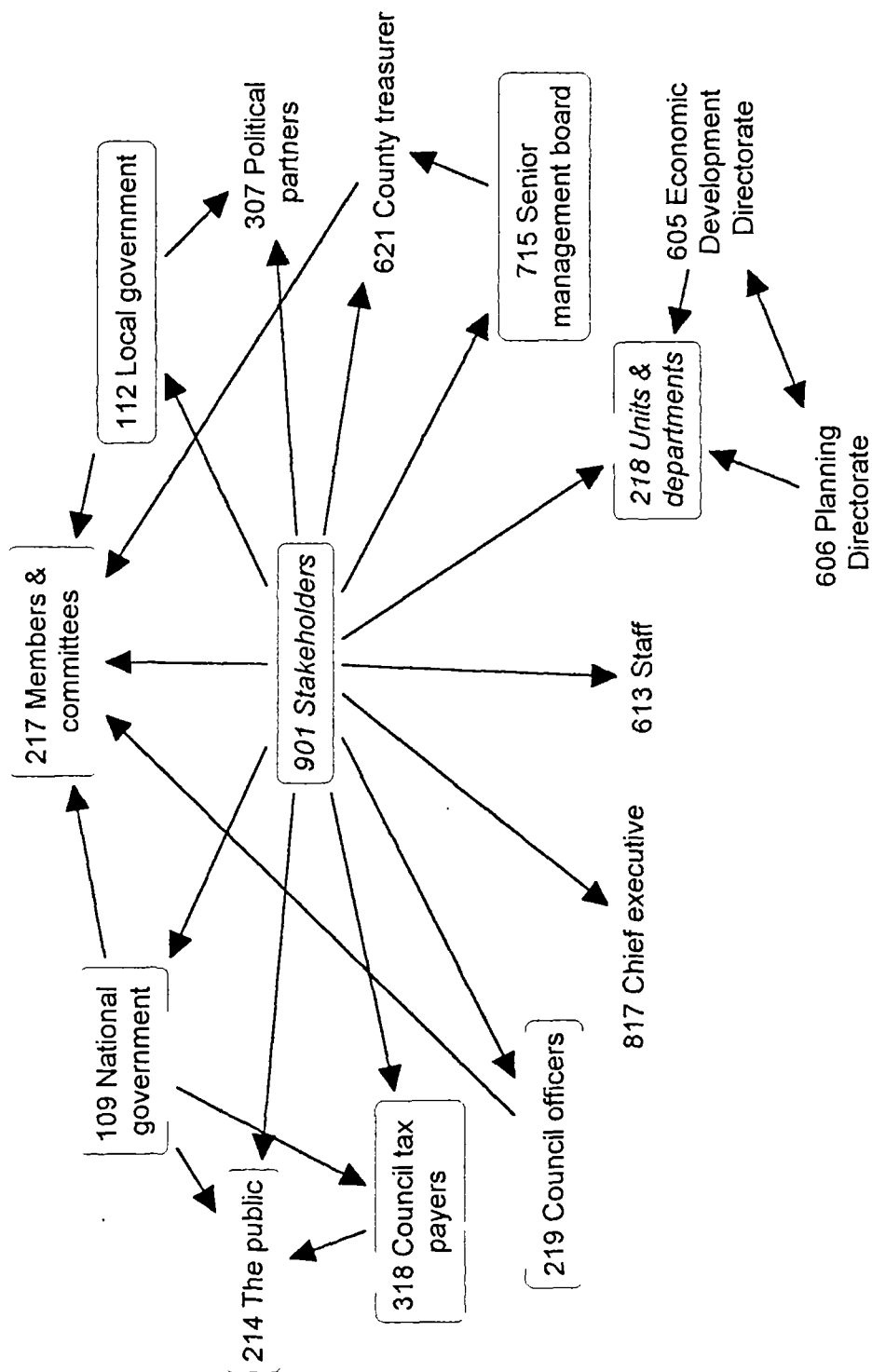
O4: SWCC Shared Mental Model: 'The Budget Setting Process - Service Issues (general)'



## O5: SW/CC Shared Mental Model: 'The Budget Setting Process - Service Issues (specific)'



O6: SWCC Shared Mental Model: 'The Budget Setting Process - Internal Units'



O7: SWCC Shared Mental Model: 'The Budget Setting Process - Stakeholders'

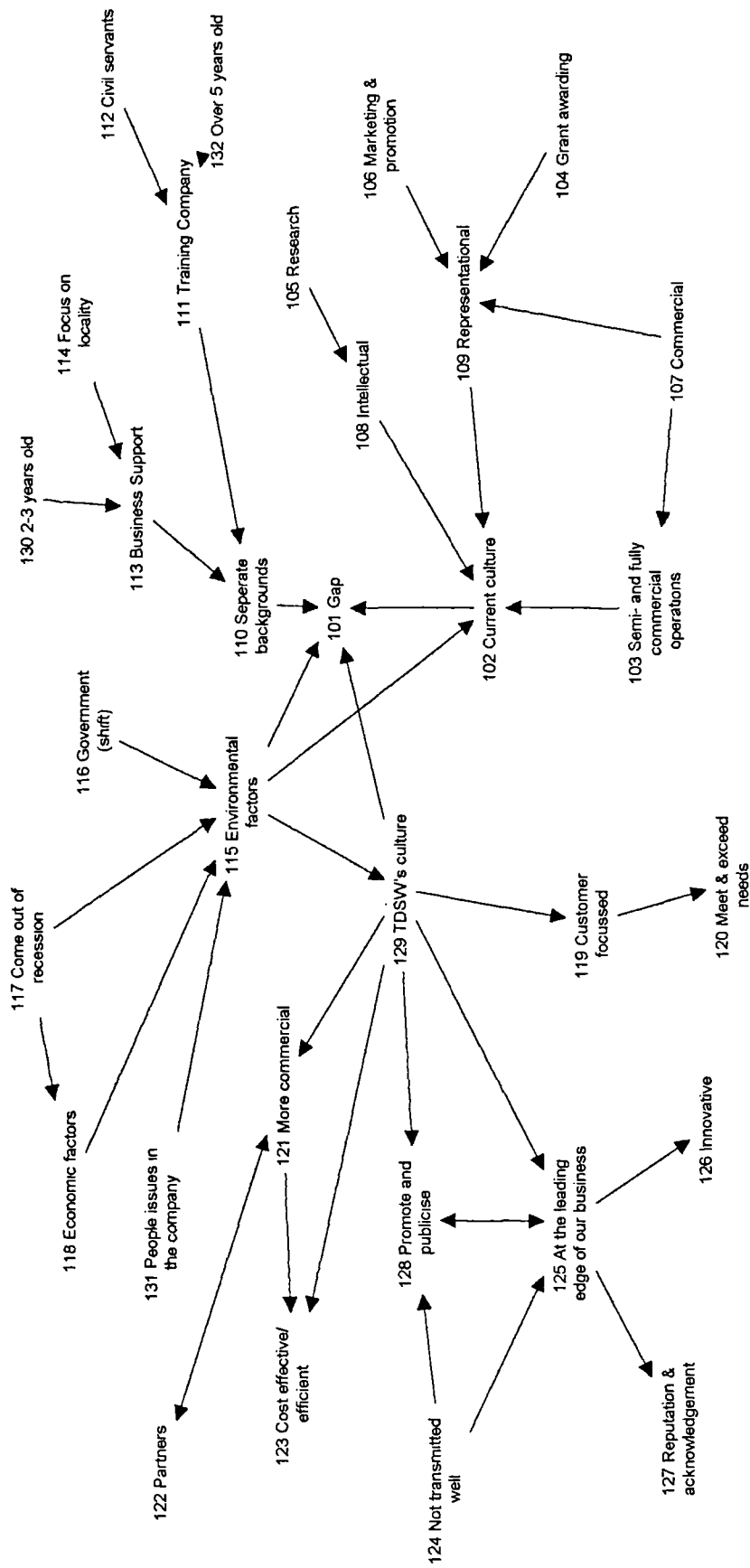
## SWCC: Merged Concept Summary

<i>Merged Concept Code</i>	<i>Merged Concept Label</i>	<i>Individual Concepts Included</i>
101	Not enough money	101; 203
104	Distribution and allocation of funds	104; 515; 602
105	Corporate exercise	105; 714
108	Negotiation and compromise	108; 220; 821
109	National Government	109; 202; 304; 402; 802; 822
110	Budget Setting Process	110; 216; 502; 701; 829
111	Maintain effective service delivery	111; 204; 314; 505; 615; 712; 809
112	Local Government	112; 302; 510; 614; 808
113	Politics	113; 301; 804
116	Delivering statutory services	116; 616
117	Widening financial gap...	117; 313; 410; 501
121	Communication	121; 414; 512; 513; 717
122	Ownership	122; 306
201	Spending budget	201; 310; 404; 503; 611
205	Cost of inflation	205; 406
206	Standard Spending Assessment	206; 704
207	Southwest County (special case?)	207; 618; 705; 805
215	Spending Targets	215; 315; 507
217	Members and committees	217; 305; 316; 504; 603; 811
219	Council officers	219; 319; 509; 610; 810; 819
221	Best Value	221; 608
303	Budget strategy	303; 411
311	Three year timescale	311; 412; 506; 708; 709; 803
317	Service issues for traditional managers...	317; 823
318	Council Tax Payers	318; 619; 719; 807
609	Revenue and funds form National Gover...	609; 703; 801
621	County Treasurer	621; 702; 818
715	Senior Management Board	715; 820

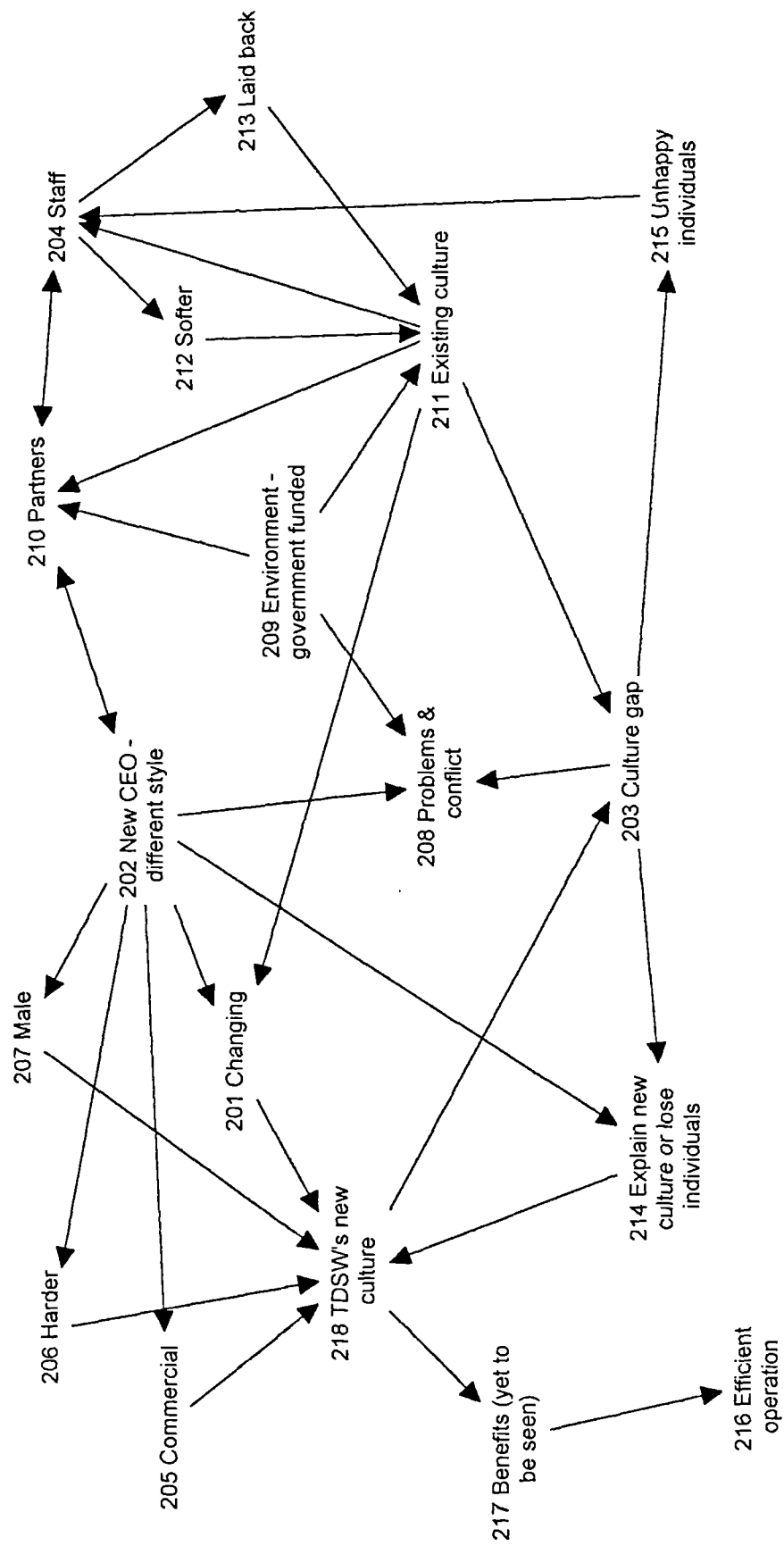
## **APPENDIX P**

# ***TDSW*: Individual Mental Models**

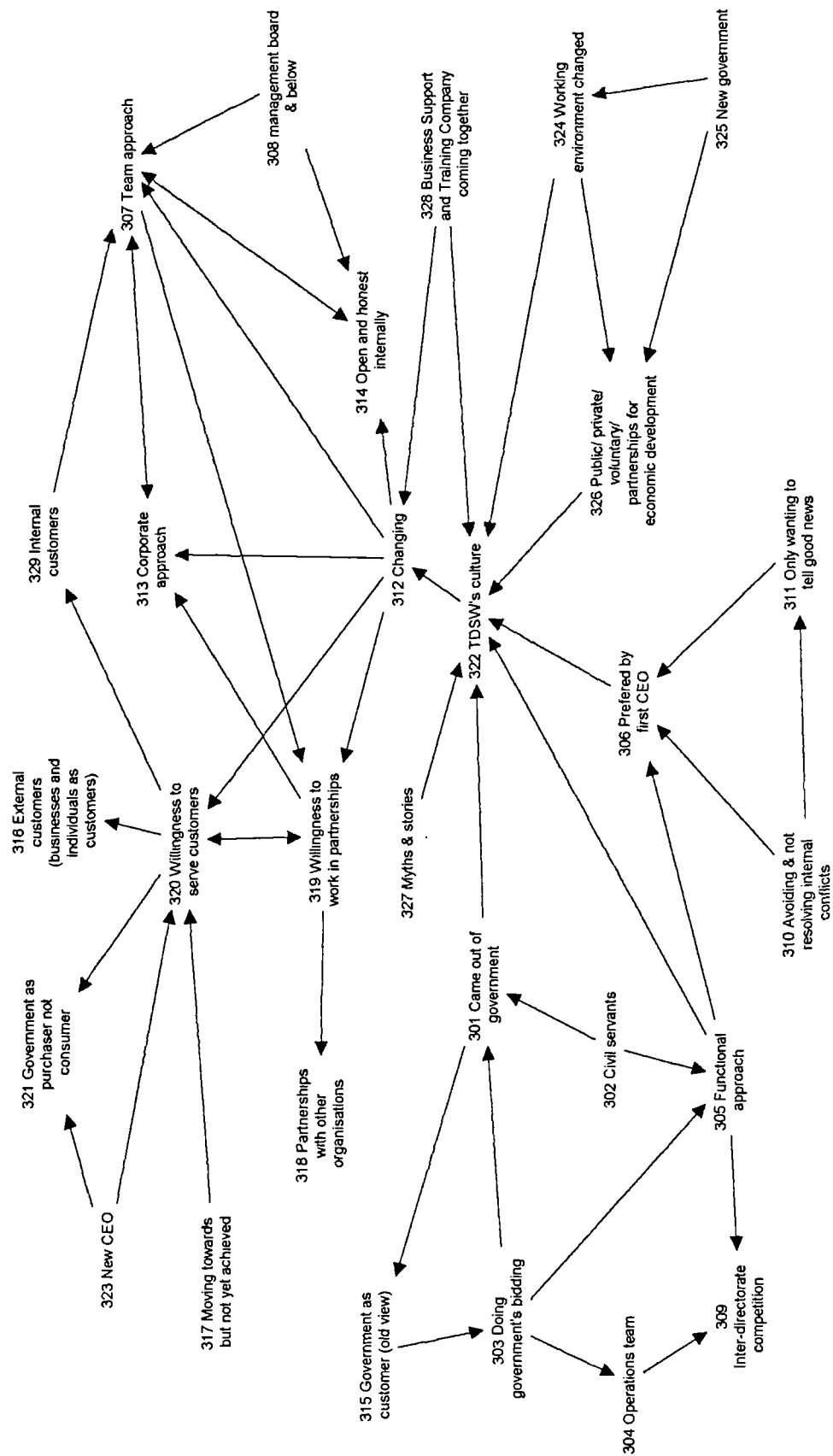




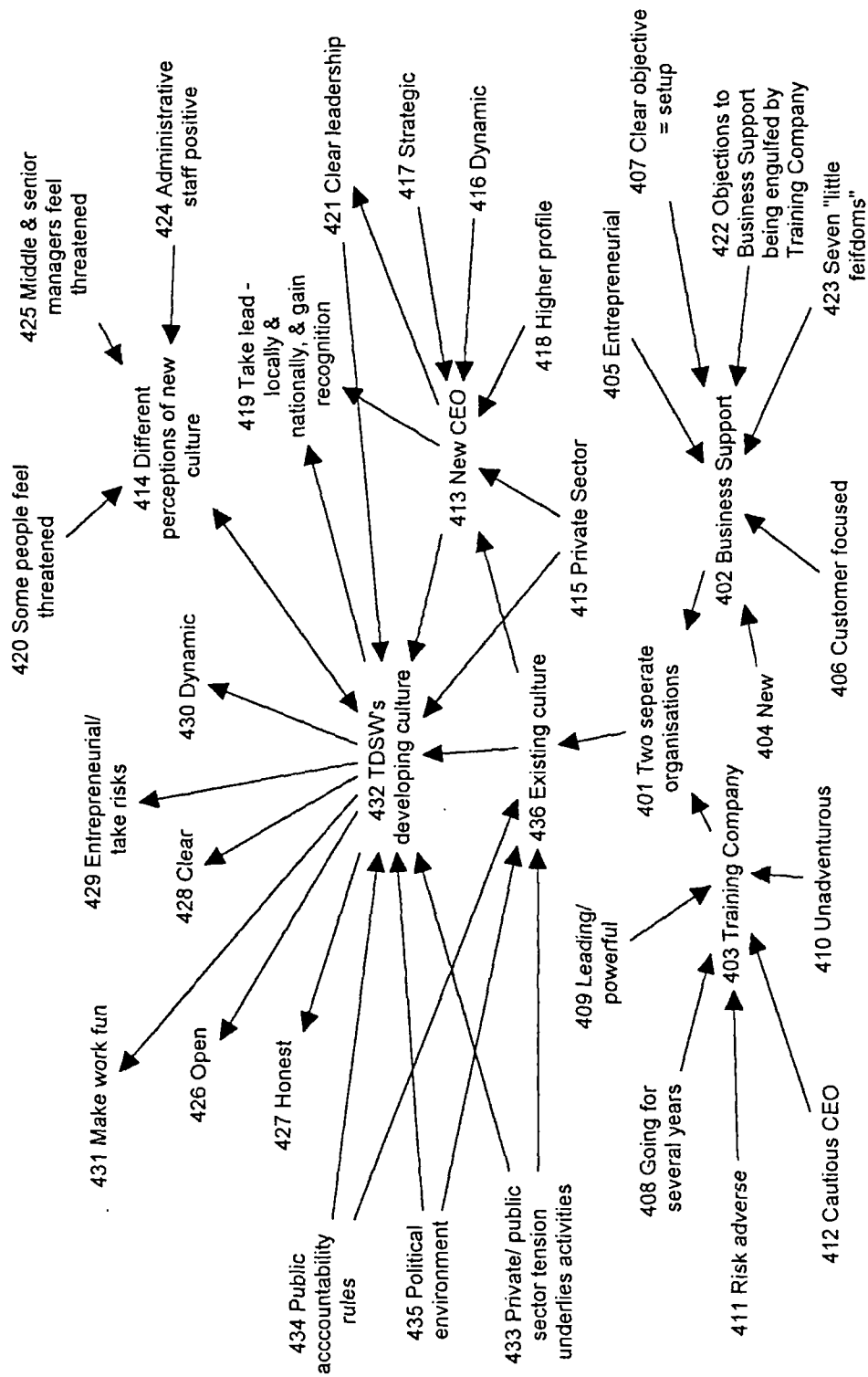
**P1: TDSW Respondent One: 'TDSW's Developing Culture'**

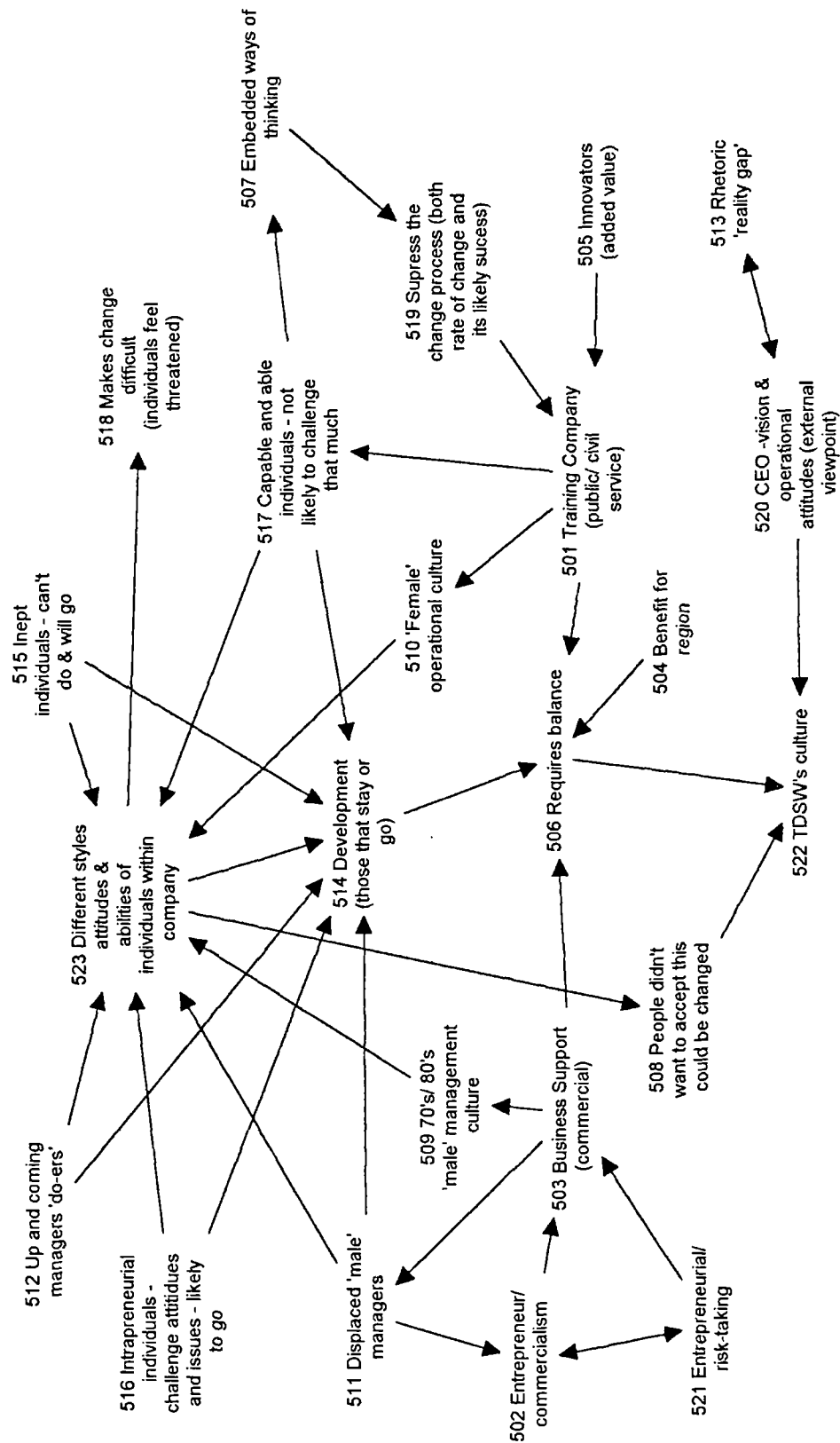


**P2: TDSW Respondent Two: 'TDSW's Developing Culture'**

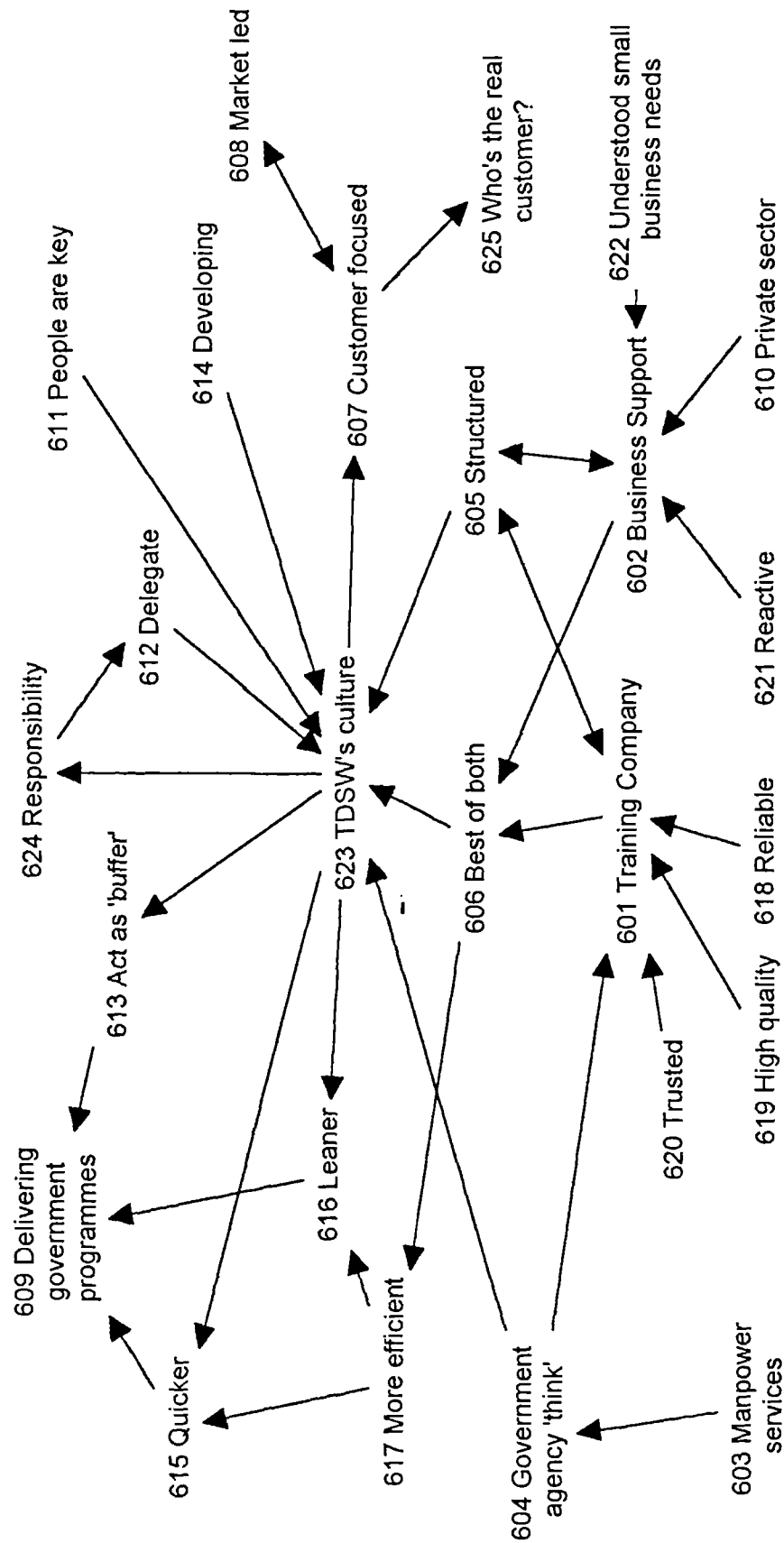


P3: TDSW Respondent Three: 'TDSW's Developing Culture'

P4: *TDSW* Respondent Four: 'TDSW's Developing Culture'



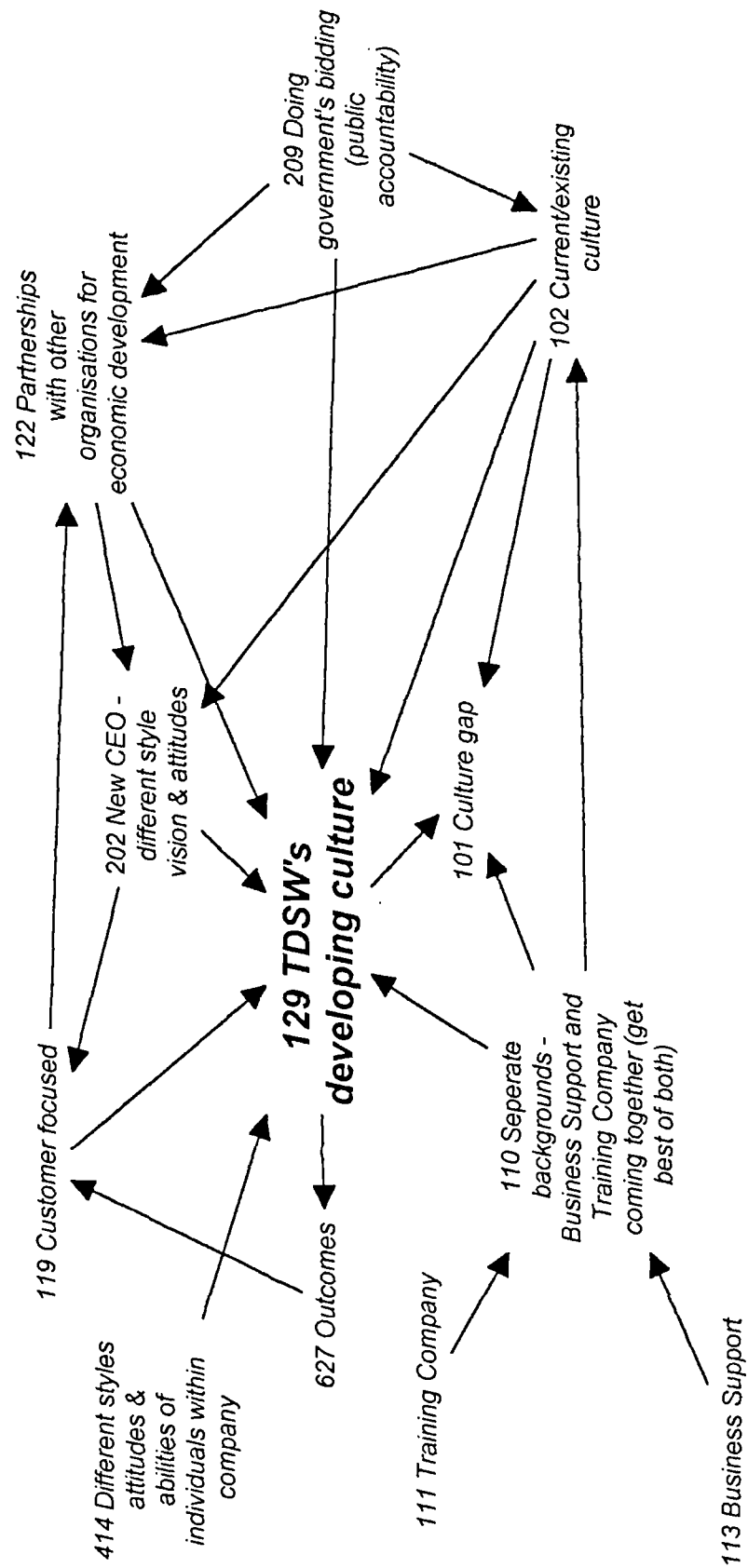
P5: TDSW Respondent Five: 'TDSW's Developing Culture'



**P6: TDSW Respondent Six: 'TDSW's Developing Culture'**

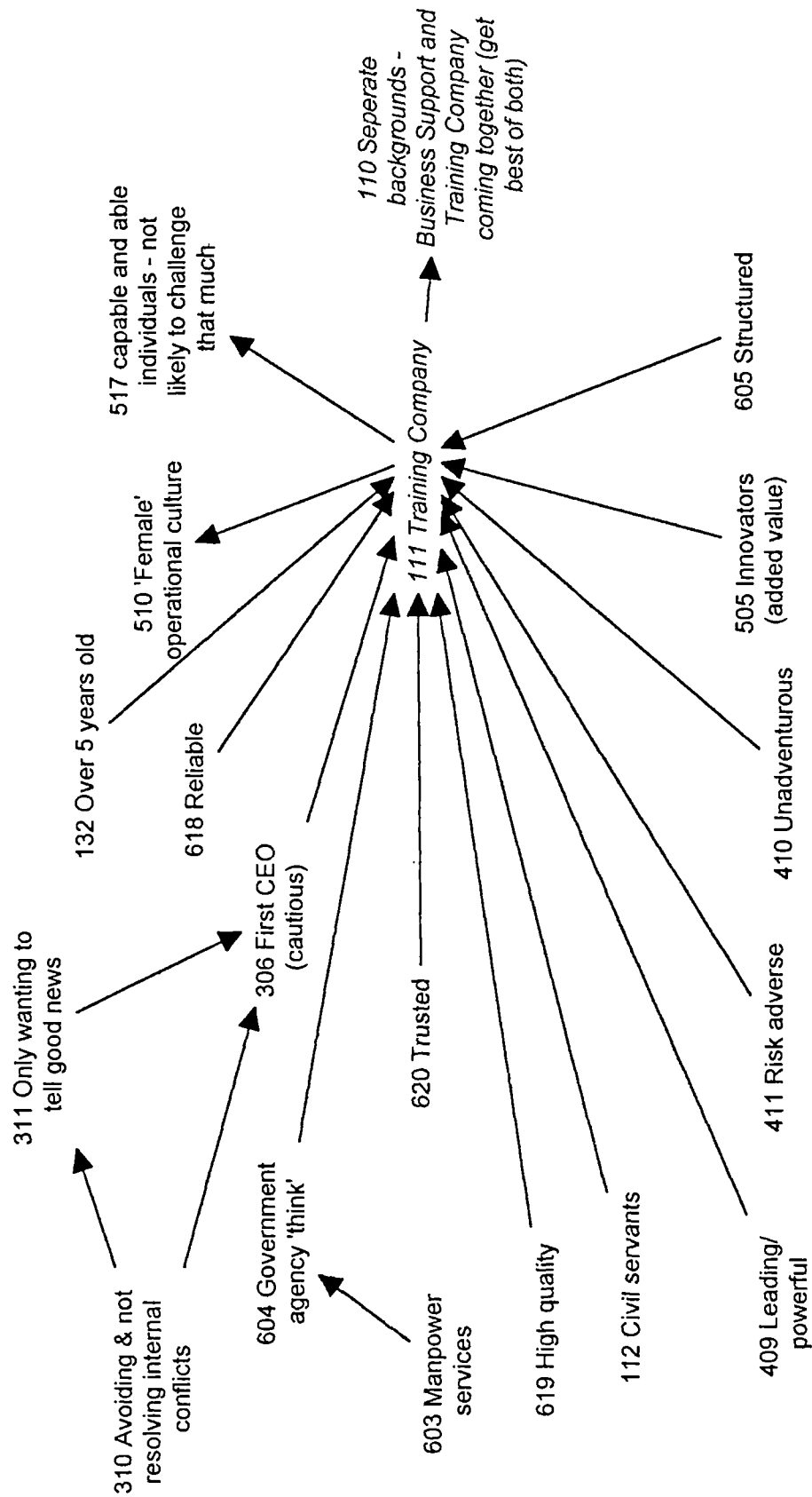
## APPENDIX Q

# ***TDSW*: Shared Mental Model & Merged Concept Summary**

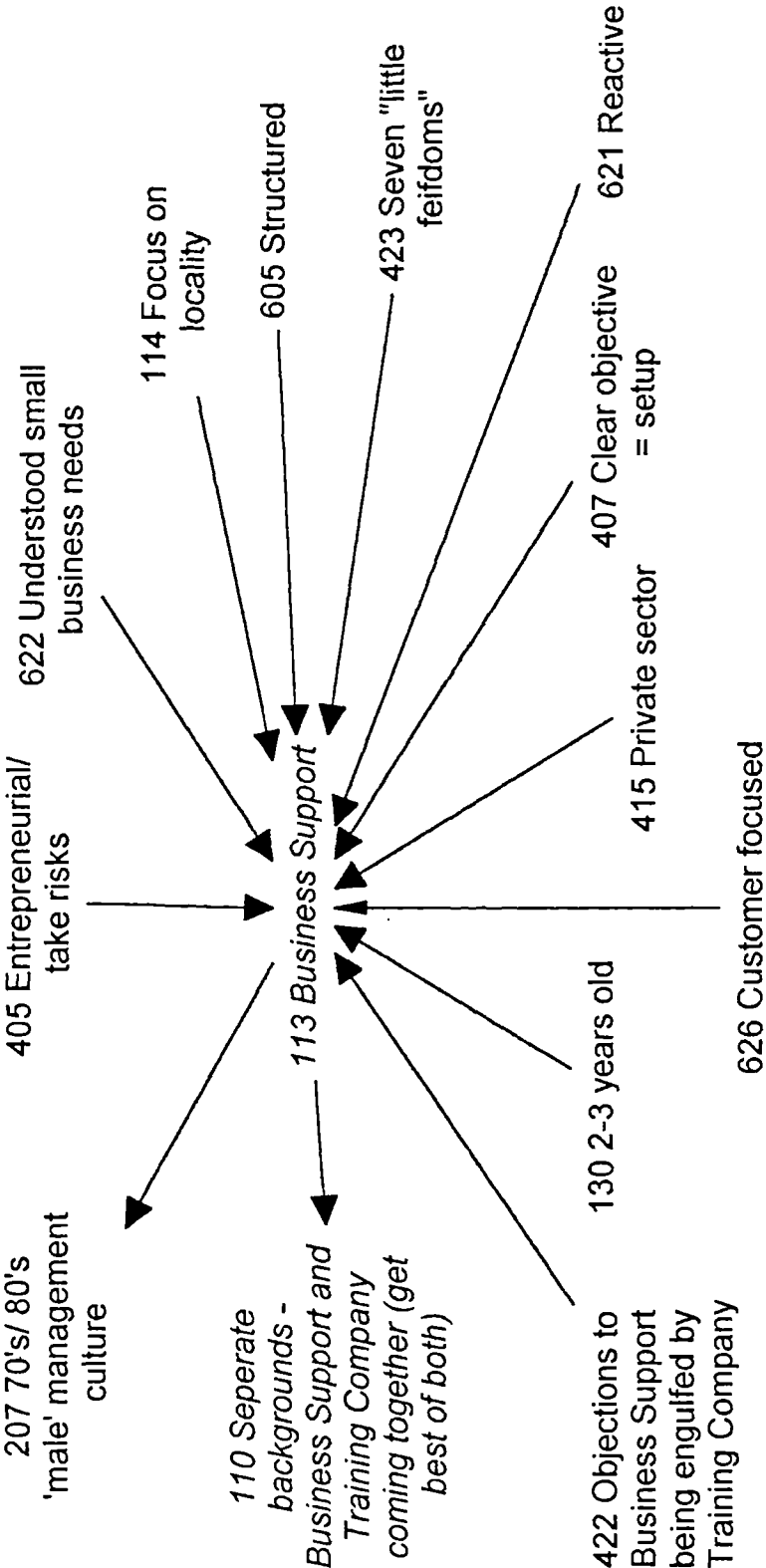


**Q1: TDSW Shared Mental Model: 'TDSW's Developing Culture - Core'**

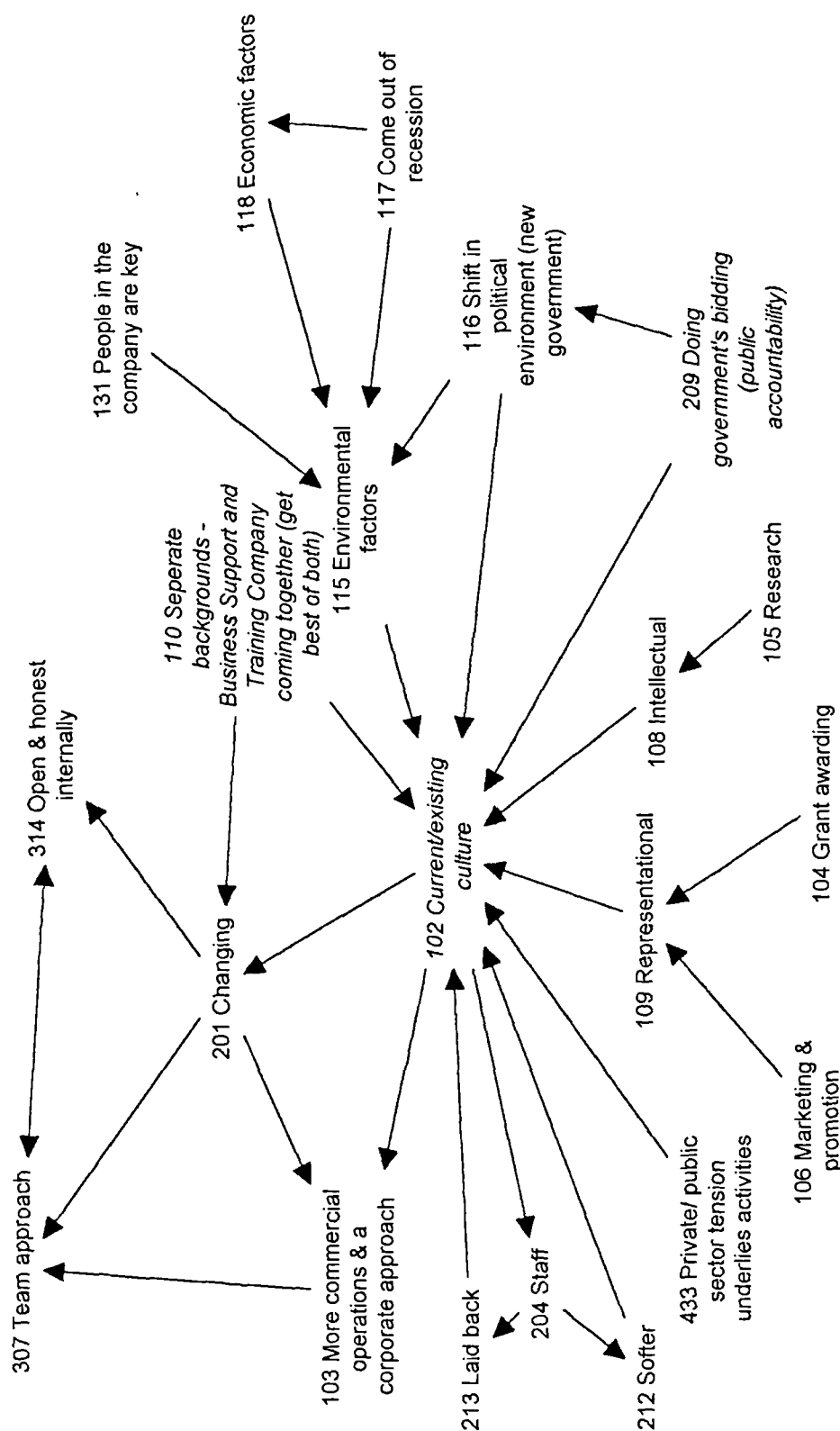




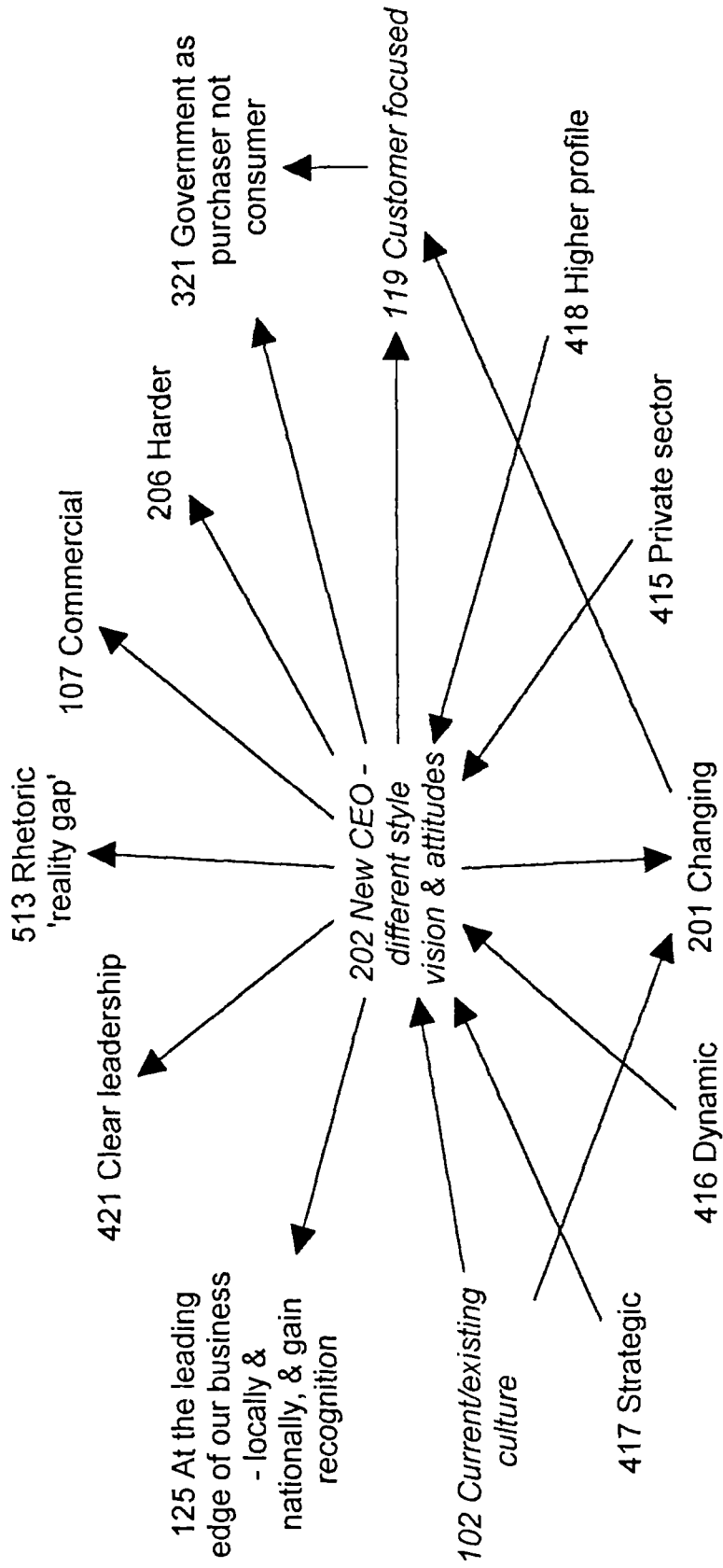
Q2: *TDSW* Shared Mental Model: 'TDSW's Developing Culture - Training Company'



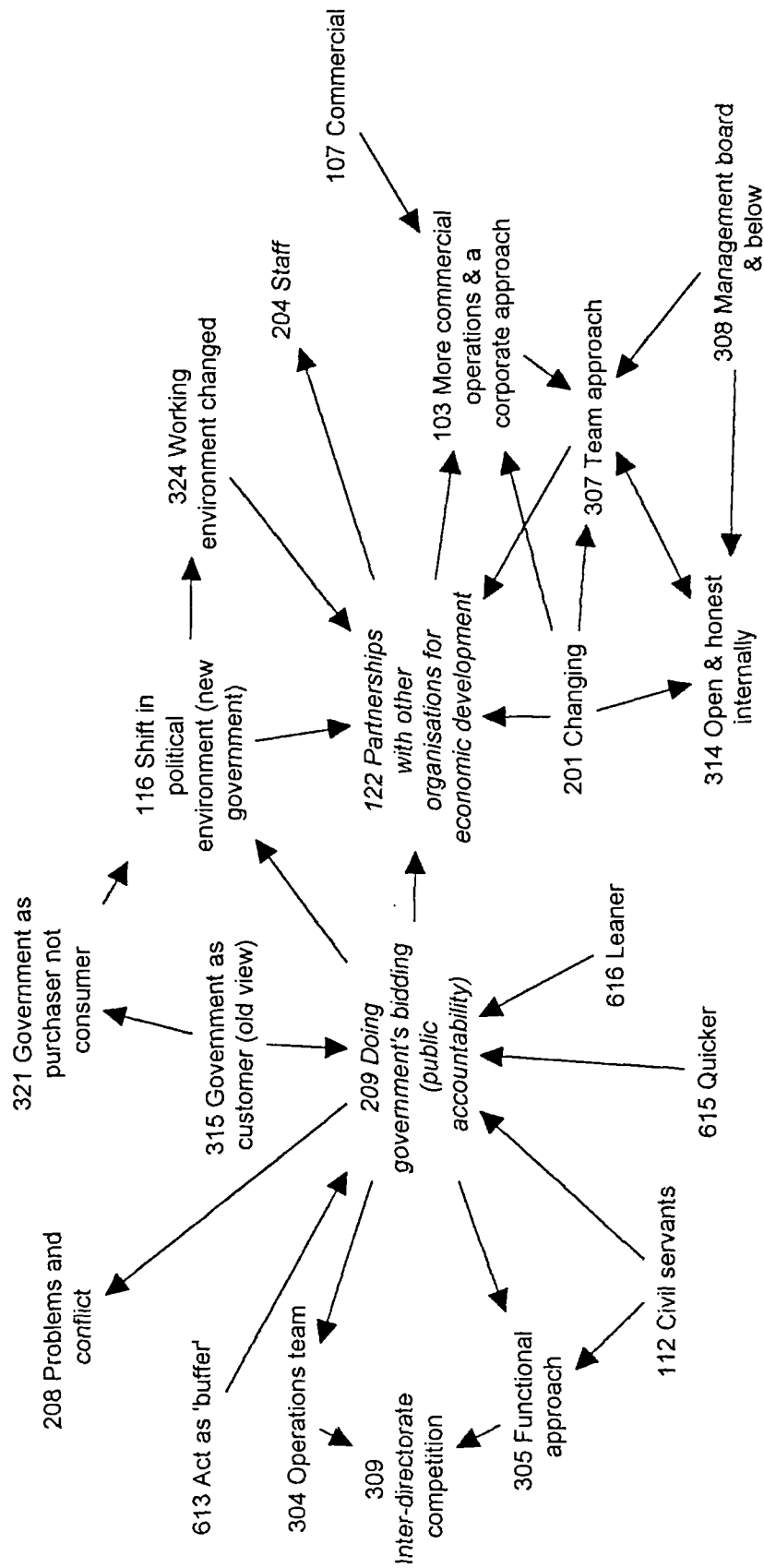
Q3: TDSW Shared Mental Model: 'TDSW's Developing Culture - Business Support'



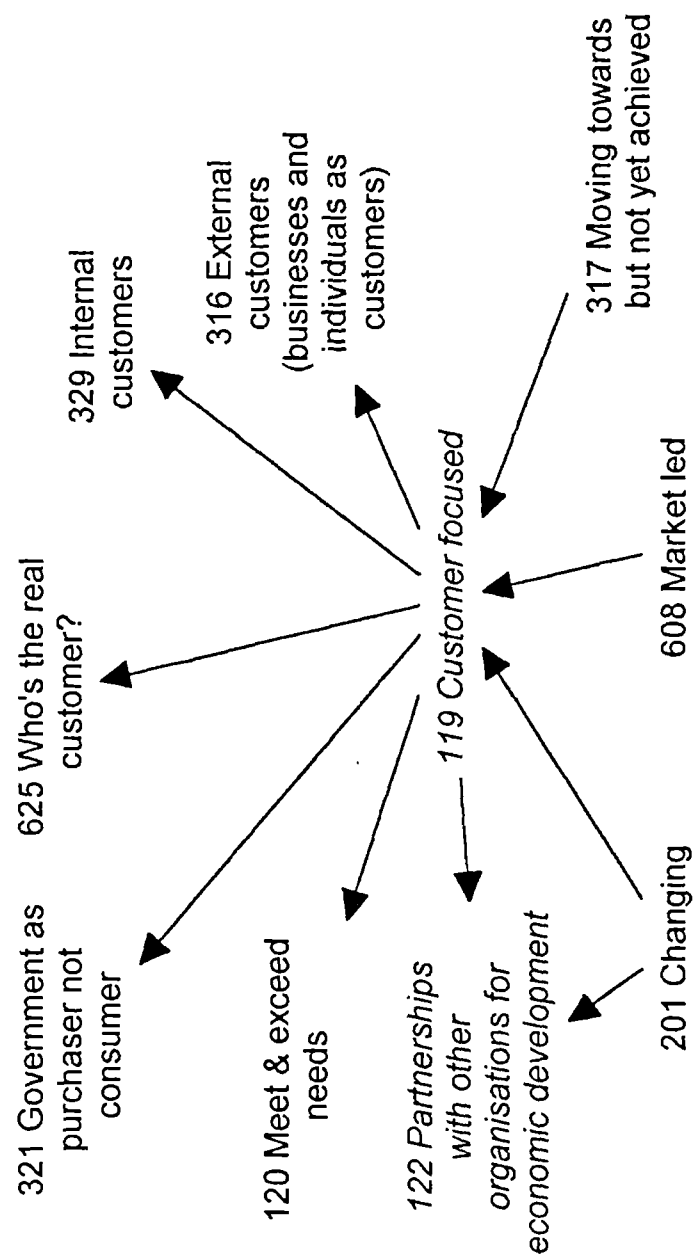
**Q4: TDSW Shared Mental Model: 'TDSW's Developing Culture - Current'**



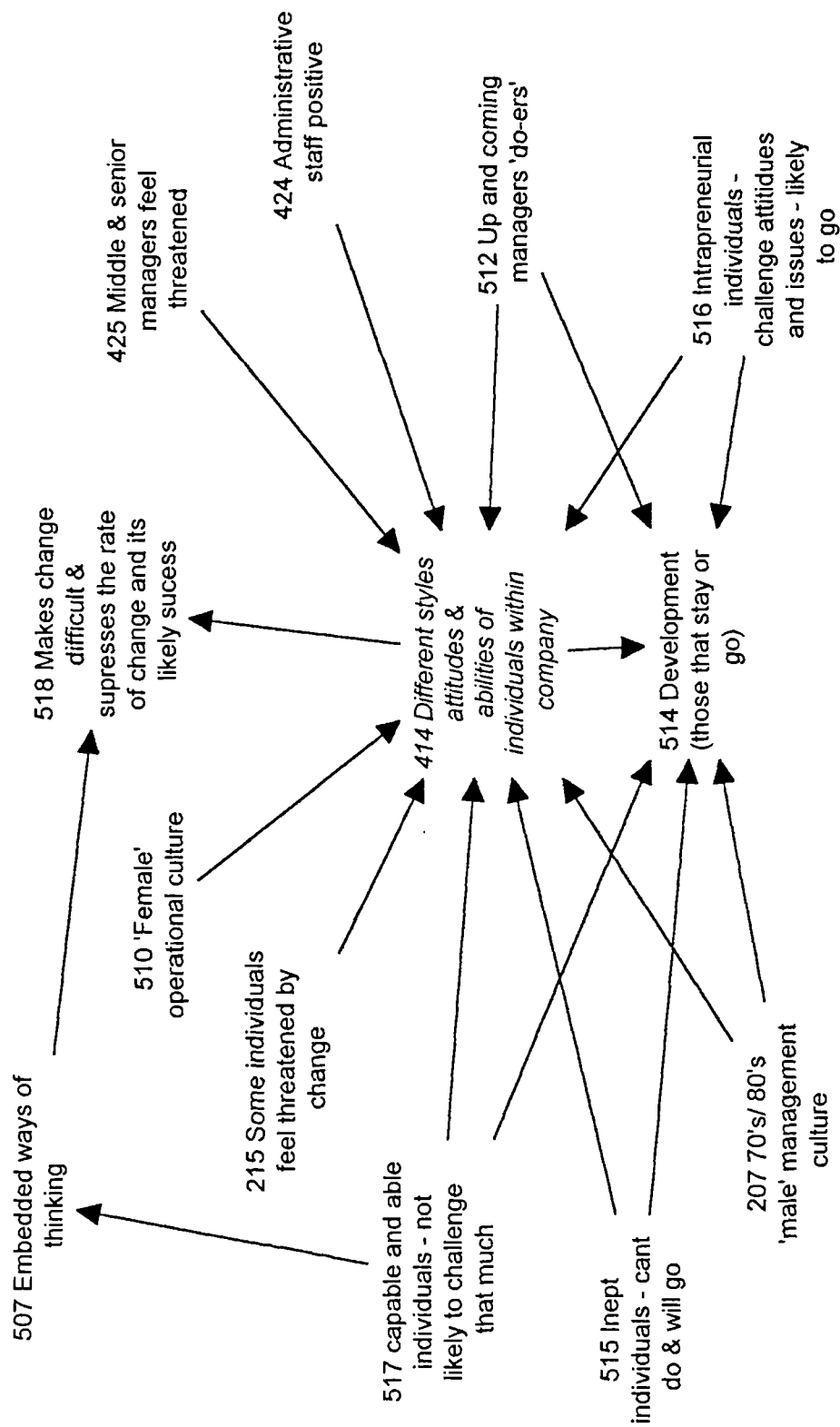
Q5: *TDSW* Shared Mental Model: '*TDSW*'s Developing Culture - CEO'



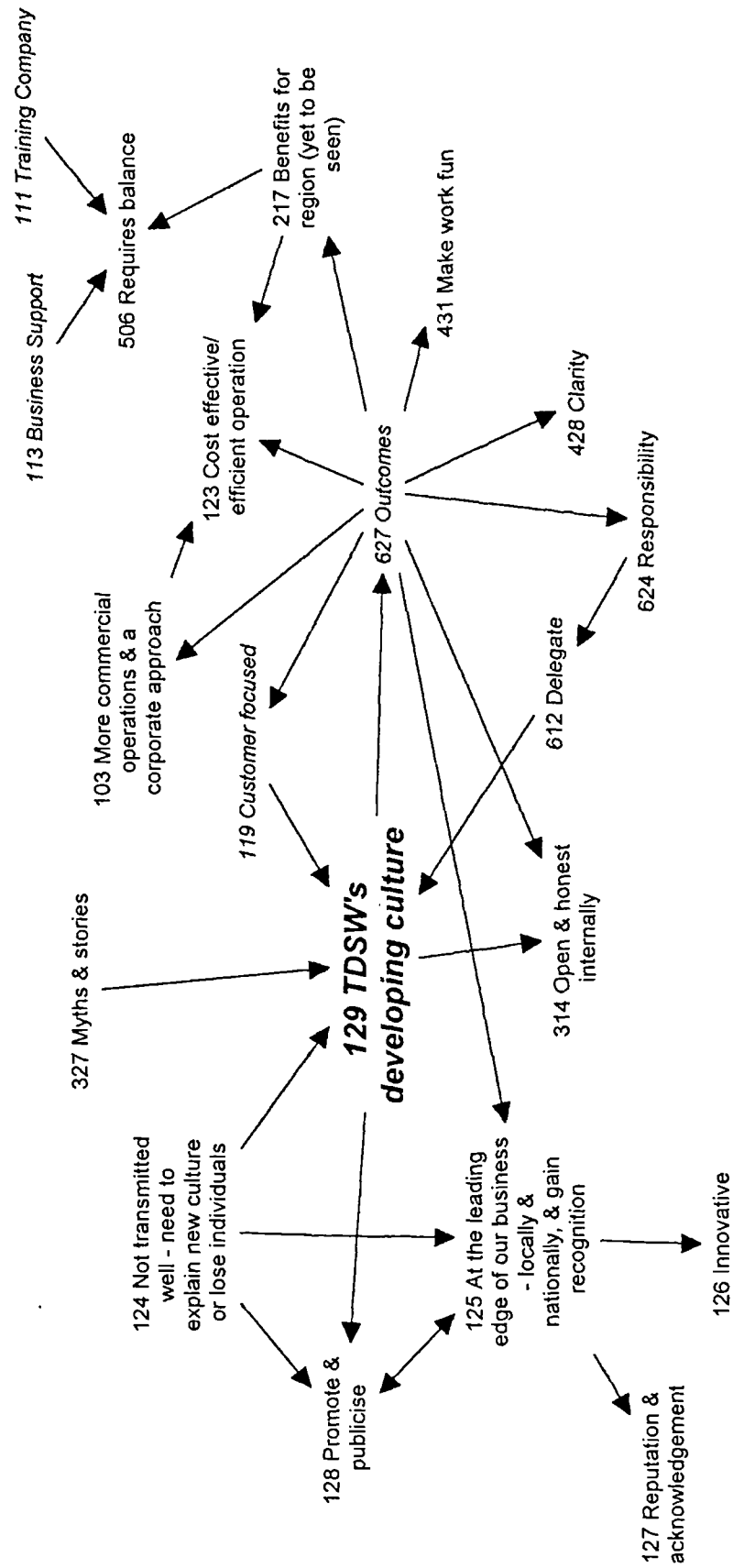
**Q6: TDSW Shared Mental Model: 'TDSW's Developing Culture - Government and Partners'**



**Q7: TDSW Shared Mental Model: 'TDSW's Developing Culture - Customers'**



Q8: TDSW Shared Mental Model: 'TDSW's Developing Culture - Individuals'



Q9: TDSW Shared Mental Model: 'TDSW's Developing Culture - Outcomes'



### ***TDSW: Merged Concept Summary***

<i>Merged Concept Code</i>	<i>Merged Concept Label</i>	<i>Individual Concepts Included</i>
101	Gap	101; 203
102	Current culture	102; 211; 436
103	Semi- and fully commercial operations	103; 121; 313
107	Commercial	107; 205
110	Separate backgrounds	110; 328; 401; 606
111	Training Company	111; 403; 501; 601
112	Civil Servants	112; 302
113	Business Support	113; 402; 503; 602
116	Government shift	116; 325; 435
119	Customer focused	119; 320; 406; 607
122	Partnerships	122; 210; 318; 326; 319
123	Cost effective/ efficient	123; 216; 617
124	Not transmitted well	124; 214
125	At the leading edge of our business	125; 419
129	<i>TDSW's</i> Developing Culture	129; 218; 322; 432; 522; 614; 623
130	Two - three years old	130; 404
131	People issues in the company	131; 611
132	Over five years old	132; 408
201	Changing	201; 312
202	New CEO - different style	202; 323; 413; 520
207	Male	207; 509; 511
209	Environment - Government funded	209; 301; 303; 434; 609
215	Unhappy individuals	215; 420; 508
217	Benefits (yet to be seen)	217; 504
306	Preferred by first CEO	306; 412
314	Open and honest internally	314; 426; 427
405	Entrepreneurial	405; 429; 502; 521
414	Different perceptions of new culture	414; 523
415	Private sector	415; 610
416	Dynamic	416; 430
518	Makes change difficult	518; 519

## APPENDIX R

*WBC: Concepts Included in the MMQ-SPP*

<i>MMQ-SPP Item</i>	<i>Concept(s)/ Relationship(s) represented</i>	<i>Reversed?</i>
1. The service planning process has simplified the council's structure.	302	NO
2. Service planning has not helped improve the council's effectiveness. (Service planning has helped improve the council's effectiveness.)	308	YES
3. Restructuring the council into service units has not led to changes in working practices. (Restructuring the council into service units has led to changes in working practices.)	413>207	YES
4. The service planning process has improved communications throughout the council.	102	NO
5. Service planning has not helped the council create mechanisms for performance management. (Service planning has helped in the creation of mechanisms for performance management.)	506>201	YES
6. The service planning process does not require commitment from all those involved in the process. (The service planning process requires commitment from all those involved in the process.)	214>110/ 515>110/ 516>110	YES
7. Service plans result in the development of clear aims and objectives for service units.	310>311> 507>304	NO
8. Commitment to the service planning process relies, in part, on the feedback provided by service units to the council.	304>102> 110	NO
9. The service planning process has required the council to draw up mission statements/ key principles/ position statements.	622	NO
10. Commitment to service planning is demonstrated by the uptake of mission statements/ key principles/ position statements.	110>622	NO
11. The service planning process has not resulted in a higher quality of service provision. (The service planning process has resulted in a higher quality of service provision.)	309	YES
12. The service planning process has led to performance reviews which help to maximise efficiency.	201>308	NO
13. The service planning process does not require support from everyone throughout the council. (The service planning process requires support from everyone throughout the council.)	211	YES
14. Service planning has created shared resources which give the council the flexibility it requires to meet needs.	106>111> 107	NO
15. A key part of the service planning process is the monitoring and evaluation of targets.	704	NO
16. Creation of a shared purpose within the council is not a key element of the service planning process. (Creation of a shared purpose within the council is a key element of the service planning process.)	101	YES
17. The service planning process is 'owned' by all members of the council.	504	NO
18. Important principles (such as openness and honesty) are recognised by everyone in the service planning process.	615>217	NO
19. The service planning process does not require all the interested parties (both within and beyond the council) to be consulted about a particular issue. (The service planning process requires all the interested parties (both within and beyond the council) to be consulted about a particular issue.)	615>501	YES
20. The service planning process has not made the council more responsive to change. (The service planning process has made the council more responsive to change.)	619>601	YES
21. In terms of its outcomes, the benefits of the service planning process outweigh any problems or difficulties.	902/ 616	NO
22. One of the key benefits of the service planning process is that it has fostered learning throughout the council.	312	NO
23. Service planning has not improved my own working environment. (Service planning has improved my own working environment.)	305	YES
24. Politics within the council have not had a significant influence on the service planning process. (Politics within the council have had a significant influence on the service planning process.)	203	YES
25. Service planning is aimed at ensuring the council maximises benefits for all members of the community.	103	NO
26. Pressure to provide 'Best Value' is not an important driver of the service planning process. (Pressure to provide 'Best Value' is an important driver of the service planning process.)	314	YES

## APPENDIX S: *WBC*: Respondents Comments

**Q. 2.27: If you would like to add any further comments about the service planning process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.**

1. The main benefit as far as I am concerned with service planning is listing tasks and objectives for the current and future years, helping to ensure they aren't left or forgotten
2. Key communication problems are now emerging within the organisation as a whole although increasingly we are no longer looking at the 'bigger picture' i.e. the organisation as a whole. Also most decisions made within the council are now down to the service unit managers discretion; which can result in double standards or contradictions depending on the SUM's personal view.
3. Many staff are not particularly interested / do not have an in-depth knowledge of the process. Much of the literature / aims have been worded too vaguely. Need to be clear about exactly what is meant by "service planning". Misson statements are too general & not properly defined.
4. I agree with the ideals & principles of the S.P. process. However, I don't think our performance has been monitored or considered by members. This then takes the motivation out of trying to stick to the Service Plan. Enthusiasm seems to have dwindled from all corners (members, executive & staff). I hope it doesn't become a 'lip-service' charade each year as it takes a lot of work to create the plans.
5. I feel that service planning is at a strategic level and more should be done at the 'front office' operational level to incorporate best value at efficiency savings.
6. The Service Planning Process is very beneficial in that it pulls the team together and involves everyone in planning for the future objectives. However there is a danger of division and puralialism in that Service Units are only intent on running "their own show" in their own way to the exclusion of the complete corporate identity. There also does not seem to be anything to indicate how this is more successful than the old corporate identity and what savings have been achieved!
7. I do not consider the extra duties and responsibilities of the service unit managers was adequately rewarded (only a v. small pay nse)
8. The service committees have not had an effective input into Service Plans. The comments of the performance review panels should have been made by the service committees.
9. Qn 24 Definition of Politics Party politics - no influence. 'Politics' in agreeing a 'manifesto' - yes. This was translated into Position Statements that 'drive the SP Process. Qn 11 - yet to be measured / Time needed. Qn 19 - Not all / always at this stage.

**Q4.6: Finally, if you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.**

1. Questions on cognitive style are open to interpretation. It may be better to relate the questions to more specific examples. I think that clarity is important -> both within this questionnaire and within the service planning process!
2. Too many of the questions were asked in a 'negative' style, which can prove confusing. Eg. Sec 2, Q20 Why could this question not have been worded: "The service planning process has made the council more responsive to change." ? It would have made answering a lot easier, rather than trying to work out all the double negatives!
3. I feel at a fundamental level there is a lack of respect within the authority which is devisive and on an individual level - reduces my self esteem and the confidence required to get on and improve the function of the business in which I work. This is a real shame for me personally and I wonder if others feel the same?
4. I think you should avoid using the word not in statements as it can lead to confusion in answering this questionnaire. Or was this intended??
5. I believe the organisation is in danger of accepting every new management technique which happens our way without analysing the benefits. Not enough effort is put into ascertaining the pulic perception/aspiration/needs - i.e. the organisation is not customer/client orientated. Front line services are "poor relations" to the support services.
6. The questions are double sided, in my job I need flexibility.
7. In view of the Service Planning Process and forecoming VCT, the staff did wish to be involved in planning and "owning" the business/service plan and all are taking a very proactive role in this respect
8. The double negatives (in Section 2 mainly) were really quite disorientating. Not conducive to an easily answered questionnaire.
9. The service planning process has yet to demonstrate its true worth. Some would suggest it has fragmented communication and co-operation between Service Units i.e. There are 17 Service Units to replace 5 Departments. A strong and effective Executive Core demonstrating leadership and real commitment to the underlying principles of the Service Planning Process is vital to ensuring a corporate sense of direction.
10. I am proud to work for [*WBC*], and glad to see it working with P. Univ. on topics such as this!
11. I have found difficulty in providing replies based upon the "organisation", which I feel is remote to, or has different problems to those faced by my service unit. I could have completed 2 surveys to give a clearer picture for you.
12. Cognitive Style Some 'problems take a different reaction to others - hence ?

## APPENDIX T

### Revised Research Questionnaire (Version 2: *SWCC*)

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# ***QUESTIONNAIRE: LEARNING IN SOUTH-WEST COUNTY COUNCIL***

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This questionnaire looks at three aspects of your working environment. Section 1, looks at your's and Southwest County Council's learning, Section 2: looks at the Budget-setting Process, and Section 3 assesses your cognitive (thinking) style. Work quickly and carefully through the questionnaire responding to the statements in each section as appropriate. Your responses will be treated in total confidence. This research is being undertaken by David Spicer from the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School, and is fully supported by Southwest County Council.

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## SECTION 1: LEARNING STYLE

Below are 34 statements about how you and your organisation learn. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "I am often on the lookout for new ideas from any source," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	1	2	3	4	5
2. As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	1	2	3	4	5
3. I am often on the lookout for new ideas from any source.	1	2	3	4	5
4. This organisation's strategy and policy are prescribed by senior managers. No one else can really have a say.	1	2	3	4	5
5. This organisation doesn't encourage or use feedback from employees or customers on how well it works.	1	2	3	4	5
6. I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	1	2	3	4	5
7. This is an open organisation and as much information as possible is made available to employees.	1	2	3	4	5
8. Risk taking and experimentation is rarely encouraged and rewarded in this organisation.	1	2	3	4	5
9. I don't really need to improve my working practices in order to increase my efficiency and effectiveness.	1	2	3	4	5
10. I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	1	2	3	4	5
11. This organisation has a limited range of very efficient working practices that it sticks to.	1	2	3	4	5
12. I dislike experimenting with new and novel ways of working.	1	2	3	4	5
13. Employees are discouraged from experimenting with new and novel ways of working.	1	2	3	4	5
14. Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	1	2	3	4	5
15. There is two way communication between employees of all levels about what this organisation's doing and where it's going.	1	2	3	4	5
16. This organisation tends not to look out for new ideas from suppliers, customers and competitors.	1	2	3	4	5

5 = strongly agree					
4 = agree					
3 = neutral (neither agree or disagree)					
2 = disagree					
1 = strongly disagree					
17. Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	1	2	3	4	5
18. I put forward ideas about policy, even if they challenge senior managers' views.	1	2	3	4	5
19. I seldom try to communicate my decisions and their outcomes throughout the organisation	1	2	3	4	5
20. The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	1	2	3	4	5
21. As an organisation, we tend not to encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	1	2	3	4	5
22. I rarely need to change my plans once I've made them.	1	2	3	4	5
23. My working practices are fixed and I rarely have any need to change them.	1	2	3	4	5
24. My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	1	2	3	4	5
25. I hardly ever challenge the organisation's mission, values and assumptions.	1	2	3	4	5
26. As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	1	2	3	4	5
27. I regularly experiment with new ways of working.	1	2	3	4	5
28. This organisation tends not to allow its broad strategy to be continuously challenged and re-interpreted.	1	2	3	4	5
29. Constructive feedback is given to all employees on how they're doing in their jobs.	1	2	3	4	5
30. Employees are encouraged and supported in undertaking job-related training and development activities.	1	2	3	4	5
31. Employees who've experienced learning, training or development are encouraged to share the learning with colleagues.	1	2	3	4	5
32. People share their knowledge and resources.	1	2	3	4	5
33. The organisation's goals and strategy are made clear to all employees.	1	2	3	4	5
34. People aren't afraid to voice differing opinions on organisational matters and conflicts are worked through constructively.	1	2	3	4	5

Please continue to Section 2 below.

## SECTION 2: THE BUDGET-SETTING PROCESS

Below are 26 statements about the Budget-setting Process in Southwest County Council. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "Communication is not an on-going part of the budget-setting process," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion.

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
1. There is a growing gap between the resources that the council has available and the needs it must fulfil.	1	2	3	4	5
2. Communication is not an on-going part of the budget-setting process.	1	2	3	4	5
3. National government does not have a significant impact on the funds available for the council's budget.	1	2	3	4	5
4. The potential effects upon council tax payers are recognised throughout the budget-setting process.	1	2	3	4	5
5. The Senior Management Board do not play an significant role in the budget-setting process.	1	2	3	4	5
6. There has been a move by the council to deal with budgetary issues, such as financial management, savings plans and budget strategy on a three year as opposed to one year timetable.	1	2	3	4	5
7. There is no argument for treating Southwest's budget as a special case when compared with the budgets of other counties.	1	2	3	4	5
8. The standard spending assessments provided by national government are not a major factor controlling the council's spending plans.	1	2	3	4	5
9. Communication between all those involved in the process is critical to setting the budget.	1	2	3	4	5
10. The major aim of the budget-setting process is to maintain effective service delivery across the council.	1	2	3	4	5
11. The council provides a number of services which are not explicitly recognised by the public.	1	2	3	4	5
12. The cost of inflation varies between departments and units depending upon the nature of the service they provide.	1	2	3	4	5
13. The spending budget represents the agreed distribution of funds between the departments and units of the council.	1	2	3	4	5
14. Pressure to provide 'best value' is not a part of the budget-setting process.	1	2	3	4	5

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
15. Traditional service managers and departments are supported by a number of internal business units within the council.	1	2	3	4	5
16. Service committees are not influenced by national politics.	1	2	3	4	5
17. Negotiation and compromise is required between service committees in order to ensure that an effective service is maintained.	1	2	3	4	5
18. Departments and units within the council have to respond to and operate under sets of pressures which are unique to them.	1	2	3	4	5
19. The impact of internal service providers (such as personnel and information services) on the budget-setting process is clearly understood by the rest of the council.	1	2	3	4	5
20. The elected members of the council are not influenced in their decisions about the budget by local political factors.	1	2	3	4	5
21. Ownership of the spending budget across the council is built by its communication throughout the council.	1	2	3	4	5
22. The County Treasurer does not play a major role in the budget-setting process across the council.	1	2	3	4	5
23. The budget-setting process results in spending targets for departments and units which aim to minimise the gap between needs and resources across the council.	1	2	3	4	5
24. The council's officers provide professional and expert assessment of the options available in the budget-setting process.	1	2	3	4	5
25. There exists within the council an internal market, serviced by a range of internal business units.	1	2	3	4	5
26. There are no significant differences in the way the budget-setting process operates within the council's departments and units.	1	2	3	4	5

27. If you would like to add any further comments about the budget-setting process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.

Please continue to Section 3 below.



### SECTION 3: COGNITIVE STYLE

People differ in the ways they think and in the ways they structure and use knowledge and information. Below are 38 statements designed to identify your thinking style (sometimes called 'cognitive style'). If you think that a statement is true about yourself, answer *T*. If you think that its false, answer *F*. If you are uncertain whether it is true or false, answer *?*. Again, there are no right or wrong answers, be honest and give the answer that comes closest to your own opinion of yourself. Work quickly through it by ticking the appropriate box next to each statement.

<i>T = true; ? = uncertain; F = false</i>	<i>T</i>	<i>?</i>	<i>F</i>
1. In my opinion rational thought is the only realistic basis for making decisions.			
2. To solve a problem, I have to study each part of it in detail.			
3. I'm most effective when my work involves a clear sequence of tasks to be performed.			
4. I have difficulty in working with people who 'dive in at the deep end' without considering the finer aspects of the problem.			
5. I am careful to follow rules and regulations.			
6. I avoid taking a course of action if the odds are against its success.			
7. I am inclined to scan through written documents rather than read them in detail.			
8. My understanding of a problem tends to come more from thorough analysis than flashes of insight (i.e. seeing the answer quickly and easily).			
9. I try to keep a regular routine in my work.			
10. The kind of work I like best is that which requires a logical, step by step approach.			
11. I rarely make 'off the top of the head decisions'.			
12. I prefer chaotic action to orderly inaction.			
13. Given enough time, I would consider every situation from all angles			
14. To be successful in my work, I find that it is important to avoid hurting other people's feelings.			
15. The best way for me to understand a problem is to break it down into its constituent parts.			
16. I find that adopting a careful, analytical approach to making decisions takes too long.			
17. I make the most progress when I take calculated risks.			
18. I find that it is possible to be too organised when performing certain kinds of tasks.			
19. I always pay attention to detail before I reach a conclusion.			
20. I make many of my decisions on the basis of intuition (i.e. feelings rather than facts).			
21. My philosophy is that it is better to be safe than sorry.			
22. When making a decision, I take my time and thoroughly consider all the relevant factors.			
23. I get on best with quiet thoughtful people.			

<i>T = true; ? = uncertain; F = false</i>	<i>T</i>	<i>?</i>	<i>F</i>
24. I would rather my life was unpredictable than it followed a regular pattern.			
25. Most people regard me as a logical thinker.			
26. To fully understand the facts I need a good theory.			
27. I work best with people who are spontaneous.			
28. I find detailed, methodical work satisfying.			
29. My approach to solving a problem is to focus on one part at a time.			
30. I am constantly on the look out for new experiences.			
31. In meetings I have more to say than most.			
32. My instinctive feelings are just as good a basis for decision making as careful analysis.			
33. I am the kind of person who casts caution to the wind.			
34. I make decisions and get on with things rather than analyse every last detail.			
35. I am always prepared to take a gamble.			
36. Formal plans are more of a hindrance than a help in my work.			
37. I prefer ideas rather than facts and figures.			
38. I find that 'too much analysis results in paralysis'.			

Cognitive style is an important aspect of how we learn. Many people have found a knowledge of their style to be very beneficial for their self development. Individual feedback on your style is available. If you would like to know what your cognitive (thinking) style is, please include your details in the box below. This will in no way affect the confidentiality of your responses and will only be used to return your cognitive style assessment.

NAME:
WORK ADDRESS:

Please continue to Section 4 below.

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**SECTION 4: RESPONDENT DETAILS**

1. What is your age? (Please tick)..... ☐ Under 30 ☐ 31-40  
☐ 41-50 ☐ 51-60 ☐ Over 60

2. What is your gender? (Please tick)..... ☐ Male ☐ Female

3. How many years have you worked for this organisation?.....

4. What is your department/ unit?.....

5. Job level?..... ☐ senior manager ☐ first line manager  
☐ middle manager ☐ support staff

or:  (own description)

6. Finally, If you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.

**THANK YOU FOR TAKING THE TIME TO  
COMPLETE THIS QUESTIONNAIRE**

**Please return your questionnaire in the FREEPOST envelope provided  
to: David Spicer, University of Plymouth Business School, Drake Circus,  
Plymouth, PL1 1BR. Tel. 01752 232881 Fax. 01752 232853.**

## APPENDIX U:

*SWCC: Concepts Included in the MMQ-BSP*

<i>MMQ-BSP Item</i>	<i>Concept(s)/ Relationship(s) represented</i>	<i>Reversed?</i>
1. There is a growing gap between the resources that the council has available and the needs it must fulfil.	117	NO
2. Communication is not an on-going part of the budget-setting process. (Communication is an on-going part of the budget-setting process.)	121>511	YES
3. National government does not have a significant impact on the funds available for the council's budget. (National government has a significant impact on the funds available for the council's budget.)	109>201	YES
4. The potential effects upon council tax payers are recognised throughout the budget-setting process.	318	NO
5. The Senior Management Board do not play an significant role in the budget-setting process. (The Senior Management Board play an significant role in the budget-setting process.)	715	YES
6. There has been a move by the council to deal with budgetary issues, such as financial management, savings plans and budget strategy on a three year as opposed to one year timetable.	311	NO
7. There is no argument for treating Cornwall's budget as a special case when compared with the budgets of other counties. (There is a strong argument for treating Cornwall's budget as a special case when compared with the budgets of other counties.)	207	YES
8. The standard spending assessments provided by national government are not a major factor controlling the council's spending plans. (The standard spending assessments provided by national government are a major factor controlling the council's spending plans.)	206>201	YES
9. Communication between all those involved in the process is critical to setting the budget.	121>901	NO
10. The major aim of the budget-setting process is to maintain effective service delivery across the council.	111	NO
11. The council provides a number of services which are not explicitly recognised by the public.	214/208/ 209	NO
12. The cost of inflation varies between departments and units depending upon the nature of the service they provide	205>218	NO
13. The spending budget represents the agreed distribution of funds between the departments and units of the council.	104>201	NO
14. Pressure to provide 'best value' is not a part of the budget-setting process. (Pressure to provide 'best value' is important in the budget-setting process.)	221	YES
15. Traditional service managers and departments are supported by a number of internal business units within the council.	825	NO
16. Service committees are not influenced by national politics. (Service committees are influenced by national politics.)	109>217	YES
17. Negotiation and compromise is required between service committees in order to ensure that an effective service is maintained.	217>108> 111	NO
18. Departments and units within the council have to respond to and operate under sets of pressures which are unique to them.	405	NO
19. The impact of internal service providers (such as personnel and information services) on the budget-setting process is clearly understood by the rest of the council. (The impact of internal service providers (such as personnel and information services) on the budget-setting process is not understood by the rest of the council.)	813	YES
20. The elected members of the council are not influenced in their decisions about the budget by local political factors. (The elected members of the council are influenced in their decisions about the budget by local political factors.)	112>217	YES
21. Ownership of the spending budget across the council is built by its communication throughout the council.	121>122	NO
22. The County Treasurer does not play a major role in the budget-setting process across the council. (The County Treasurer plays a major role in the budget-setting process across the council.)	621	YES
23. The budget-setting process results in spending targets for departments and units which aim to minimise the gap between needs and resources across the council.	117>215> 218	NO
24. The council's officers provide professional and expert assessment of the options available in the budget-setting process.	514>219	NO
25. There exists within the council an internal market, serviced by a range of internal business units.	816>814	NO
26. There are no significant differences in the way the budget-setting process operates within the council's departments and units. (There exist significant differences in the way the budget-setting process operates within the council's departments and units.)	415>201/ 201>103	YES

## APPENDIX V

### Letter Supporting Research Questionnaire (*SWCC*)

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: d.spicer@plymouth.ac.uk

Dear colleague,

We are writing to ask for your help with the enclosed questionnaire which looks at learning in Southwest County Council. This questionnaire is the second part of ongoing research being conducted by the *Group for Organisational Learning Development (GOLD)* at the University of Plymouth Business School and Southwest County Council and we'd be grateful for your assistance. The questionnaire consists of three sections. Section 1 looks at how you feel you and the county council learn, Section 2 looks at the the budget setting process, and Section 3 will assess your cognitive (or thinking) style. An assessment of these issues will be beneficial to the council's development and continued success, and your opinions are important to this. There is also an opportunity for you to get feedback on your own cognitive style, an awareness of which will be beneficial to your personal development.

The questionnaire should take around 20 minutes to complete, and your responses will be entirely confidential. A Freepost envelope is enclosed for you to return your completed questionnaire.

If you have any questions, please contact the project leader, David Spicer at the address shown above. Thank you in advance for your time and help.

Yours sincerely,

John Smith [name changed].  
*Head of Personnel Services*  
Southwest County Council.

David Spicer.  
*Group for Organisational Learning Development*  
University of Plymouth Business School.

## APPENDIX W

### *OILLs-1 Test-Re-Test Questionnaire (SWCC)*

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## ***LEARNING STYLE QUESTIONNAIRE***

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This questionnaire contains 34 statements about how you and Southwest County Council learn. Please respond to these by circling one number for each statement according to how accurate you feel the statement is. For example, if you agree that "I am often on the lookout for new ideas from any source," circle '4', if you strongly disagree circle '1'. There are no right or wrong answers, work quickly giving your immediate reaction, and circle the number that most closely corresponds with *your* opinion. By completing this repeat questionnaire, you will be helping us ensure the validity and accuracy of the information provided for the council. Your responses will be treated in total confidence. This research is being undertaken by David Spicer from the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School, and is fully supported by Southwest County Council.

---

5 = strongly agree					
4 = agree					
3 = neutral (neither agree or disagree)					
2 = disagree					
1 = strongly disagree					
1. We're reluctant to try out new ways of working because we're not the sort of organisation that can take risks.	1	2	3	4	5
2. As an organisation, we often look for new ways of working to replace any inefficient and ineffective work methods we currently use.	1	2	3	4	5
3. I am often on the lookout for new ideas from any source.	1	2	3	4	5
4. This organisation's strategy and policy are prescribed by senior managers. No one else can really have a say.	1	2	3	4	5
5. This organisation doesn't encourage or use feedback from employees or customers on how well it works.	1	2	3	4	5
6. I'm reluctant to try out new ways of working because I'm not the sort of person who likes to take risks.	1	2	3	4	5
7. This is an open organisation and as much information as possible is made available to employees.	1	2	3	4	5
8. Risk taking and experimentation is rarely encouraged and rewarded in this organisation.	1	2	3	4	5
9. I don't really need to improve my working practices in order to increase my efficiency and effectiveness.	1	2	3	4	5
10. I prefer to have strategy and policy handed down to me by management rather than have a say in its creation.	1	2	3	4	5
11. This organisation has a limited range of very efficient working practices that it sticks to.	1	2	3	4	5
12. I dislike experimenting with new and novel ways of working.	1	2	3	4	5
13. Employees are discouraged from experimenting with new and novel ways of working.	1	2	3	4	5
14. Ideas from all employees are listened to and acted on to change organisational policy even if they challenge senior managers' views.	1	2	3	4	5
15. There is two way communication between employees of all levels about what this organisation's doing and where it's going.	1	2	3	4	5
16. This organisation tends not to look out for new ideas from suppliers, customers and competitors.	1	2	3	4	5
17. Ideas about changing the organisation's policy are listened to as long as they don't challenge the views and values of senior managers.	1	2	3	4	5
18. I put forward ideas about policy, even if they challenge senior managers' views.	1	2	3	4	5
19. I seldom try to communicate my decisions and their outcomes throughout the organisation	1	2	3	4	5
20. The organisation's broad strategy is quite firmly fixed and undergoes only minor modifications.	1	2	3	4	5

	5 = strongly agree				
	4 = agree				
	3 = neutral (neither agree or disagree)				
	2 = disagree				
	1 = strongly disagree				
21. As an organisation, we tend not to encourage employees and customers to let us know if we're going wrong in the way we do things and to let us know how we can improve.	1	2	3	4	5
22. I rarely need to change my plans once I've made them.	1	2	3	4	5
23. My working practices are fixed and I rarely have any need to change them.	1	2	3	4	5
24. My tried and tested ways of working are usually fine. I have no need to incorporate new ideas.	1	2	3	4	5
25. I hardly ever challenge the organisation's mission, values and assumptions.	1	2	3	4	5
26. As an organisation, we do have set working practices, but we can change these in pursuit of greater efficiency if need be.	1	2	3	4	5
27. I regularly experiment with new ways of working.	1	2	3	4	5
28. This organisation tends not to allow its broad strategy to be continuously challenged and re-interpreted.	1	2	3	4	5
29. Constructive feedback is given to all employees on how they're doing in their jobs.	1	2	3	4	5
30. Employees are encouraged and supported in undertaking job-related training and development activities.	1	2	3	4	5
31. Employees who've experienced learning, training or development are encouraged to share the learning with colleagues.	1	2	3	4	5
32. People share their knowledge and resources.	1	2	3	4	5
33. The organisation's goals and strategy are made clear to all employees.	1	2	3	4	5
34. People aren't afraid to voice differing opinions on organisational matters and conflicts are worked through constructively.	1	2	3	4	5

## THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

**Please return your questionnaire in the FREEPOST envelope provided to: David Spicer, University of Plymouth Business School, Drake Circus, Plymouth, PL1 1BR. Tel. 01752 232881 Fax. 01752 232853.**



## APPENDIX X

### Letter Supporting Test-Re-Test Questionnaire (SWCC)

David Spicer  
University of Plymouth Business School  
Drake Circus  
Plymouth PL4 8AA  
Tel: 01752 232881  
E-mail: d.spicer@plymouth.ac.uk

Dear Sir/Madam,

I am writing to ask for your help with the enclosed questionnaire which may be familiar to you. It looks at learning in Southwest County Council. This questionnaire is the final part of ongoing research being conducted by the *Group for Organisational Learning Development* (GOLD) at the University of Plymouth Business School and the council and we'd be grateful for your assistance. The purpose of sending it to you again is to help assess the validity and accuracy of the questionnaire you completed earlier this year. It consists of one section, which looks at how you feel you and the council learn. By completing this repeat questionnaire, you will help us increase our confidence in the information produced through this assessment, and the feedback which will be provided for the council.

The questionnaire should take no more than ten minutes to complete, and your responses will be entirely confidential. A Freepost envelope is enclosed for you to return your completed questionnaire.

If you have any questions, please contact me. Thank you in advance for your time and help.

Yours sincerely,

David Spicer.  
*Group for Organisational Learning Development* (GOLD)  
University of Plymouth Business School.

## APPENDIX Y: *SWCC*: Respondents Comments

**Q. 2.27: If you would like to add any further comments about the service planning process, particularly if you feel that any aspects of the process have not been covered above, please use the space below.**

1. Internal service providers do not seek feedback on the quality of service provided or justify costs to that service. There is no internal market and use of other service providers is restricted increasing costs and reducing efficiency. Senior managers are often not trained and not qualified to set budgets. There should be regular training and regular communication for senior managers.
2. Service delivery is affected as much by accountancy practices as it is by budget.
3. Haven't a clue how the budget setting process work.
4. Don't know about the budget setting process for the council. I only know about this unit.
5. I know very little about the budget setting process so I'm not sure how useful my answers will be.
6. I know very little about the budgets - perhaps *SWCC* staff should be told more?
7. The variation of "financial responsibility" between the various unit is such that a global set of questions cannot properly cover each element - the answers for social services will be markedly different from those for highways
8. In my opinion the budget is determined by the Elected Members and Senior Management Boards (advised by the Treasurer), taking into account: a. Statutory obligations b. Political expediency c. Available resources. Middle and Junior members of staff may provide information but do not feature, in the budget setting process.
9. Not party to budget-setting process and have little knowledge.
10. Budget settings seems to follow a historic path rather than reexamining the current needs. It must at some point be necessary to reexamine some of the budget requirements and update the formulas by which they are set.
11. We are not consulted on how our budget is set. It would be helpful to be given information so that we can be better informed when responding to questionnaires such as these.
12. That, budgets are often dictated by personal and tradition factors as much as an objective assessment of what is needed in the current political and economic context.
13. In my opinion some committees i.e. library - for youth etc. are poor relations with regards to expenditure to building maintenance.
14. Budgets tend to be set so they work 'on paper' but the constant shedding of posts, in reality, have led to difficulties. If you reduce the workforce to the bare minimum it looks good 'on paper' and will work if all workers remain in situ but take one or two out for sickness, holiday etc. and problems occur. It is now a constant battle to achieve our goals.
15. I believe that the budget-setting process owes as much to political pressures as it does to departmental needs. Whilst I believe *SWCC* does an excellent job in meeting local needs, its motives for budgetary decisions sometimes reflect the pressure it wishes to apply to national government.
16. Units within Departments can't effectively plan ahead. "Best Value" is only being played with and then with strange projects?!
17. As capital budgets can be rolled into following financial years in decisive spenders (like [other department]) can tie up approved capital allocations.
18. at my level I have no input to the process which is apparently largely politically controlled.
19. I am not fully aware of the chief officer and senior management processes prior to my involvement in the budgets allocated for my unit.
20. Eventually, officers, members and the public will have to unite to loosen the straps on the straight-jacket of central government's direction and control of service levels/ income generation, to allow more genuinely local discretion. The service is at the point where directives as to service levels are impossible to be met within the allowed income raisable, both being set centrally.
21. The amount of 'monies' taken by departments - should be used by that department e.g. fines in libraries.
22. Non-statutory work of the Council is under-valued in cases where the Council's funding levers large external grants for important services.
23. budget setting appears to be an annual crisis management exercise, due to inadequate S.S.A. this creates, or leads to, draining of resources from non statutory to statutory functions, regardless of efficacy of former. Doesn't appear to be long-term strategy for budget allocations and planning for long or even medium term change.
24. I am not at a level which would give first hand knowledge of many of these issues.
25. The overall aims of the Council are sound, but the budget setting to achieve these aims are hampered by the traditional jealousies between different departments. The aims are not reflected in the concomitant budget allocations across the departments.
26. A "Hung County Council" causes problems.
27. most of the Questions asked here are outside the scope of my knowledge.
28. Not part of my field of work so have very little knowledge of budget setting.
29. I have no input in the budget setting process and therefore most of the above answers are neutral.
30. No real available definitions of 'value' or means to indicate value.
31. I have very little knowledge about the budget-setting process being remote from it geographically and in terms of my work.
32. I have very little knowledge of how budgets are set within *SWCC*. I have had no induction training. Any letters, memos from management either do not address the issue or don't make sense.
33. Re.Q. 20 members are definitely politically motivated and are largely unable to negotiate and compromise.

34. No mention of external funding and how effects/ boosts/ assists/ etc. internal budgeting.
35. There would appear to be little understanding of the concept of 'Equality of opportunity' in some budget allocations in spite of declared adherence.
36. Information over the past 2 years has been minimal. We are not fully aware of the overall plan and therefore how it affects us as employees.
37. One area that should be addressed is the financial year end budget capping problems. Perhaps this will be addressed by Best value?
38. I rarely got any information at my level regarding the county council's budget setting aims etc.
39. The budget setting process is not communicated to members of staff in sufficient detail as to answer the above questions - I have not even been on the SWCC induction course yet. (I have been here 8 and a half years!)
40. As an employee of [department] and watching and noticing the spending of Area supervisors who are in the first instance in control of their own budgets, I am concerned that these people do not fully understand the process they should be higher qualified and be able to spend their budgets more efficiently to get more jobs done for the same money therefore I think that these people with respect should leave the spending to the divisional surveyor who is fully aware of budgetary management.
41. Only that I am not involved in the budget-setting process, so found the statements in this section difficult to agree or disagree with.
42. Most of these responses are assumptions on my part I feel that I am not consulted or party to the budget setting process.
43. Most staff are not part of any budget making process and aren't in a position to see or understand it. It is received from above.
44. There is little communication about the budget-setting process, hence the neutral answers.
45. Not having set budgets for this authority I am answering the questions with linseed knowledge of [Southwest County]'s procedures.
46. Not really involved with it.
47. As far as library resources are concerned there needs to be a clearly agreed and explicitly stated policy first, understood by councillors, officers and staff with discussion and communication taking place. There is no clear policy statement against which we can scrutinize our activities. We discuss things but with no clear objective in mind.
48. I do not have sufficient knowledge of the budget setting process to form a useful opinion in many of the questions.
49. Q1 - There are insufficient funds to cover minimum statutory duties in many areas - There are insufficient budget allowances to cope with reacting to public demands for service/ accountability/ disputes.
50. Lack of information on process passed down to individual units or departments. No real involvement or power to change things.
51. We need to explain further & more fully to central government that [Southwest County] does have more problems & different issues compared to other counties - infrastructure, old victorian schools, rural locations meaning longer travel distances, no localised industries & traditional ones failing. Only by explaining & using examples will we succeed in time for creating a unique & special case for greater funding.
52. Although I am an employee of the County Council and I am a budget holder, all the funding for which I am responsible comes from external sources. I am not part of the budget setting process and not directly affected by it. My responses recorded above are general impressions rather than certain knowledge that would result from direct involvement.

**Q4.6: Finally, if you have any comments you would like to add about your organisation in light of this questionnaire or about the questionnaire itself, please use the space below.**

1. I tend to find that, as an organisation, we are too defensive about our work. We ought to publicise the good work that we do (media advertising style) in order to influence and inform the public. This would also benefit morale within the organisation.
2. My colleague believes that these comments and questionnaires never remain confidential, hence he asked me to write his comment on mine. I hope you have fun reading the comments, I deal with many questionnaires and the comments are always a laugh.
3. Too much of a gap between councillors and workers.
4. I generally view the work and aspirations of my team as more progressive than most at County Hall. This may be a misconception. I would be concerned if I transferred to another department that opportunities to be creative would be lost.
5. I have no involvement or knowledge with regard to the budgeting process. In terms of well-targeted external training this is the best organisation I have ever worked for.
6. I find my own section of the organisation generally good in terms of policy & forward-thinking. However my general view of the whole authority is that it is often backward and not forward-thinking enough for example the IT in the authority is often poor and I don't feel the authority is fully tackling environmental sustainability issues.
7. The County Council is a mass of different cultures and values. Even within T&E, there are marked differences between attitudes of structures/ roads/ maintenance staff. When compared with social/ finance/ legal, the staff might come from a different world!
8. I think Local Authorities remain terribly bureaucratic. When it suits, they try to behave like (in the case of my work) a Consulting Engineer, but the fact that it is public rather stifles ambition. We are expected to provide a professional fee paid, profit sharing, BUPA, company car etc. Also our salaries are negotiated by a union which seems to care more about low paid workers in the wider public sector rather than professional specialists.
9. Regardless of opinions of employees decisions are made at committee level on policy and implementation which departments have to comply with. Communication is still a major problem within departments. Unfortunately.
10. My job is all about Admin Support and financial (Computer Based) Systems with Audit implications. To some extent much of what my staff and myself do, is constrained by financial regulations and computer deadlines. The organisation is inefficient in some ways (like Best Value) because of the time taken in compliance. That said there have been many changes of systems recently and in introducing those we have had to adapt a flexible approach and be responsive to new ways of working. Nothing in the Questionnaire Pt III on moral issues. These are important to me.
11. Training budgets within [department] are spent on the workforce. Management Development is almost nonexistent.

12. Decisions tend to be made for us - there is very little consultation e.g. [other department] will become an arms-length company of *Southwest County Council* but we were not given to opportunity to feed back our thoughts and concerns. There should be much more consultation of staff where important decisions affect them.
13. In light of parts I and II of the questionnaire my geographical isolation from the corporate nucleus needs to be taken into account.
14. Many of my maintenance ideas have and are being used by the county, However little or no recognition has been forthcoming, of late I use o receive "merit payments" for ideas and it was good to know that it was appreciated.
15. I found myself struggling at certain points when considering "the organisation". If I considered [department] as the organisation I would have answered some questions differently than for *SWCC* as a whole. I have therefore answered as if the organisation was *SWCC*.
16. Further to points raised under QUE. 27 I would add that after 18 years in local government I haven't seen such levels of stress and stress related illness as I do now.
17. I was unsure whether the question was asking me how it is intended that things should work or how they actually do in practice.
18. I consider that my organisation needs better IT back up than exists at present. There are too many network breakdowns possibly due to inadequate infrastructure.
19. Communication is a two way process, which seems to be a factor which is frequently ignored. There are lessons to be learned from experience and practicality rather than "book learning" or academic results.
20. Like many of the questions many of my answers are by instinct.
21. I found Section 1 difficult as the style of my unit is not representative of the organisation as a whole, so I have answered considering the whole of *SWCC*. It is hard to generalise about an organisation as units vary considerably. There have been no updates to the mission/ vision or even restatement of them. I believe here is no relationship between departmental goals and the last corporate statement. Budget setting is delegated in various levels of the organisation and it is quite difficult to judge the level of participation across the entire organisation Cognitive style - the results for me depend very much on the circumstances/ problems.
22. Things in local government seem to move exceedingly slow. A lot of personnel problems seem to be the result of poor management.
23. I am jointly responsible for 15 staff directly and 170 indirectly and manage a budget of nearly half a million, however the lines of communication to and from senior management about budget and policy can be confused, because for the different subject matters we cover we seem to be handled by a different senior manager.
24. I work in a marketing role which is not considered to be part of the 'core' of the departments work. Hence all my training is self instigated and funded.
25. The department with which the library has recently been integrated with tends to adopt a different form of management to what I am familiar with. I would say this is matrix & stripe management rather than traditional. Also staff seem to move around a lot and I find that difficult to keep up with.
26. Don't get involved with budgets.
27. I would have liked to see a few more questions regarding training and provision for C.P.D., as these aspects of being a S.W.C.C. employee are surely lacking at present.
28. Answers to section 2 not based on much personal knowledge or experience.
29. There is still a great reluctance on the part of the County Council to accept the principles of sustainability when it comes to the environment of the county. This principle should underpin everything that we do.
30. Although I am theoretically partly responsible for a budget and do make some financial decisions, most important decisions and juggling of money between budgets takes place at levels above me. This, I think, is fairly indicative of the way a big organisation with major political inputs like *SWCC* works. It is very centralised, I don't think middle management level input is encouraged and there is an increasing culture of conformity
31. Because of cuts in Budgets, staff, especially lower grades (scale 1 to scale 4) have been reduced. This has put pressure on the lower graded staff in the past. Pressures they are not paid to take. Also when staff who are grade 3,4, or 5 leave, their job descriptions are 're-written' and down-graded, usually to Grade 1 or 2. 'Stress' was never a problem before staff reductions.
32. A well-intentioned but hide-bound organisation with out-moded working practices and appallingly restricted communication systems. Needs to be nudged through the 20th Century before approaching the 21st. Many staff - because of geographical isolation - have never worked anywhere else and are far too set in their ways.
33. What a coincidence that I have been asked to do this questionnaire when the Library service is undergoing radical reorganisation!!
34. A lot of the questions are aimed at a high level than my current position.
35. Since February 98 the management style has changed considerably and the structure of the organisation is in a state of change. My answers have reflected this new style and situation.
36. The department has ceased to be a listening department
37. As a local authority contractor we have to use local authority procedures and employees and on occasions this is extremely expensive. I would prefer to see more sub contractors used at a cheaper rate therefore increasing profitability which at the end of the financial year would be better for [department] and as a lot of profits are ploughed back into [Southwest] county council (ever decreasing circles) it would be better for both organisations having equally as much turnover but less expenditure.
38. This has been difficult to complete due to a transfer of the Service in which I work from Social Services to the LEA in April 1998. I feel I am now in a different organisation with which I am not yet familiar. Analysis of my answers my display an ambivalence as I attempt to understand the new environment. One further point. In 1997 I obtained a Diploma in Management and an NVQ5 paid for by [Southwest County Council] and undertaken partly in work time. I have been very disappointed by the lack of response from the organisation to my achievements an learning. Apart from my immediate line manager, there has been no feedback at all. The Social Services Training Section contacted me in April as, from their records, I was still a candidate for NVQ4, although I had sent them a copy of my certificate (which noted my Portfolio as 'Excellent'). I put in a considerable amount of time and effort and I am left wondering what it was for organisationally.

39. As an individual with I am told flair and enthusiasm I am often 'hogtied' by a lack of strategy or policy from senior management which results in lost opportunities to this authority. If only this authority would set a clear strategy soon it would release staff out of growing cynicism and even mental inertia.
40. I feel that the "organisation" I work for does not consult me and my colleagues from time to time, however it appears to be on issues which I personally don't have any influence over. I always feel that there is more to the issues present to me/ us than the "organisation" is telling us.
41. There is a distinct lack of clear corporate plan or manifesto against which progress can be measured or activities be held accountable.
42. Life here seems to be a process of coping with the last bloody stupid decision whilst bracing oneself for the next one....it seems a process of constant change from one "new" idea to the next.....never followed up properly.....I'm a fairly 'instinctive' operator, but even I recognise the need for some forward planning - shame the management don't.....
43. I've only been in my post 2 months in 6 months time my answers may be different.
44. Working in an organisation which is business - lead has many pressures. Our organisation within the county council has been characterised by this for the time I have worked for them. Time to reflect - a precious commodity - is the most valuable asset absent.
45. We have only recently moved under Trading Standards Management. My answers were based on my former management - Transportation and Estates.
46. I know how my own small department works but have ever really become involved in the policies/ strategy of the "county council." I take n active involvement in shaping the way countryside access works but have no involvement in the wider picture. Because of this I found the first two sections of the questionnaire difficult to complete!
47. Although I've answered the first two sections (to the best of my ability) I feel that my jobs do not give me enough insight to be of real use to you. Especially regarding the Budget section!
48. In section 2 I do not know enough about the subject so I have answered neutral.
49. The 'sharp-end' parts of the organisation (dealing mostly with customers/ councillors) seem to be under high pressure, whilst there are still quiet old style 'backwaters' not sharing the same degree of responsibility/ duty/ accountability. This imbalance gets a bit frustrating!
50. As Registration officers we are statutory officers - the *SWCC* are obliged by National Govt to provide us as a service to the public, but we are not governed by *SWCC* in the work we do, nor indeed can we be hired or fired by *SWCC*.
51. The answers given in this questionnaire must be taken in context with my service with the authority (only 6 months) which means I have not seen a budget cycle through I have several years experience with other authorities which may have coloured my responses.
52. Most of these responses have been made as a *SWCC* employee. Questions relating to 'the organisation' would probably have been answered differently if 'the organisation' had been interpreted at the Adult Education Business Unit.
53. Although new working practices are being introduced and old ones revamped it is often because they are financially orientated and are often disadvantageous to the workforce & also demoralising. There is usually only enough time in a day to get your work done without having chance to introduce your own ideas or to talk them through with colleagues. These financial constraints are from central government & the county council makes do with the funding that it receives to its maximum ability.
54. I consider my organisation to be one which has built a successful structure from which it has been very successful in grasping opportunities to develop. The questionnaire required responses to be black or white, when the accurate picture is usually grey (or blue and gold!)
55. As we are a rapidly evolving service, newly created within the LEA on April 1st '98, it is difficult to respond in general terms.
56. Department doesn't not give enough thought for job satisfaction. It is very much management and employees in a them and us situation. This style of management has only happened in the last few years. Officer are often economical with information to members.