Construction of a Measure of an Organizational Sensemaking System and its Consequences for Organizational Performance

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Doctor of Philosophy of Management.

Statement of Original Research

I hereby certify that the work embodied in this thesis is the result of original research and has not been submitted for a higher degree to any other University or Institution.

(Signed) .....

Dedication

In loving memory of my mother, June Ann Guy

...who always valued what I had to say.

Acknowledgements

It would not have been possible to complete this research without the support of several people.

My heartfelt gratitude to John Stanton who persuaded, guided and trusted me to explore a topic personally meaningful to me. His grace and trust in my capabilities is a continuing source of inspiration and motivation.

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Abbreviations and Acronyms

ABS – Australian Bureau of Statistics

FTE – Full time equivalent

MIP – Market Information Processing

MO – Market Orientation

OL – Organization Learning

SM – Sensemaking

SMS – Sensemaking System

ABSTRACT

The marketing literature in recent times has focused on managements' use of information as an input to marketing strategy formulation. Market orientation, organization learning, market information processing in organizations, knowledge as an asset and information use for improved organizational performance have positioned marketing research at the forefront of inquiry about management practice in information intense environments. Some theorists maintain that organization learning and the information processing behaviours that underpin it are important facilitators of competitive advantage; with superior information processing capabilities, organizations should be able to interpret market information and formulate responses in a more timely manner than competitors, thus resulting in enhanced performance outcomes.

Information acquisition, dissemination behaviours and some organizational cultural and value-laden behaviours have been investigated in the literature, but the detailed organizational behavioural processes that filter information selected, interpreted and retained for future use have not been investigated. Organizational interpretation and memory behaviours are acknowledged to be hard to model and measure and have been referred to as the 'organizational black box'. This thesis addresses the 'organizational black box' of market information interpretation and memory behaviours in organizations.

It does this by using sensemaking (SM) theory to construct a measurement model of SM processes in organizations called a sensemaking system (SMS). The thesis shows that a SMS operates within organizations through the interdependent relationships of constructs concerned with organizational identity, organizational memory and social interaction. The thesis also shows that the SMS has a positive relationship with organizational performance outcomes.

CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND TO THE RESEARCH PROBLEM

Over the last two decades or so, the boundaries of marketing have broadened to encompass research areas focusing on managerial information use as an input to marketing strategy formulation. Research areas such as market orientation (MO) (Kohli and Jaworski 1990; Narver and Slater 1990), organizational learning (OL) (Day 2002; Baker and Sinkula 1999a), market information processing (MIP) in organizations (Moorman 1995), knowledge as an asset (Glazer 1991) and information use for improving organizational performance (Souchon, Cadogan, Procter and Dewsnap 2004) have positioned marketing research at the forefront of inquiry about management practice in information intense environments.

One of the areas of impact on the business literature occurred through MO theory, which has been instrumental in highlighting the importance of market information use for the effective strategic management of organizations. Several empirical studies of business organizations indicated that MO had a positive impact on their performance (Narver and Slater 1990; Jaworski and Kohli 1993; Kohli, Jaworski and Kumar 1993; Deshpande Farley and Webster 1993; Day and Nedugadi 1994; Moorman 1995). Similarly, important advances were made in conceptualizing some of the key capabilities revealed by market-oriented organizations, for example information processing capabilities (Day 1990; Kohli and Jaworski 1990, Webster 1992).

A focus on information processing capabilities led to research on how these could be further advanced through OL (Sinkula 1994; Baker and Sinkula 1999a). Because organizations are cognitive enterprises, understanding how they process market information is a necessary condition for understanding how they learn. Learning scholars maintain that OL and the information processing behaviours and capabilities - including organizational values -

that underpin OL, are important facilitators of competitive advantage (Hunt and Morgan 1996; Dickson 1996). This is achieved through behaviours and values that allow an organisation to process market information faster than its rivals, to act on that information and to continually improve its learning processes (Dickson 1996).

Information acquisition and generation, internal dissemination of market information and coordinated response and implementation are the fundamental operands of market-oriented organizations. However, the organizational behavioural processes that filter information selected, interpreted and / or retained for future use have not been investigated in the literature. Virtually all business research in this area assumes that market information is 'out there' in an objective sense waiting to be collected by organization members. Organizational interpretation and retention processes and their potential impact on the quality of information gathered, disseminated and coordinated for strategic response have not been accounted for.

Day (1994b) noted that success at MIP depends not just on the acts of acquiring, disseminating and responding to market information in a timely manner; it also depends on how such information is interpreted and what implications are drawn for current and future organizational actions. Information acquisition, dissemination and aspects of learning have been modeled and tested in an organizational setting, but interpretation and memory – past interpretations - are acknowledged to be hard to model and measure (Sinkula, Baker and Noordeweir 1997). Organizational memory exists in the collective knowledge of the organization and contains theories in use, shared mental models, information databases, formalized procedures and routines and cultural norms that guide behaviour (Slater and Narver 1995). Interpretation has been described as *"the process through which information is given meaning"* (Daft and Weick 1984 p. 294).

The making of meaning has been variously described as 'sensemaking' (Thomas, Clark and Gioia 1993), comprehending (Olsen 1978), interpreting

(Huber 1991), categorizing (Dutton and Jackson 1987), or elaborating on evoked information using an organization's memory (Hedberg 1981; Levitt and March 1988) and collective schema, or shared mental models (Day 1994b; Day and Nedugadi 1994). Consequent to the difficulty of modeling and measuring such abstract notions, very little empirical work exists, that models and tests interpretation. That which does exist, such as Gioia and Thomas (1996) who tested for interpretation of issues by management as strategic or political, and Thomas, Clark and Gioia (1993), who modeled and tested interpretation through a positive/negative gain/loss matrix, tests for categories of interpretation, rather than finely grained behaviours, systems and activities that would enlighten understanding about interpretation *in practice* in organizations. More importantly, no research currently exists that models and measures interpretation operating through organizational MIP behaviours like those espoused through MO and learning orientation research, nor links these behaviours to organizational performance outcomes.

One of the contributions of MO theory is arguably its usefulness to practitioners. While OL and MIP concepts have added considerably to understanding how organizations process market information, much of this discussion about learning, knowing and information processing issues is finessed in the literature: *"Creating a conducive learning environment cannot be done without commitment from the top"* (Senge 1990 p. 13); *"Learning organizations are guided by a shared vision that focuses the energies of organizational members on creating superior value"* (Slater and Narver 1995 p. 71); *"Organizations should examine and attempt to improve on their market information processing behaviours"* (Sinkula, Baker and Noordewier 1997 p. 315). The point is that much of the focus is philosophical and filled with sweeping metaphors rather than the *"gritty details of practice"* (Garvin 1993 p. 79).

The gritty details of managerial practice in terms of MIP, *viz* intelligence gathering, dissemination and response, are what initially imbued MO theory with so much appeal to both practitioners and theorists. This appeal has not

waned, as evidenced by the continual stream of MO empirical and theoretical research. However, while the initial concepts have been augmented to improve understanding of what is really occurring within organizations in terms of the operation of MIP, many of these augmentations to extant theory are macro conceptualizations rather than models that illustrate micro processes or the *"gritty details of practice"* (Garvin 1993 p. 79). Many researchers admit that these macro concepts consist of yet unexplored sub or micro processes (Day 2002; Sinkula, Baker and Noordeweir 1997; Slater and Narver 1995).

Discovering the micro processes through which organizations proceed when processing market information for the purpose of organizational performance, is crucial for understanding how MIP operates in organizations. A framework is required to subsume the emerging constructs that holistically make up the processing of market information in organizations. One such framework, sensemaking, has been emerging (Day 2002; Gioia and Mehra 1996).

Sensemaking (SM) offers a distinct paradigm for studying how people think and behave within organisations (Thomas, Clark and Gioia 1993). SM theory has the potential to inform MIP because it explicates in 'gritty detail', actual MIP behaviours and activities in organizations as well as the organizational context that impacts upon these activities.

Therefore, the purpose of this research, using SM theory as a focus, is to develop and test a holistic model of a sensemaking system (SMS) in organizations. This will explicate in finer detail the organizational information filtering and framing behaviours (interpretation and memory processes) as well as dissemination behaviours (called social interaction in SM theory) through which these occur. The research will also link the SMS to sensing (information acquisition behaviours) and response behaviours and evaluate the consequent relationships with organizational performance.

1.2 RESEARCH OBJECTIVE AND RESEARCH QUESTIONS

To determine how market information is processed for interpretation and memory through SM behaviours in organizations and how this is related to organizational performance.

The research objective is developed into the following research questions based on review of the relevant literature:

(1) how is SM operationalized in organizations?

(2) how is the SMS related to sensing ?

(3) how is the SMS related to organizational performance?

(4) how is the SMS related to organizational response?

The first part of the research task is to explore SM processes in organizations by qualitative means, such that a model of the operation of SM in organizations is developed. This model becomes the SMS. The second part of the research task is to test the measurement of the SMS model by quantitative means, to determine its composition and internal structure. The third part of the research task is to test, by quantitative means, the structural relationships of the SMS to other variables such as Sensing, Response and Performance.

The premise of this thesis is that interpretation and memory processes and subsequent action taken by the organization are a function of the operation of the organization's SMS. The SMS acts as a model of organizational SM processes. It is proposed that the SMS is made up of information processing exchanges – operating through social interactions of varied forms - between organizational actors. These information exchanges are filtered by perceptions of the organization's identity and memories thereby influencing issue interpretation and consequent organizational action. Implicit in this proposition is that the distinct dimensions of the SMS – identity, memory and social interactions - will have co-variation or feedback effects between each dimension. The feedback effects are based on SM theory's assertion (Weick 1969; 1995; 2001) that organizational identity filters information

attended to and acquired, which then impacts information selectively retained, which in turn influences future attention and acquisition. This cyclical processing of information occurs through a variety of social interaction processes in organizations also affecting qualities of information selected and retained. Figure 1.1 illustrates the proposed three-factor structure of the SMS model.

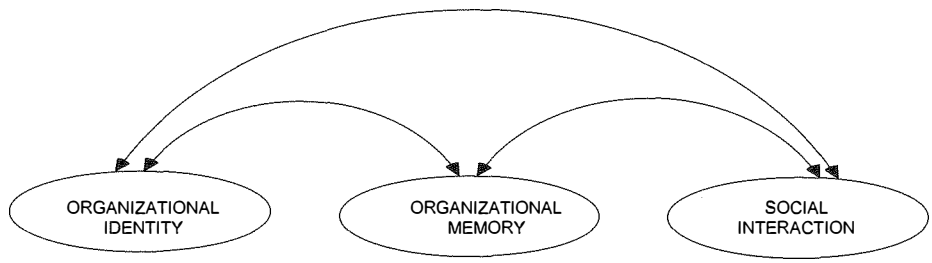

Figure 1.1 SMS– Proposed Three Factor Structure

It is also proposed that the SMS requires informational inputs that stimulate its function. These inputs are provided by Sensing, which are information acquisition activities. And as SM is the is the removal of sufficient ambiguity from information for action to ensue (Weick 1995), a higher level of SM in the organization, as measured by the SMS construct, leads to a reduction in ambiguity and therefore greater response capabilities with a positive impact on performance. Additionally, it is proposed that as the SMS may account for micro adaptations through changing task behaviours of organization members, the SMS will directly influence performance. And, as prior studies have found a direct influence between scanning behaviours and organizational performance, a direct link from sensing to performance is proposed. Figure 1.2 represents the model of the relationships between the SMS, sensing, response and performance.

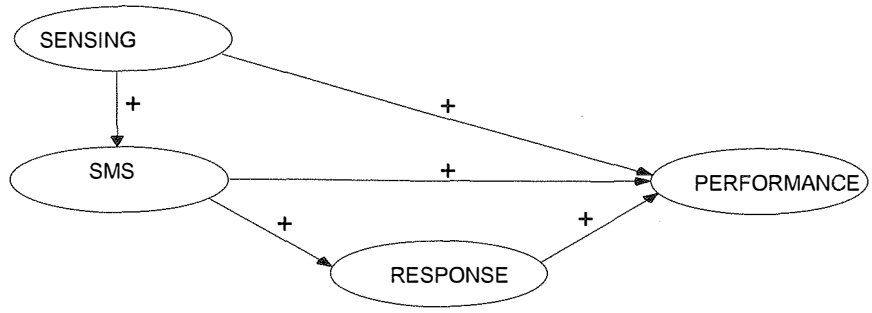

Figure 1.2 Hypothesized Structural Relationships between Sensing, SMS, Response and Performance.

1.3 DEFINITIONS USED IN THE RESEARCH

The key definitions fundamental to this thesis are highlighted in Table 1.1.

Table 1.1 Definitions of Constructs

Constructs	Definitions
Sensing	*Frequency of useful information gathered from all environmental sectors; customer, competitor, supply, technological, economic, social and regulatory (Daft, Sormunen and Parks 1988).*
SM - Sensemaking	*The processes of individual and organizational information processing that results in a reduction in ambiguity from which action may proceed (Daft and Wieck 1984; Weick 1995; 2001).*
SMS - Sensemaking System	*Hierarchical model of organizational information processing that creates organizational interpretation and memory; subsumes Organizational Identity, Organizational Memory and Social Interactions (Dutton and Dukerich 1991; Gioia and Thomas 1996; Turner 1988; Walsh and Ungson 1991; Wieck 1995).*
Organizational Identity	*Perceptions held by organizational members of the organization's communicated objectives and vision (Dutton and Dukerich 1991; Gioia 1998; Gioia and Chittipeddi 1991; Weick 1979).*
Organizational Memory	*Active recall of organizational members past experiences to inform present situations, role clarity through clear job and role expectations (Walsh and Ungson 1991; Homburg and Pflesser 2000).*
Social Interaction	*Interactions between organizational members having properties of frequency, richness and diversity and the physical surroundings that provide the context for these (Walsh and Ungson 1991; Turner 1988; Weick 1995).*
Response	*The organizational capacity to detect change in the marketplace and respond quickly to that change (Kohli and Jawoski 1990; Ranson, Hinings and Greenwood 1980).*
Performance	*Subjective rating of overall performance and*

	achievement of mission, strategic and financial objectives (Jaworski and Kohli 1993; Kohli and Jaworski 1990).

1.4 IMPORTANCE JUSTIFICATION AND CONTRIBUTION OF THE RESEARCH

Figure 1.3 outlines in graphic form the importance of the research, its justification and the contribution that it makes.

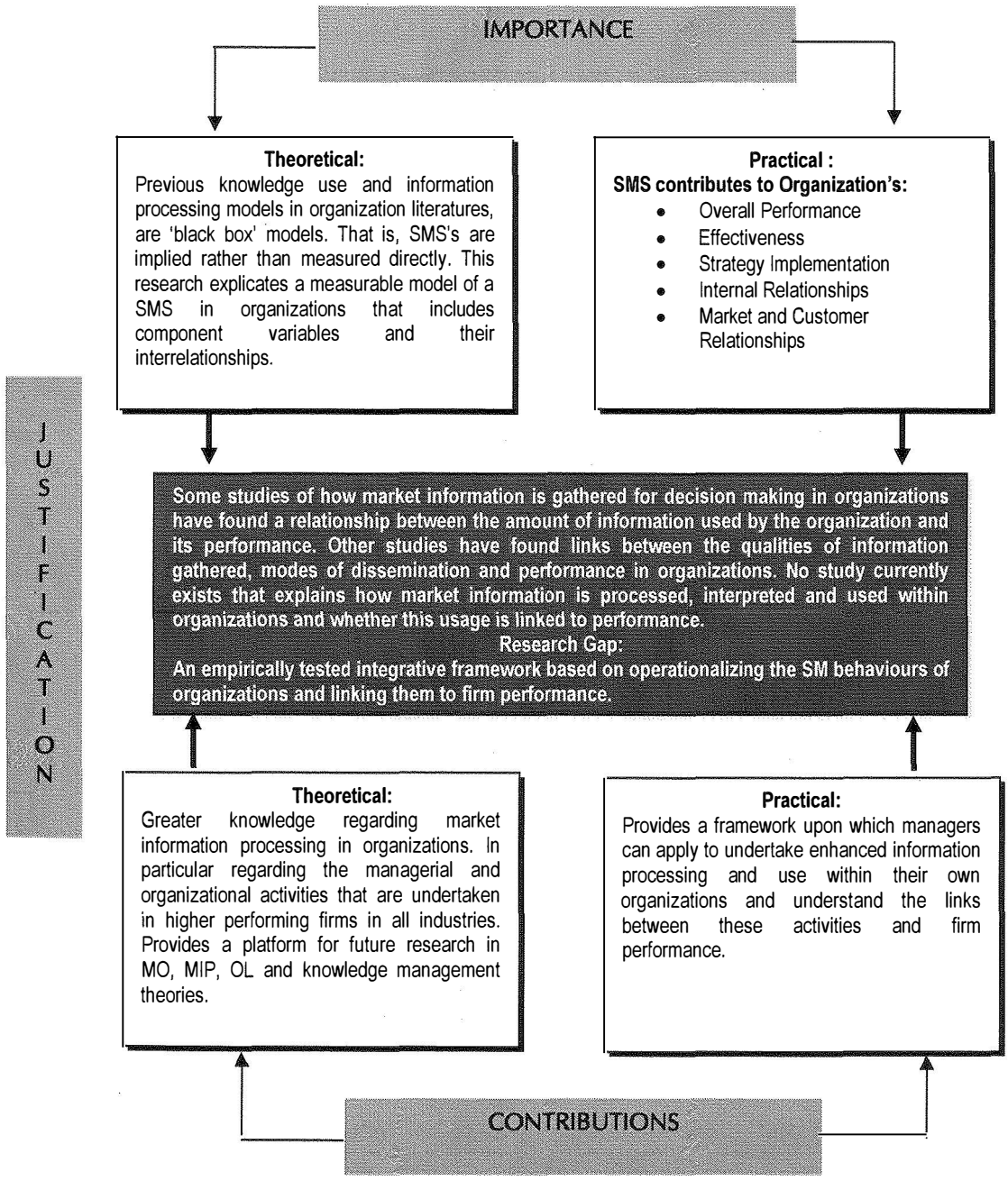

Figure 1.3 Importance, Justification and Contributions of the Research

1.4.1 Importance of the Research

From a theoretical perspective, models of MIP in organizations acknowledge an interpretation step within fundamental stimulus-response (S-R) models (Moorman 1995). However, interpretation is often implied from the consequences experienced by organizations, rather than being accounted for and measured. Current models within either the MO or OL tradition, neither detail the operation of organizational interpretation processes, nor link these to performance. It is necessary and important to study these processes and to link them to performance because the speed with which meaningful interpretation of information is achieved and the quality of interpretation reached, could plausibly be expected to impact on the capacity of an organization to take action and to respond appropriately to market environment changes.

From a practical perspective, a model of interpretation – a SMS - provides a framework that managers can use to enhance MIP capabilities within the organization. In this way, the SMS model acts as a representation of organizational SM processes. Such a model allows for diagnosis of information processing problems within the system and offers opportunities for adaptation when internal or external shocks create operating or marketplace ambiguities for the organization and its actors. For example, an organization that experiences a novel market event can use its SMS to interpret the event, disseminating this interpretation throughout the organization for coordinated response. Understanding the contribution that each component of the SMS makes to organizational interpretation and how the components interact with one another allows the SMS to be adjusted, ensuring its ongoing usefulness as an organizational mechanism for interpretation. For example, where a loss of organizational memory through planned or unplanned staff losses is experienced, management may choose to mitigate this loss through renewed emphasis on aspects of the SMS that either create new memories or re-work old memories into a more useable form suited to the needs of the remaining organizational actors.

1.4.2 Research Contribution

Adopting an interdisciplinary approach incorporating MO, OL and SM theories, this thesis develops a construct of an interpretation system in organizations – a SMS - and links it to organizational performance. This corresponds to a more comprehensive and holistic model of the complex web of human information flows and embedded interpretation and retention mechanisms in organizations.

The interpretation process has been previously implied but not measured in the marketing literature. This has negative implications for accurate and reliable acquisition, generation and dissemination of market information. This is an important gap in the marketing literature and for market-oriented organizations where market turbulence is the norm. This thesis addresses this gap by introducing the first operationalized model of the SM process in organizations. It is also the first quantitative study of SM processes in organizations.

SM theory has been criticized for its esoteric nature and the difficulty of understanding how it works in organizations (Warner 1996; Gioia and Mehra 1996). This study also addresses this criticism by breaking down the SM process within organizations into component parts that are simple to understand and offer a prescription to managers for implementation. The construction of a measurement model of a SMS provides managers with a map of behaviours and activities that describe the system in detail, hence enabling appropriate managerial intervention as needed.

In addition to the theoretical and practical contributions identified above, marketing, management, SM and OL literatures are advanced in methodological terms. The measurement model of a SMS is hierarchical in nature and this research represents one of the few studies where hierarchical modeling is used to test a complex phenomenon. This type of higher order factor modeling is more common in psychology and education research but less common in marketing and OL and non - existent in contemporary SM

literature. The study contributes to complex construct modeling in the marketing field and paves the way for quantitative studies in SM.

1.5 RESEARCH METHOD

The development of an holistic model of a SMS in organizations pursued in this thesis involves theory building and theory testing. Therefore, a two-phase research design incorporating both qualitative and quantitative methodologies is applied, consisting respectively of exploratory literature review and in-depth interviews followed by a field postal survey. This research design will allow the formulation of operands of SM behaviours to be identified through exploratory research. These operands are not actual measures, but are used to indicate the operation of a latent factor, SM, so that the invisible becomes more visible. In this way, they reflect the perceptions of study participants. The research design, then allows for the testing of the indicators to determine whether they indicate the presence of particular factors in the findings.

1.6 THESIS OUTLINE

Following this chapter, chapter two provides an overview of OL literature and MO and learning literature. These are the bodies of literature particularly concerned with learning at the organizational level. The purpose of this review and analysis of the literatures is to establish that there exists a gap in knowledge in both bodies of literature and to establish a theoretical basis for the thesis. This chapter acknowledges information processing approaches as areas of research in a variety of disciplines but underscores that no adequate model of interpretation in organizations currently exists in either MO or OL literatures. A review of the extensions to MO theories, known collectively as MIP approaches is presented and a summary of commonalities between the literatures is developed. The gap of a model of interpretation and memory in organizations in extant literatures is highlighted. Finally, the chapter proposes that SM theory provides an avenue to further our understanding about interpretation in organizations from an information processing perspective.

Chapter three critically reviews the focus theory used in the research, SM theory. SM has broad acceptance in the 'learning' approaches to organizational research, considered a core theory of organization science and draws on earlier paradigms derived from sociology, anthropology, psychology and social psychology disciplines. Chapter three first outlines the seven properties of SM and then outlines the application of SM theories to organizations and organizing. The historical roots of SM theory are also discussed. The empirical work concerned with investigating SM and SM processes in organizations, is outlined and critically evaluated. Finally, a model of the dimensions through which SM in organizations operates is proposed.

The model and hypotheses regarding the SMS's relationship to organizational concepts such as 'sensing', 'response' and 'performance' are developed in chapter four. First, the chapter outlines each of the constructs used to test the model. Second, attention is focused on the SMS construct derived from evaluation of the literature in chapter three. Each of the SMS dimensions is reviewed and hypotheses are developed about the composition of the SMS itself – the measurement model. This includes hypotheses concerned with the three SMS dimensions, their underlying sub-dimensions and correlations with one another.

The development of an holistic model of a SMS in organizations pursued in this thesis, involves theory building and theory testing, therefore, a two-phased research design is justified. Chapter five discusses the exploratory phase of the research which involves in-depth interviews. The chapter justifies the sample selected, outlines the interview procedures and discusses the development of interview protocol that draws on literature from SM, organizational identity, organizational memory and social interaction theories. Finally, data from the interviews is analysed, the findings are presented and evaluated, in light of the findings minor adaptations are made to the SMS model underpinning the ensuing quantitative phase of the research.

Chapter six justifies the mail survey methodology used in phase two. Design and development of the survey instrument, the methods employed to administer the questionnaire before, during and after being mailed are outlined and discussed. The data analysis strategy, consisting of structural equation modeling (SEM) is also discussed and evaluated.

Chapter seven presents the data analysis and findings from the research. After a review of the hypotheses forwarded in chapter four, responses are discussed, non-response analysis is conducted and data preparation strategies are outlined. The basic SEM steps applied to data analysis are presented next. The two-stage approach – measurement model evaluation and structural model evaluation – is discussed followed by the evaluation of the measurement model. The analysis progressively evaluates each factor ascending through the hierarchical structure of the SMS and the relationships of the factors with one another. Finally, the structural model is evaluated and hypotheses are reviewed.

The key findings of the research and their implications for theory and practice are reviewed in chapter eight. The contributions of this research (theoretical, managerial and methodological) are then summarized. Limitations of the research are identified as well as directions for further research.

1.7 DELIMITATIONS

The scope of this research is confined to investigating the composition of an organizational SMS and its effect on performance. The OL, MO and MIP based literatures all suggest that there are wide varieties of factors that may influence organizational performance. Within the OL tradition, competitive advantage is said to be an outcome of superior information processing capabilities (Hunt and Morgan 1996; Dickson 1996) that allow organizations to outperform competitors by speedier action and improved learning processes (Dickson 1996). Some of these processes are subsumed within the SMS construct. MO is said to lead to improved performance through innovation (Baker and Sinkula 1999b) and new product

development (Moorman 1995). These antecedents to performance are not included in the model to be tested therefore the analysis cannot determine their influence on performance. MIP research suggests that performance is gained through rapid strategic decision making capabilities (Bourgeois and Eisenhardt 1988) and these also are not modeled explicitly in this research therefore these influences will not be able to be determined from this study.

1.8 CONCLUSION

This chapter provided an overview of the thesis of the research. Importantly, a discussion of the theoretical gap and practical importance that confirm the contribution of the research was presented. To provide a focus to the thesis, the key research objective and related research questions were stated. The definitions of the key constructs have been presented followed by justification of the two-phase research design and chosen methodologies. Lastly, an outline of the thesis including an overview of the chapters has been presented. Having set the foundation for this thesis, the following chapter, chapter two, contains a literature review of the background theories that inform and set the stage for the study that follows.

CHAPTER TWO: BACKGROUND THEORY: ORGANIZATIONAL LEARNING AND MARKET ORIENTATION.

2.1 INTRODUCTION

Two main streams of literature are reviewed in this chapter both as a foundation for the focus theory of the research, SM theory (Weick 1969; 1995; 2001), which is discussed in detail in chapter three, and to support the development of the proposed model. The first literature stream reviewed is OL, including an outline of the diversity of disciplinary areas from which OL is derived. The conclusion reached from this review is that no clear theoretical convergence has yet been reached in OL literature that would guide the development of a model of learning in organizations that could account for interpretation and memory processes in detail. The second body of literature reviewed, MO theory, is presented as its development has been somewhat narrower in focus than OL literatures and in particular, it takes a pragmatic and managerial approach focusing on MIP behaviours. In addition, MO theory draws on a richer empirical base than does OL literature and has made some progress towards a detailed map of MIP in organizations at the level required to answer the research questions. However, MO theory still presents some research gaps that are identified in section 2.4, when SM theory is proposed as a suitable theory for both filling the research gaps and answering the research questions.

The chapter is organized in the following manner. OL theories are outlined in section 2.2 taking into account decision making (Levitt and March 1988), systems theory (Katz and Kahn 1978), organization cognition (Senge 1990), culture (Schein 1991) and action learning approaches (Argyris and Schön 1978). OL involves a diverse body of literatures (Dierkes, Berthoinatal, Child and Nonaka 2001), being shaped by a variety of viewpoints with no clear theoretical convergence yet being reached. Broad foundational issues are still being debated, such as levels of learning in organizations (Senge 1990), the

structure of the learning system (von Krogh and Roos 1996) and rational choice (Mintzberg 1976) versus ecological change perspectives (Cyert and March, 1963).

Section 2.3 discusses the emergence of MO theory (Kohli and Jaworski 1990; Narver and Slater 1990) and evaluates empirical findings from MO studies (Kohli and Jaworski 1990; Narver and Slater 1990; Day 1994b; Hult, Ketchen Jr. and Slater 2005), arguing that the mixed findings concerning the links between MO and firm performance led to increased interest in OL theories by marketing theorists. This development has been referred to by some as 'beyond market orientation' (Steinman, Deshpandé and Farley 2000; Darroch and McNaughton 2002) and includes perspectives referred to collectively as market based OL (Sinkula, Baker and Noordeweir, 1997).

Section 2.4 charts the evolution and development of MO research as it began to reach 'beyond market orientation' (Slater and Narver 1995; Baker and Sinkula 1999a; 2002). Important concepts drawn from managerially based OL literature began to be incorporated into the marketing research agenda in an effort to explain the ambiguous findings from some marketing research that did not confirm MO's positive link to organizational performance.

Section 2.5 argues that there is a gap in many measurement models of market based OL – interpretation and memory's effect upon it – and that the inclusion and measurement of these variables in fundamental market based OL models should more closely account for performance differences in organizations. Figure 2.1 outlines the framework that the chapter follows.

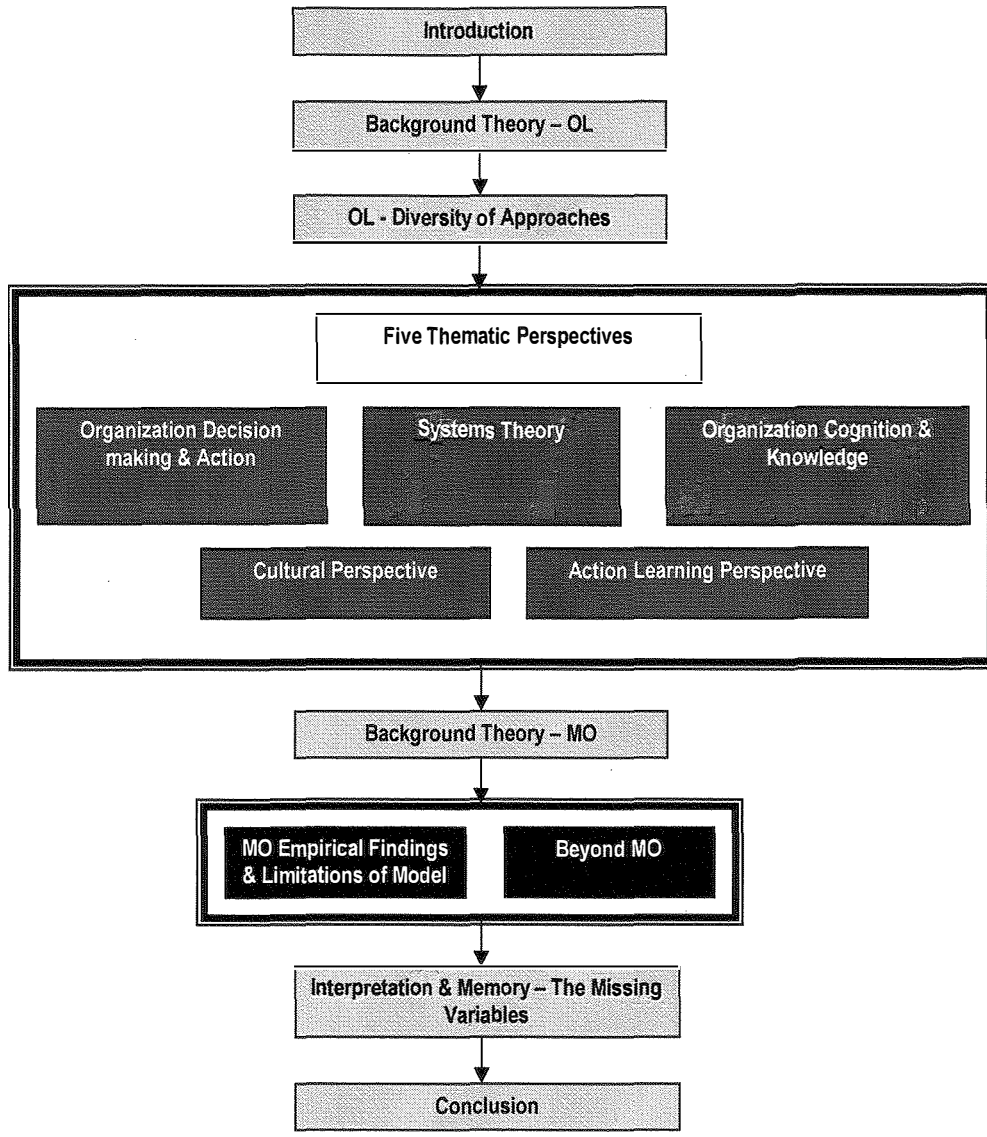

Figure 2.1 Chapter Two Framework

2.2 BACKGROUND THEORY - ORGANIZATIONAL LEARNING

OL can be defined as a dynamic process of creation, acquisition and integration of knowledge aimed at the development of resources and capabilities that contribute to better organizational performance (Bell, Whitwell and Lukas 2002). Since Cyert and March (1963) first spoke of organizational learning and since the publication of Argyris and Schön's *Organizational Learning: A*

Theory of Action Perspective (1978), the concept of OL has been used in different ways in different disciplines. Interest in OL has escalated to such an extent that the amount of literature is almost overwhelming. It has become difficult to systematize and group the array of contributions, indeed Fiol and Lyles (1985) state,

> *Although there exists widespread acceptance of the notion of organizational learning and its importance to strategic performance, no theory or model of organizational learning is widely accepted. Major research...provides the basis for initial attempts to define, to develop and to differentiate organizational learning and its components. Each has approached the subject from different perspectives, leading to more divergence* (p. 805).

So far, no single analytical or conceptual model serves as a framework for researchers of OL and the field is undergoing exponential growth (Easterby-Smith 1997; Cohen 1998). This growth coincides with a sense of ambiguity (Pawlowsky 2001), lack of consensus (Barnett 1998), and even growing confusion (Wiegand 1996). Some integrative frameworks to understand OL approaches are beginning to emerge and it is the distinctions between these approaches that are of assistance in understanding the basic assumptions of OL. The next section briefly explores some of the diversity in OL approaches.

2.2.1 OL – Diversity of Approaches

Shrivastava (1983) was the first researcher to systematically differentiate four distinct and contrasting perspectives on organizational learning. First, the decision making perspective of Cyert and March (1963) known as 'adaptive learning'; second, Argyris and Schön's (1978) 'assumption sharing'; third, development of the knowledge base with an emphasis on development of knowledge about action-outcome relationships; and fourth, what Shrivastava (1983) referred to as "*institutionalized experience effects*" (p. 10), such as learning curves (Abernathy and Wayne 1974).

More recently, Weigand (1996) explained five OL theoretical perspectives based on historical development of contributions. First, the pioneer approach is acknowledged in relation to different stages of development work by Cyert and March (1963), March and Olsen (1976) and Levitt and March (1988). Second, Argyris' (1964) theories focused on the individual as the acting agent of the organization with Argyris and Schön (1978) exploring the promotion of OL through interventions within the organization; this constituting the main body of their work on 'theories in action'[1]. Third, knowledge based approaches are based on the work of Duncan and Weiss (1979), Nonaka and Takeuchi (1995), Huber (1991) and Walsh and Ungson (1991). Although most discussion of OL relates to knowledge as the starting and end point of learning, the contributions clustered in this perspective focus on different types of knowledge and organizational processes connected with knowledge creation and diffusion. Hence, Senge's (1990) work, the fourth approach described, aimed at developing systems thinking as a way of fostering OL. The fifth approach, by Hedberg (1981), was where organizations were conceptualized as cognitive systems developed by individual perceptions and interpretations. Thus, diversity of approaches, whilst valuable for exploration of the breadth of OL principles and their application, widen the scope of OL and do not create a research framework that allows sufficient focus for the development of a holistic model of OL as a managerially relevant process in organizations.

Cutting across these approaches developed in the OL literature so far, are five distinct thematic perspectives. They are (1) organization decision making and adaptation, (2) systems theory, (3) cognition and knowledge, (4) culture and (5) action learning. Each of these themes has made an important contribution to OL theories therefore they are investigated and critically reviewed in the following sub-sections.

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1 OL occurs when individuals within an organization experience a surprising mismatch between expected and actual results of actions and respond to that mismatch by a process of thought and further action. This leads them to modify their images of organization or their understanding of organization phenomena and to restructure their activities so as to bring outcomes and expectations into line, thereby changing organization theory-in-use. (Argyris and Schón 1996 p. 16)

2.2.2 Five Thematic Perspectives of OL

2.2.2.1 Organization Decision Making and Adaptation Perspective

The early work of Cyert and March (1963) revolved around a stimulus–response (S-R) behavioural approach to learning and was based on a contemporary conceptualization of decision making in organizations. Their understanding of OL is that it is triggered by external shocks that make adaptation necessary (Cyert and March 1963 p. 99). The organization has a number of decision making variables and rules that are modified as external shocks are progressively adapted to. By learning new combinations of external stimuli and internal decision-making rules, the organization learns. In this way, learning is regarded as reactive adaptation in line with S-R learning principles.

March and Simon's (1958) understanding of the learning process seems to be derived from earlier work on goal directed behavioural models (Tolman, 1932). Humans are considered to be complex information processing systems whereby memory is part of the information processing cycle and includes *"all sorts of partial and modified records of past experiences and programs for responding to environmental stimuli"* (March and Simon, 1958 p. 10). March and Simon (1958) transferred the S-R conceptualization to organizations, whereby the individual concept of memory is replaced by standard operating procedures at the organization level. March and Olsen (1976) also associated OL with "*organizational intelligence"* (p. 55) and cognitive processes. To them, OL was conceptualized as experiential learning based on 'cognitions and preferences', 'models of the world', ideas, beliefs and attitudes that members of the organization hold (March and Olsen 1976 p. 338). They also extended the concept of OL to include social psychological factors and cognitive structures as important elements.

Levitt and March (1988) considered that "*organizations are seen as learning by encoding inferences from history into routines that guide behaviour"* (p.320). These routines are more than standard operating procedures (Cyert and March

1963) and are considered independent of individual organizational actors. They therefore can survive individual organizational actor turnover and open the way to conceptualizing collective bases of organization knowledge that are not only the result of direct learning, but also of learning from organization wide interpretations such as stories, paradigms, frames of reference and culture.

2.2.2.2 Systems Theory Perspective

By defining organizations as systems of "*consciously coordinated activities or forces of two or more persons*", Barnard (1956 p. 75) is often cited as one of the first to ground management thinking in a systems perspective. Bertalanffy (1951) developed the principles of a general systems theory as a means of linking different disciplines. It is the basis for a number of approaches that conceptualize organizations as open systems that are confronted with environmental pressure to which they must adapt.

With respect to OL, three distinct approaches within the systems view have developed. The first approach is concerned with system based management and system–environment relations. Organization environments were perceived as exerting pressure on organizations, pressure to which the organization had to adapt. Ashby's law of requisite variety (1956) for example, states that "*only variety can destroy variety*" (p. 207) meaning that organizations that have to cope with environmental complexity, have to generate sufficiently complex structures and systems to cope with that complexity. The perspective of organizations as open systems was further developed by Katz and Kahn (1978) who stated that "*the organization lives only in being open to inputs, but selectively, its continuing existence requires both the property of openness and selectivity*" (p. 31).

The second approach is based on the assumptions of self-organizing processes as being self-referential. According to the authors adopting this approach (e.g. Brodbeck 2002; Rycroft and Kash 2004;) organizations have to build in slack in order for self referential processes to take place for organizational development.

Management is advised to build in structural pre-conditions to allow for and promote self-referential processes.

Third, is the systems dynamic approach that originates in population analysis (Forrester, 1961). The assumption underlying this approach is that once one has reduced the complexity of a network system by analyzing the features of relevant factors and their dynamic relations over time, this knowledge can be applied to understanding the functioning of the system and interventions targeted accordingly. Additionally, all outputs of one system are seen as inputs into other systems. As stated by Senge and Sterman (1992), "*organizational learning processes are most effective when they help managers develop a more systematic and dynamic perspective*" (p. 354).

2.2.2.3 Organization Cognition and Knowledge Perspective

From the perspective of organization knowledge and cognition, cognitive systems are the basic concepts applied at the individual and collective levels. Basically this perspective centres on the assumption,

> *that all deliberate action had a cognitive basis, that it reflected norms, strategies and assumptions or models of the world which had claims to general validity...Human action and human learning could be placed in the larger context of knowing* (Argyris and Schön 1978 p. 10).

Essential to the cognitive notion is the conscious character of learning; organizational members are not merely a storage bin of past rational experiences but interpreters of reality according to the specifics of their cognitive system.

There are a variety of clusters within this perspective, each emphasizing different aspects of learning and knowledge. Three that are relevant here are: (1) the structural approach that focuses on information processing abilities that are dependent on the structural characteristics of the cognitive system (Axelrod 1976; Huber 1991); (2) the corporate epistemology approach (Von Krogh, Roos and Slocum 1996) in which the interpretation process and the cognitive construction of reality is regarded as the central issue of importance in learning

(Daft and Weick 1984; Sims and Gioia 1986; Weick and Bougon 1986); and (3) the core competencies approach, whereby the organization's competitive advantage depends on the knowledge and skills it possesses in a distinct area (Leonard-Barton 1995).

The structural approach emphasizes that OL and decision making are dependent on the *structure* of the knowledge system. Organizational mind (Sandelands and Stablein, 1987) and collective cognitive cause maps (Weick and Bougon, 1986) are two perspectives here. In the structural approach,

> *Learning enables organizations to build an understanding and interpretation of their environment...it results in associations, cognitive systems and memories developed and shared by members of the organization* (Fiol and Lyles, 1985 p. 804).

The corporate epistemology approach emphasizes *how* organizations develop knowledge. Essentially this approach does not view knowledge as an objective reflection of reality, but rather reality is created out of the history of each participating member of a joint knowledge system. This is Weick's (1969) 'enacted environment', which means that "*the actor creates the environment to which the system then adapts*" (p. 64); the actor does not react to his environment, he 'enacts' it. This can be seen as a subjective construction of meaning and can be conveyed from private knowledge to organizational knowledge through interactions between actors in the organization. Hence, the epistemological perspective suggests cooperation and interaction as a means of promoting knowledge development and therefore OL.

The core competencies approach assumes that the organization's competitive advantage depends on the knowledge and skills it possesses about knowledge creation and development processes (Hamel and Prahalad 1994; Prahalad and Hamel 1990). Core capabilities in organizations are seen as the 'well-springs' of OL processes (Leonard-Barton 1995). In order to promote OL, different

activities such as integrated problem solving across different cognitive and functional barriers, experimentation and importation of know-how are suggested (Leonard-Barton 1995 p. xv).

2.2.2.4 Cultural Perspective

Schein (1991) states that, *"at the simplest conceptual level...we can say that culture is the shared common learning output"* (p. 247). This approach builds on the notion that members of organizations create a set of inter-subjective meanings (construction of reality) that can be seen in organizational myths, stories, symbols and ceremonies and are tied together by values, beliefs and emotions.

Cook and Yanow (1993) described the distinctive way in which OL is viewed through the cultural approach, *"Our intention...is to outline a cultural perspective on organizational learning ...we see this perspective as a complement to, not a substitute for, the cognitive perspective"* (p. 374). They argued that the cognitive perspective focuses only on the individual level, whereas the cultural perspective can capture learning at a collective level. This perspective is closely linked to the knowledge perspective discussed previously, as demonstrated when culture is defined as,

> *the set of values, beliefs and feelings together with the artifacts of their expression and transmission (such as myths, symbols, metaphors, rituals) that are created, inherited, shared and transmitted within one group of people, and that in part distinguish that group from others* (Cook and Yanow 1993 p. 379).

Several contributions have built on the cultural dimension, helping to bridge the gap between individual and collective concepts of learning. Sackman's (1991) conceptualization of culture as the "*collective construction of social reality"* (p. 33) distinguishes among types of cultural knowledge, e.g. directory knowledge - how-to theories of organization action and axiomatic knowledge - cause maps, assumptions and beliefs. Argyris (1990) introduced the notion of

culture and emotion into OL; knowledge systems in organizations are not only joint constructions of reality they are also general constructions of meanings with affective connotations.

2.2.2.5 Action Learning Perspective

The action learning perspective derives its assumptions from several traditions. Essential to action learning is the idea that learning occurs through acting. The basic notion is that understanding is enhanced through a reflection process that follows action. Pure cognitive learning may be memorized, but it does not allow for understanding. According to Revans (1982), learning occurs from experience, the basic idea being that a person has an experience and then thinks and reflects on this experience by relating it to former experiences.

Action learning is also viable for collective experiential learning. Experiences are shared, analysis is enhanced, and new concepts are gradually developed and understood in order to meet the needs of the group. Pedler (1997) suggested that action learning be given a collectivist interpretation that *"frees us from the limitations of individual action and learning"* (p. 261).

2.2.3 Conclusion and Implications for Theorizing about OL

The preceding discussion of a variety of OL approaches reinforces the notion of theoretical divergence incorporating differing disciplinary perspectives. Besides these differences, the approaches to learning in organizations have similarities that reappear, albeit with different labels. In one way or another, all approaches to OL refer to similar issues. First, is the issue of transference of learning from the individual to the group or organization level; second, is the distinction between adaptive learning (S-R model) and reflective learning; third, and most importantly, the differences between cognitive, cultural and action related aspects of OL are diminishing, for authors from many traditions seem to be calling for more integrative approaches to these three forms of learning.

Theorizing about OL has evolved to increasingly encompass this diversity and variety. Indeed many authors have developed their initial approaches to the topic, to such an extent, that they now include and subsume multiple perspectives (e.g. Levitt and March 1988, Sims and Gioia 1986; Argyris and Schön 1996; Weick 1995). However, having outlined the possible multiple approaches, still no model of OL encompassing all these elements has emerged from the literature, thus precluding empirical testing of OL concepts in real world settings.

MO literature, in many ways runs parallel to OL theories and is reviewed here as background theory. The labels are different, but the ideas bear many similarities to OL. Firstly, MO's evolution coincides with OL, secondly and more importantly, its genesis was based on the idea that theories should be able to be implemented by managers and add value to all stakeholders of the organization. In that sense the very practical initial purpose for MO's theoretical development has ensured its ongoing fascination for marketing academicians and practitioners alike. The third and final reason for MO theory's inclusion as background theory is that unlike OL, it has developed a strong empirical base grounded in part by its consensual dimensionality. The sheer diversity and richness of OL literatures has precluded not only an agreed definition, but also has prevented agreement around its constituent dimensions. Without agreed conceptual dimensions, systematic and substantive empirical research is hindered. Therefore MO theory offers some insight into the variables and methods that might be considered as part of an OL framework integrating interpretation and memory and its relationship to other variables such as organizational performance.

2.3 BACKGROUND THEORY: MO

The concept of MO emerged in the late 1980's and early 90's as an outcome of increased calls from practitioners and marketing theorists for more implementable theories. MO is fundamentally a concept about managerial and

organizational behaviours concerned with learning about markets and formulating timely responses to marketplace change through information processing activities (Sinkula 1994). The proposed outcome of these behaviours was enhanced firm performance.

MO has its roots in the philosophy of the marketing concept and the perceived problems with implementing the concept. Several scholars advocated that a marketing philosophy was intrinsic to long term firm performance and they were responsible for more clearly aligning the philosophy of marketing with the practice of marketing strategy (Kotler 1977; Shapiro 1988; Kohli and Jaworski 1990; Narver and Slater 1990; Ruekert 1992).

Two predominant conceptualizations of the operation of the marketing concept in firms - known as MO - emerged. The first conceptualization became known as the cultural or values model. Narver and Slater (1990 p. 20) stated that MO is at the very heart of modern marketing management and strategy. They developed a measure that involved three *behavioural* components of customer orientation, competitor orientation and interfunctional coordination, and two decision criteria – long term focus and profitability. In addition, they sought to assess the influence of a market orientation on business performance. Subsequent empirical investigation (Narver and Slater 1990 p. 26) revealed that only the three behavioural components contributed to the validity of the construct and that a strong relationship existed between their measure of market orientation and business profitability. An alternative conceptualization was Kohli and Jaworski's (1990) behavioural model, that sought to address the issue of misalignment of the theoretical notion of the marketing concept with practical application. The behavioural dimensions of the model included intelligence gathering, intelligence dissemination and organizational responsiveness.

Of importance for the current study, is that while there were two seemingly different conceptualizations of MO, both models were tested using behavioural measures. Also of importance to the current study is that the behavioural dimensions defined and measured, were grounded in OL process and behavioural principles based on the flow of information within and through organizations.

2.3.1 MO Empirical Findings and Limitations of the Model

During the past twenty years there has been a seemingly constant stream of research exploring the construct of MO. Research in this area has explored the construct's conceptual parameters (Day 1994b; Narver and Slater 1990; Kohli and Jaworski 1990) and measurement issues (Hult, Ketchen Jr. and Slater 2005)

Most studies on MO claim compelling evidence that it has a positive effect on organizational performance. However, a closer look at the results of empirical research on MO and its links to organizational performance reveals that the predictive power regarding the relationship is still an open question. Langerak (2003) investigated 50 key studies that addressed the relationship between MO and performance and found that while there is some limited support for how MO influences performance, at best there is equivocal support for the overall effects of MO on performance with some effects being found for some performance measures, eg. new product success and ROA (Moorman 1995) and none for other performance measures, eg, increase in market share (Hult *et al* 2005).

Yet MO remains one of marketing's most utilized and popular theories. Perhaps the seductiveness of a predictive theory, that is supported over half of the times it is tested, particularly over such an extended period of time, tells theorists that the theory has at least captured something important about the world.

In an effort to increase the predictive accuracy of MO and its links to organizational performance, models that utilize MO theory have been augmented to include more variables to further explain the relationship between MO and performance. These variables mediate, moderate, and are antecedents to or consequences of the basic MIP model. However, model augmentation, while adding to the complexity of these models, has possibly reduced their ability to be implemented by managers. In addition, they add to conceptual divergence as they attempt to subsume all the possible elements of MIP, MO and OL, in a holistic model of a market knowledge generating system within organizations. The next section now addresses this divergence by outlining the augmented MO theories that emerged in an effort to 'explain' the ambiguous findings from earlier MO studies.

2.3.2 Beyond MO – Fine Tuning the Concept.

As research on MO developed, important concepts drawn from managerially based OL literature were incorporated into the marketing research agenda in an effort to explain ambiguous findings from some marketing based research that did not confirm MO's positive link to organizational performance. As outlined earlier in Section 2.2, there has emerged a large and growing literature on OL that includes important work by marketers on how learning confers a competitive advantage through its interplay with marketing information capabilities and outcomes (Slater and Narver 1995; Baker and Sinkula 1999a, 2002).

A number of researchers have emphasized the relevance of OL in several marketing areas, including strategic marketing (Frankwick, Ward, Hutt and Reingen 1994) and marketing management (Baker and Sinkula 1999a). Indeed marketing has a large stake in the OL literature. Many researchers view OL as critical to the process of developing market knowledge and as such, OL is seen as a driving force in the management of market oriented organizations (Baker and Sinkula 2002). Much of the research from a marketing perspective is

derived from what is referred to as the process school of OL thought (Bell, Whitwell and Lukas 2002), which is characterized by learning that is grounded in the cognitive and behavioural capabilities of individuals and is socially constructed.

Table 2.1 lists an overview of important literature that marked the evolution of MO theories into more holistic market-based OL models. It is important to note that the marketing literature has provided measurable and testable models of some aspects of OL processes in organizations, unlike management literature utilizing OL theories, which has concentrated on conceptual development.

Table 2.1 Beyond MO Theories – MO Concepts to market based OL Concepts

Author	Main Arguments Presented	Empirical Findings
Sinkula, 1994.	*Proposed OL model based on MIP behaviours through a hierarchy of market SM activities – model still untested.*	*N/A*
Moorman, 1995.	*Developed model of MIP including culture, information acquisition, transmission and use, linking to performance.*	*Cultural support and information use linked to product development and performance outcomes.*
Sinkula, Baker & Noordewier 1997.	*Developed model of market based OL linking Learning Orientation to MIP behaviors and organizational actions.*	*Positive links found between Learning Orientation, market information processing and organization outcomes such as strategic dynamism.*
Baker & Sinkula 1999a.	*Proposed that MO and Learning Orientation have a synergistic and positive effect on performance.*	*Support for argument found plus links to performance through innovation in products, procedures and systems.*
Baker & Sinkula 1999b.	*Proposed that Learning Orientation and MO both affect performance directly and through innovation.*	*Learning Orientation found to be more important.*
Homburg & Pflesser 2000.	*MO culture modeled including values, norms, artifacts & behaviours & linked to performance.*	*MO culture influences financial performance & found to be more important in dynamic markets.*
Darroch & McNaughton 2002.	*Knowledge management orientation practices proposed to influence performance.*	*Knowledge management orientation found to influence performance more than MO. MO is sub-set of Knowledge management orientation.*

Table 2.1 Beyond MO Theories – MO Concepts to market based OL Concepts (Contd.)

Baker & Sinkula 2002.	*MO & Learning Orientation contribute to performance through product innovation.*	*MIP hierarchy of learning found from incremental learning to adaptive learning to generative or higher order learning.*
Day 2002.	*Model proposed of market driven learning processes – Sensing, Sensemaking and Reflection - untested*	*N/A*
Farrell & Oz Czkowski 2002.	*MO & Learning Orientation lead to increased performance.*	*MO values lead to Learning Orientation which contributes to performance.*
Morgan & Turnell 2003.	*Market based OL model proposed, based on values, market information processing (based on MO models) & performance outcomes.*	*Support for increase in Market based OL values leads to increase in market information processing which leads to positive Performance outcomes.*
Hult, Ketchen Jr. & Slater 2005.	*MO and MIP approaches both explain performance, but through Response.*	*Both MO & MIP lead to Response which leads to Performance. MO & market information processing do not directly affect Performance.*

As table 2.1 illustrates, from a marketing perspective, the main mechanism of OL is seen as the processing of information within the organization. It is an important area of application for OL research for three main reasons. First, the OL and MO research domains are perceived as conceptually similar. Second, they are concerned with understanding organization wide phenomena such as organization culture and norms. Finally, both encompass relationships and interdependencies between individuals and groups and the coordinated use of both tangible and intangible resources. Figure 2.2 illustrates the commonalities between OL approaches and MO approaches.

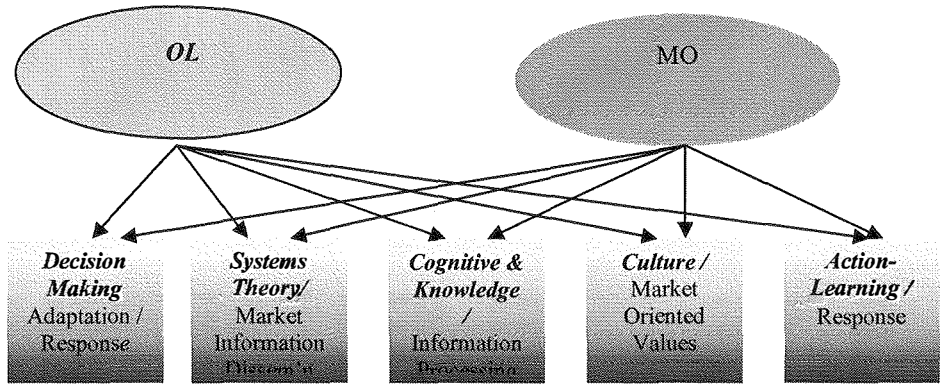

Figure 2.2 Commonalities between OL and MO Approaches.

Following from these conceptual commonalities and the underlying information processing model which grounds both OL and MO perspectives reviewed here, some research has emerged that attempts to explicitly model information processing in organizations. Indeed, some notable researchers are redefining MO and OL. Baker and Sinkula (2002) recently described MO as being *"the extent to which a firm's strategic planning process is dependent on the outcome of market information acquisition, dissemination and interpretation activities"* (p. 8) and learning orientation as having a moderating effect on MO because it influences *"the ultimate quality of information acquisition, dissemination and interpretation"* (p. 8). In other words, learning processes moderate MIP to provide the organization with higher quality processing which should lead to superior performance outcomes.

This higher quality MIP is referred to by Baker and Sinkula (2002) as the *"organizational black box"* (p. 6) and is said to consist of behaviours that question belief systems and reconcile mental models that conflict with market realities (Baker and Sinkula 2002 p. 16). While Sinkula, Baker and Noordeweir's (1997) framework for market-based OL consisted of specific organization values - commitment to learning, shared vision and open-mindedness - that influence MIP behaviours such as information generation and dissemination, their model also acknowledges that interpretation and organizational memory influence the quality of MIP and thence organization actions. However, their model does not operationalize or measure the actual behaviours that might make up organizational interpretation and memory.

In a similar vein, Day (2002) discusses market based OL, proposing a model of MIP consisting of sensing activities, SM activities and reflection. Sensing and SM activities are proposed to consist of creating a spirit of open minded inquiry, carefully analysing rivals' actions, listening to staff, seeking out latent needs, scanning the periphery of the market and encouraging experimentation (Day 2002 p. 241). Yet again, many of these activities are finessed rather than explicitly modelled so that they might be suitable for testing. No model yet exists within OL or MO / market-based OL literatures that clearly outlines the activities managers might implement to ensure high quality MIP and that might therefore conceivably lead to higher quality actions and performance. Sinkula *et al* (1997) state,

> *Although information interpretation and organization memory are key market information processing constructs, it is far more difficult to measure their effects in a process sense...To date, the impact of interpretation and organizational memory on learning has for the most part been determined by analogy rather than direct investigation* (p. 308).

The marketing literature has recognised the importance of these key processes within MIP and their potential effect on the quality of learning, action and organizational performance. Therefore a framework is required that will make overt, that which has 'to date, been determined by analogy rather than direct investigation'. The next section briefly outlines one possible means for remedying the lack of overt interpretation and memory variables in MIP models.

2.4 ORGANIZATIONAL INTERPRETATION AND MEMORY – THE MISSING VARIABLES

Interpretation has been described as the process "*through which information is given meaning*" (Daft and Weick 1984 p. 294). The making of meaning has been variously described as 'sensemaking' (Thomas, Clark and Gioia 1993), comprehending (Olsen 1978), interpreting (Huber 1991), categorizing (Dutton

and Jackson 1987), or elaborating on evoked information using an organization's memory (Hedberg 1981; Levitt and March 1988) and collective schema, or shared mental models (Day 1990; Day and Nedugadi 1994; Baker and Sinkula 2002). Organizational memory exists in the collective knowledge of the organization and contains theories in use, shared mental models, information databases, formalized procedures and routines and cultural norms that guide behaviour (Slater and Narver 1995).

Consequent to the difficulty of modelling and measuring such abstract notions, very little empirical work exists, that models and tests interpretation[2]. That which does exist, tests for categories of interpretation (Gioia and Thomas 1996; Thomas, Clark and Gioia 1993) rather than finely grained behaviours, systems and activities concerned with interpretation and memory in practice in organizations. More importantly, there is no research that models and measures interpretation and memory within the MIP paradigm, as espoused through MO and learning orientation, and links it to organizational performance. A framework is required to subsume the emerging concepts that holistically make up MIP in organizations. One such framework is emerging (Day 2002; Gioia and Mehra 1996).

SM in organizations offers such a framework for studying how people think and behave in organisations (Thomas, Clark and Gioia 1993). SM theory has the potential to inform MIP because it explicates in detail, individual and social cognitive behaviours and activities from a process perspective as well as accounting for the organizational context that facilitates these activities, in the same way that culture and values have been explored through earlier MIP research (Homburg and Pflesser, 2000; Sinkula Baker and Noordeweir 1997; Moorman, 1995).

[2] Gioia and Thomas (1996) tested for interpretation of issues by management as strategic or political, and Thomas, Clark and Gioia (1993) modeled and tested interpretation through a positive/negative, gain/loss matrix.

Therefore, using SM theory as a focus, the purpose of the current research is to model and test MIP in organizations – including processes that include interpretation, organizational memory and the social interaction processes through which these occur - and to link these processes to organizational action and thence performance outcomes. In order to do this, initial exploratory investigation through literature review of SM theories and studies is required. The following chapter therefore, is devoted to a review of the foundations, properties and current research using SM theory to inform the model development process.

2.5 CONCLUSION

This chapter provided an overview of the background theories related to the current research. Relevant OL literature has been reviewed and a diversity of approaches has been outlined. Following from OL, the development and growth of MO theories has been explored encompassing emergent learning orientation and MIP concepts known collectively as market based OL. Empirical work in this tradition has been summarised and reviewed. The gaps of interpretation and organizational memory have been identified and SM theory has been proposed as a relevant theory to explore in order to fill these gaps. Having explored the background to the research problem and determined important theoretical and practical knowledge gaps to fill, the following chapter, chapter three, contains a literature review of the focus theory - SM theory - that will aide in the development of a model to guide the research.

CHAPTER THREE: FOCUS THEORY - FOUNDATION AND REVIEW OF SENSEMAKING

3.1 INTRODUCTION

The purpose of this chapter is to evaluate the literature related to the concept of SM and the extant research that uses SM as an explanatory framework. The literature evaluation underpins the articulation of a model of MIP based on SM processes that include interpretation, memory and the social interactions through which these are created and utilized in organizations. These SM processes once modeled, are then able to be investigated for links to organizational performance outcomes.

The previous chapter charted the broad development of OL and MO focusing on commonalities between the two approaches to MIP in organizations by cognitive and cultural learning behaviours. It is asserted that research emergent empirical research within the marketing tradition begins to model aspects of MIP in organizations, for example Kohli and Jaworski's (1990) intelligence gathering and dissemination of information in organizations and Narver and Slater's (1990) customer and competitor focus based on organizational communication activities. As recent research suggests, higher levels of OL underpinned by MIP, provide the organization with higher quality interpretations (Baker and Sinkula 2002); these being proposed to lead to superior performance outcomes. However, there still exists a gap within existing MIP models of the explicit operation of interpretation and memory within organizations; these variables having an influence on interpretations made, actions taken and consequent organizational outcomes achieved. SM theory is therefore proposed as a relevant theory to explore in order to fill this gap, as it explains and explores the information processing cycle within individuals and between individuals in organizations and links interpretation and memory processes with action outcomes.

SM and the term 'interpretation' are often used interchangeably in OL and marketing literature. SM describes in *detail*, information processing behaviours at the organization level. SM has been described as the making of meaning (Daft and Weick 1984), comprehending (Olsen 1978), interpreting (Huber 1991), categorizing (Dutton and Jackson 1987) or elaborating on current information using organization memory. Given the 'black box' nature of interpretation activities in organizations (Day 2002; Homburg and Pflesser 2000; Sinkula 1994), SM theory provides a viable framework within which to investigate the research problem and to achieve the research objectives. This assertion is based on SM theory's expression of specific steps through which interpretation and the retrieval of memories is achieved (Weick 1995) and the empirical evidence that supports the presence of these steps in organizational SM processes, thereby enabling action at the organization level.

SM theory is considered a core theory of organization science (Whetten, in Weick, 1995 p. vii) with Karl Weick its 'elder statesman' (Gioia and Mehra 1996) and primarily responsible for introducing it into studies of organizations. The chapter reviews early work in SM (Weick 1969) outlining the genesis of the SM concept and the contributions to the literature by researchers who have made use of the concept (Cha and Edmondson 2006; Von Rekom, Von Riel and Wierenga 2006; Bean and Eisenberg 2006; Ravasi and Schultz 2006; Schwandt 2005; Rouleau 2005; Maitlis 2005; Dougherty, Borrelli, Munir and O'Sullivan 2000; Drazin, Glynn and Kazanjian 1999; Gioia and Thomas 1996; Thomas, Clark and Gioia 1993; Gioia and Chittepedi 1991; Dutton and Dukerich 1991; Milliken 1990; Keisler and Sproull 1982). See Figure 3.1 for an overview framework of the chapter.

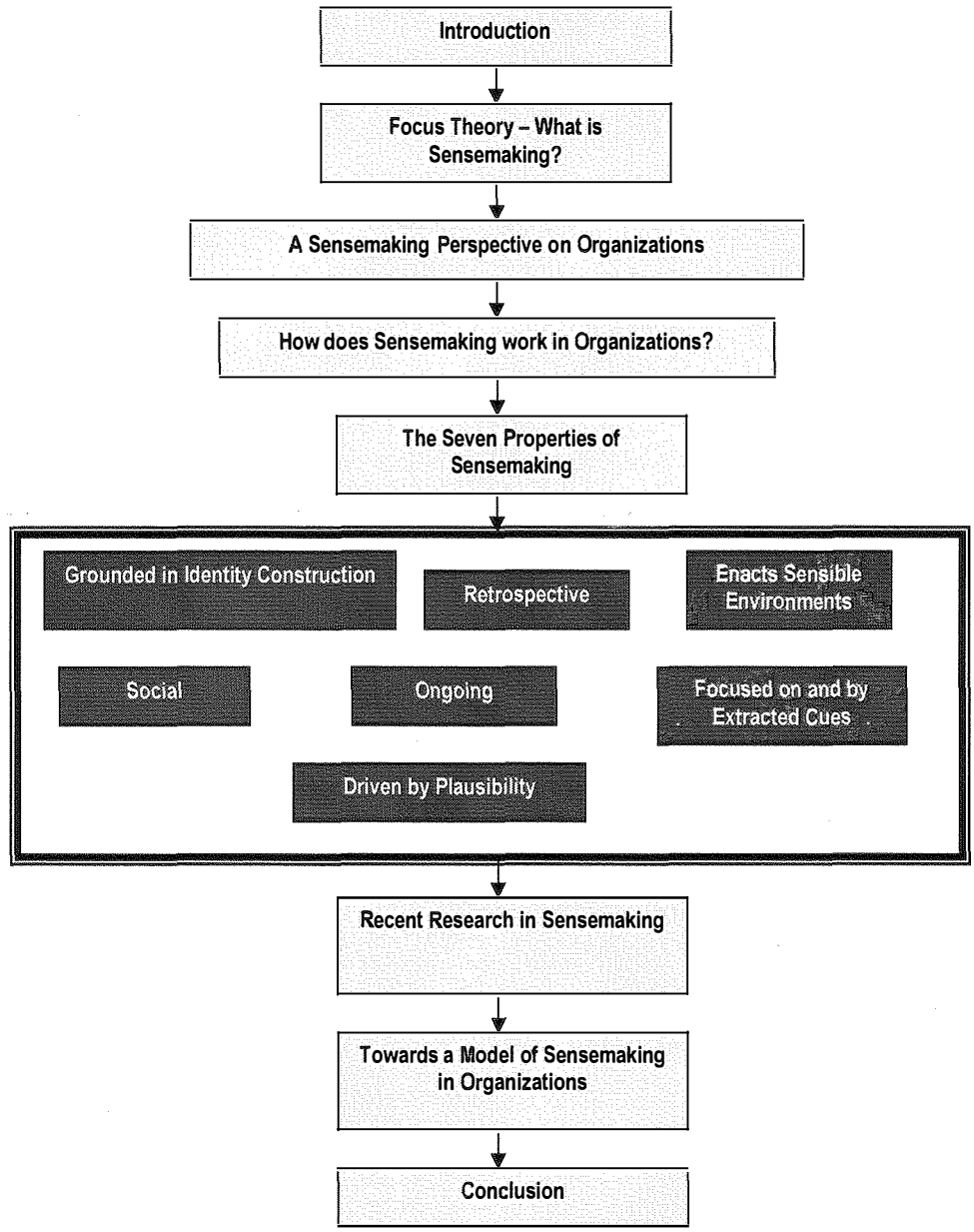

Figure 3.1 Chapter Three Framework

Section 3.2 discusses what SM is. Drawing on earlier paradigms derived from sociology, anthropology, psychology and social psychology, SM has emerged as a concept used by many researchers in diverse fields. Section 3.3 outlines how SM theory is applied to organizations and integrates this application with the three different levels of SM evident in organizational settings.

Section 3.4 outlines the mechanics or workings of SM. The SM process has not always been fully understood in the literature with authors often using a particular aspect of SM to inform a line of inquiry; also it has been referred to as 'unknowable' (Pfeffer 1995). Much of this misapprehension may be based on the perceived abstract nature of SM, however investigation of Weick's earlier works (1969; 1974; 1977a; 1977b; 1979) reveals quite explicitly, explanations of the mechanics of how SM actually works in both individuals and in organizations. This is not alluded to explicitly in his later work, which may account for some of the misperceptions surrounding SM.

Section 3.5 outlines the SM process in terms of its seven properties. These seven properties identified by Weick (1995) are a comprehensive description of the particular characteristics of the SM process. They are mentioned often in a diverse array of organizational literature and each property has practical implications within organizations. The sequence of seven properties is a crude representation of the SM process, as it omits feedback loops (Weick 1995), but serves as a rough guide for inquiry into SM, in that it suggests what SM is, how it works and where it can fail.

Section 3.6 evaluates salient recent research using the SM paradigm as a basis. This includes some conceptual work and a synthesis of empirical work that exists within this paradigm. Much of the research is concerned with investigating the meanings people in organizations attribute to events using SM processes, rather than investigations of SM theory itself.

Section 3.7 summarizes the chapter thus far and concludes with the proposed model of SM in organizations consisting of three primary dimensions worthy of further research and testing. Section 3.8 concludes the chapter.

3.2 WHAT IS SENSEMAKING?

"Sensemaking involves the ongoing retrospective development of plausible images that rationalize what people are doing." (Weick, Sutcliffe and Obstfeld 2005 p. 409). SM literally means the making of sense. People *"structure the unknown"* (Waterman 1990 p. 41) and *"construct sensible events"* (Huber and Daft 1987 p. 154).

SM theorists define SM in many ways. Starbuck and Milliken (1988) state that SM involves *"placing stimuli into some kind of framework"* (p. 51). The phrase 'frame of reference' has traditionally meant a generalized point of view that directs interpretations (Weick, 1969). When people put stimuli into frameworks, this enables them to *"comprehend, understand, attribute, extrapolate and predict"* (Starbuck and Milliken 1988 p. 51). For example, people use strategy as a framework that *"involves procurement, production, synthesis, manipulation and diffusion of information in such a way as to give meaning, purpose and direction to the organization"* (Westley, 1990 p. 337).

A conceptualization related to that of strategy is offered by Louis (1980) who views SM as a thinking process that uses retrospective accounts to explain unexpected events,

> *Sensemaking can be viewed as a recurring cycle...[that] begins as individuals form unconscious and conscious anticipations and assumptions, which serve as predictions about future events... Discrepant events or surprises, trigger a need for explanation or post diction, and, correspondingly for a process through which interpretations of discrepancies are developed* (p. 241).

This suggests that the activity of placing stimuli into frameworks is most visible when expectations are disconfirmed, which in turn suggests that SM is partially controlled by expectations. So to understand SM, is also to understand how people manage interruptions to ongoing streams of experience. In an

organizational context, this joint influence of expectations and interruptions to ongoing activity, becomes manifest in different ways and probably is contingent upon the organizational routines already in place (Weick 1995 p. 5). In other words, how an organization copes with disconfirmation or interruptions to expectations is dependent on current routines; for example, an organization that expects change may find itself puzzled when change is not forthcoming.

Thomas, Clark and Gioia (1993) describe SM as *"the reciprocal interaction of information seeking, meaning ascription and action"* (p. 240) which means that environmental scanning, interpretation and *"associated responses"* are all included. Sackman (1991) talks about SM mechanisms that organizational members use to attribute meaning to events, mechanisms that *"include the standards and rules for perceiving, interpreting, believing and acting in a given cultural setting"* (p. 33); Feldman (1989) articulates SM as an interpretive process that is necessary,

> *for organizational members to understand and to share understandings about such features of the organization as; what it is about, what it does well and poorly, what the problems it faces are and how it should resolve them* (p. 19).

Some investigators view SM as a more private, singular activity (Gioia and Chittipeddi 1991). Ring and Rands (1989) define SM as *"a process in which individuals develop cognitive maps of their environment"* (p. 342), however, they also use the term 'understanding' to refer to a mutual or shared activity and their delineation between the two remains unclear. SM is both an individual and social activity and whether the two are even separable is yet to be resolved (Weick 1995).

So far, the discussion has centered around SM being about placing information into frameworks, comprehending, redressing surprise, constructing meaning and interacting in the pursuit of understanding. Weick (1995) 'sharpens' this

broad conceptualization of SM by comparing and contrasting it with interpretation, because interpretation is often used as a synonym for SM;

> *Such synonymous usage is not a blunder, but it does blur some distinctions that seem crucial if one wishes to understand the subtleties of sensemaking in organized settings* (p. 6).

Weick (1995) goes on to say that interpretation implies that something already exists to translate; it literally means a rendering, whereby one word is explained by another. Mailloux (1990) states that interpretation is an *"approximate and acceptable translation"* (p. 121). Therefore, when interpretation is equated with translation, it is the interpreter who determines what is 'acceptable' to them through 'known' frameworks such as perceived identity (Gioia and Thomas 1996) and stored memories in the form of experiences, routines and culture and the object to be translated must be transposed against these.

When interpretation is incorporated in organization studies, it is often invoked because ambiguity and equivocation are seen as prominent accompaniments of organizational action (Huber and Daft 1987). Indeed Lounamaa and March (1987) argue that organizational life is as much about interpretation, intellect, metaphors of theory, and fitting our history into an understanding about life, as it is about decisions and coping with the environment.

Clear descriptions about the nature of SM that extract it from interpretation are found in the work of Schön (1983), Shotter (1993) and Thayer (1988). Schön discusses problem setting as a key component of professional work. In real world practice, problems do not present themselves to practitioners as givens; they must be constructed from the materials of problematic situations and in order to convert a problematic situation to a problem, a practitioner must do a certain kind of cognitive work.

Shotter (1993) likens managing to authoring a conversation and describes a manager's task as

> *generating a clear and adequate formulation of what the problem situation 'is', of creating from disorderly events a coherent 'structure' within which both current actualities and further possibilities can be given an intelligible 'place' – and of doing all this, not alone, but in continual conversation with all the others involved* (p. 150).

Thayer (1988) pulls these strands together in an analysis of leadership. His idea is that a leader is;

> *One who alters or guides the manner in which his followers 'mind' the world by giving it a compelling 'face'.... A leader does not tell it 'as it is'; he tells it as it might be...The leader is a sense-giver* (p. 250).

Each of these descriptions begins to more finely tune the distinctions between SM and interpretation. A key distinction is that SM is about the way people *generate* what they interpret. One of the crucial properties of SM is that human situations are progressively clarified (Weick 1995); it is less often the case that an outcome fulfills some prior definition of the situation and more often the case that an outcome develops that prior definition. Garfinkel's (in Maynard and Manzo 1993) studies of juror decision making processes found that decisions were defined retrospectively, *"Only in retrospect did they decide what they did that made their decisions correct ones"* (p. 182).

A similar emphasis on the idea that outcomes develop prior definitions of a situation is found in cognitive dissonance theory. A considerable body of work in organization studies shows the legacy of cognitive dissonance theory and includes the ideas of enactment (Weick 1977a), commitment (Brickman 1987), rationality and rationalization, attribution (Staw 1980), justification (Staw, McKechnie and Puffer 1993) and motivation (Staw 1980). Dissonance theory focuses on post decisional efforts to revise the meaning of decisions that have negative consequences (Thibodeau and Aronson, 1992). To reduce dissonance,

people enhance both the positive features of the chosen alternative and the negative features of the foregone alternative.

SM therefore differs from interpretation. SM is clearly about a process, whereas interpretation could be a process but could also be a product. A focus on SM as opposed to interpretation induces a mindset to focus on process that makes it a particularly appropriate theory for the current research. Even when interpretation is treated as a process, it implies that something is there, waiting to be discovered. The rational choice and decision model so favoured by management theorists fuels the idea that the realities of the marketplace are out there waiting to be discovered, but in practice the SM process is less about discovery and more about inventing or creating. 'Interpretation' implies that the object yet to be interpreted is clearly evident. No presumptions like this are implied in SM.

SM begins with basic questions like why is this so and what next? (Weick 1995). Therefore several questions arise and must be dealt with before interpretation comes into play. The way these earlier questions are resolved, determines which interpretations are plausible. In this way reality is an ongoing accomplishment that takes form when people make retrospective sense of the situations in which they find themselves. In summary, SM is about placing stimuli into frameworks and the creation of those frameworks as an ongoing accomplishment. It is about reflective practices of justification for actions taken in order that dissonance be reduced.

SM is also about information processing cycles. The cycles can begin when frameworks for understanding are interrupted or disconfirmed by unexpected or dissonant events within ongoing experiences. The resultant 'interpretation' is an outcome of the cyclic information processing that shapes both the object to be interpreted and the subject's framework for interpretation.

The preceding paragraphs have begun to unfold the multiple distinguishing characteristics of SM that differentiate it somewhat from other explanatory processes such as translation and interpretation. The next section explains how SM processes are applied at levels above the individual sensemaker, that is, at the organizational level.

3.3 A SENSEMAKING PERSPECTIVE ON ORGANIZATIONS

"There is no such thing as a theory of organizations that is characteristic of the sensemaking paradigm" (Weick 1995 p. 69). Nevertheless, SM is the central activity in the construction of both the organization itself and the environments it faces. A central theme in both organizing and SM is that people organize to make sense of equivocal inputs and enact this sense back into the world to make that world more orderly. SM therefore is more about the interplay of action and interpretation rather than the influence of evaluation on choice (Weick, Sutcliffe and Obstfeld 2005).

One way of thinking about SM at macro levels is to look at Wiley's (1988) conceptualization of three levels of SM 'above' the individual level. In ascending order they are, (1) 'inter-subjective', (2) 'generic-subjective' and (3) 'extra-subjective'. Inter-subjective SM becomes distinct from individual SM when individual thoughts, meanings and feelings are merged or synthesized through verbal conversations with others. Generic-subjectivity, is the shift from interaction between individuals to the level of the social structure, where social structure implies a generic role played by the actor; a part that anyone can fill. Wiley (1988) includes organizations at this level. Inter-subjective meanings may themselves be shaped by generic-subjective meanings in the operating context of the organization. Extra-subjective meaning is where the subject can be replaced by pure meanings. Barley (1986) discusses culture as the institutional realm or symbolic reality, *"an abstract idealized form derived from prior interaction"* (p. 83).

Weick (1995) argues that inter-subjective processes of organizing move between inter-subjectively shaped meanings and generic-subjective shaped meanings; that organizations are adaptive social forms shaped by social interactions and understandings that *"can be picked up, perpetuated and enlarged by people who did not participate in the original intersubjective construction"* (p. 72). Schall (1983) also outlines the bridge that connects the two main social forms of meaning-making in organizations. He argues that organizations are entities developed and maintained through continuous communication activities among the participants and that these create an organizational culture that is revealed through its communicating activities (Schall 1983).

Section 3.3 has outlined how SM can be conceptualized as occurring in organizations at levels above the individual sensemaker and the meanings he/she makes. This occurs through processes of communication from the level of the individual sensemaker who shares conversations with others to derive meanings, to the level of the organization as a social structure where *"people share many beliefs, values and assumptions that encourage them to make mutually-reinforcing interpretations of their own acts and the acts of others"* (Smircich and Stubbart 1985 p. 727).

Literature related to SM processes in organizations converges around the themes of placing information into frameworks, comprehending incoming information, redressing surprise, constructing meaning and interacting with others in the pursuit of understanding. A SM perspective on organizations and organizing has been outlined whereby organizations have been conceptualized as social structures that combine the generic-subjectivity of interlocking routines with the inter-subjectivity of mutually reinforcing interpretations through communication activities. The following section now outlines the mechanics of SM processes in organizations.

3.4 HOW DOES SENSEMAKING WORK IN ORGANIZATIONS ?

Even though most organizations are interested in productivity, existing theories of organizations run into the same problem: how does thought get translated into action? Weick (1969) suggests that this is achieved through interlocked behaviours that make up the basic elements of any organization; *"they consist of repetitive, reciprocal, contingent behaviours that develop and are maintained between two or more actors"* (p. 91). Each actor in interacting with the other, accomplishes the removal of equivocality through interlocked behavioural cycles. Each cycle can remove some equivocality, but it is only when several different cycles are applied to the information that a sufficient degree of certainty is produced for unequivocal action to take place. This is how SM processes are linked to action.

In this conceptualization of information processing cycles occurring through behavioural communication activities, organizing is directed toward information processing generally, but more specifically toward the removal of equivocality from informational inputs (Weick 1969) in order that action be enabled. If equivocality is to be removed, two things must happen; first it must be recognized and then second, it must be removed. This is accomplished through a process modeled on enactment theory (Jennings and Greenwood cited in Weick *et al* 2005). Figure 3.2 outlines the basic model of the SM cycle in organizations adapted from Weick *et al* (2005). It contains elements of the process and the relationships between the elements with explanations of how these elements interact.

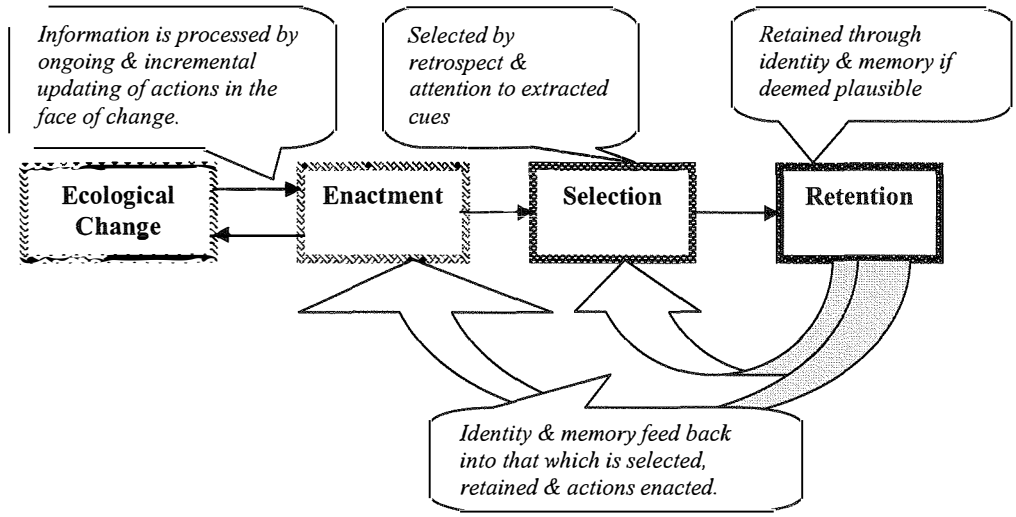

Figure 3.2 The Sensemaking Cycle – The Relationships Among Enactment, Selection and Retention in Organizations

Source: Adapted from Weick *et al* (2005 p. 414)

The model proposes that SM consists of reciprocal exchanges between actors (enactment) and their environments (ecological change) that are made meaningful (selection) and preserved (retention) (Weick *et al* 2005). *Enactment* is the process by which individuals in an organization actively create the environments they face and is activated when a discrepancy between expectations and received signals occurs in the flow of ongoing experiences. *Selection* is the process by which people begin to generate answers to their question 'what's going on here?' (Weick 1969 p. 91). The selection process chooses the meanings that can be imposed on the equivocal data from the enactment process. These meanings may be derived from prior experiences and rules that have been applied successfully in the past. *Retention* is the process by which *sense-made*, that is, enacted meanings (Choo 1998) are stored in memory so that they may be possibly retrieved on future occasions for SM. Retained meanings are stored and become cause maps that identify and label variables and connect the variables in causal relationships (Weick 1979 p. 131).

Thus, the mechanics of SM are well known. SM occurs cognitively and cyclically within individuals through behavioural interaction with other organization members. These interactions progressively remove equivocality from informational inputs through processes of enactment, selection (which can be affected by prior experiences whether they be personal, interpersonal, cultural or rules for organizing) and retention (which is also affected by prior experience and what is deemed to be worthy of retention as considered by the actor embedded within the organization).

As the purpose of the current research is to use SM theory to ultimately operationalize these market information processes in organizations, the model described above, representing the cycles that occur within the SM process, provides some insight into what to look for in organizations. Unfortunately, it will be very difficult to directly observe these processes in operation in organizations. Weick's (1995) later work however, begins to synthesize and make more concrete, the properties of SM in organizations and the order in which they occur. These properties of SM being more observable in real world settings, have been used in observational research in the past and should contribute to understanding which behaviours and activities in organizations contribute to SM and that might be measurable in organizations.

3.5 THE SEVEN PROPERTIES OF SENSEMAKING

The seven properties of SM are articulated in detail here so as to inform the development of a working model to guide the exploratory stage of the research and around which propositions and hypotheses might be developed. These seven properties identified by Weick (1995) are presented as an holistic description of the particular characteristics of SM. They are mentioned often in organizational literature and each has practical implications within organizations. The sequence of seven properties is a crude representation of the

SM process but serves as a guide for inquiry. SM is understood as a process that is,

1. Grounded in identity construction
2. Retrospective
3. Enactive of sensible environments
4. Social
5. Ongoing
6. Focused on and by extracted cues.
7. Driven by plausibility rather than accuracy (Weick 1995).

Each property is now briefly reviewed to unpack qualities of the SM process as it relates to organizational settings.

3.5.1 Grounded in Identity Construction

SM begins with a sensemaker. Bettis, Mills, Williams and Nolan (2005) state that identity construction is at the root of SM and influences how other aspects of the SM process are understood. From a SM perspective, who we think we are (identity) as organizational actors, shapes what we enact and how we interpret, which affects what outsiders think we are (image) and how they respond to us, which then stabilizes or destabilizes our identity (Weick 1995). This is the beginning of the 'framework for understanding' so often used to describe the SM process.

SM, even though at first glance appears an individual activity, is not, because no individual can act like an individual sensemaker. Instead, all individuals are a parliament of selves (Mead 1934). Identities are constituted out of the process of interaction with others and as Knorr-Cetina (1981) states, *"the individual is a typified discursive construction"* (p. 10). Thus, sensemakers themselves are *"an ongoing puzzle undergoing continual redefinition, coincident with presenting some self to others and trying to decide which self is appropriate"* (Weick 1995 p. 20).

Erez and Earley (1993) in their presentation of cultural self-representation theory view the self as a socially situated *"dynamic interpretive structure that mediates most significant intrapersonal and interpersonal processes"* (p. 26). They argue further that self-concept is to a large extent an agent of its own creation. The processes that develop and maintain a person's changing sense of self, are posited to operate in the service of three self-derived needs: (1) the need for self enhancement, as reflected in seeking and maintaining a positive cognitive and affective state about the self; (2) the self efficacy motive, which is the desire to perceive oneself as competent and efficacious and (3) the need for self consistency, which is the desire to sense and experience coherence and continuity (Erez and Earley 1993 p. 28).

Ring and Van de Ven (1989) made a similar point in their study of social transactions as occasions for innovation. They state that SM processes derive from the need within individuals to have a sense of identity, meaning and a general orientation to situations that maintain esteem and consistency of one's self conceptions. Chatman, Bell and Staw (1986) link these self- confirmation processes of SM to organizational behaviour when they state,

> *When we look at the individual behaviour in organizations, we are actually seeing two entities: the individual as himself and the individual as representative of his collectivity...Thus, the individual not only acts on behalf of the organization in the usual agency sense, but he also acts, more subtly, "as the organization" when he embodies the values, beliefs, and goals of the collectivity. As a result, individual behaviour is more 'macro' than we usually recognize* (p. 211).

3.5.2 Retrospective

This characteristic is perhaps the most distinguishing property of SM. The creation of meaning, the outcome of the SM process, is an attentional process, but attention to that which has already occurred. Since attention is directed backward from a specific point in time – from the present – and whatever past

experiences it fixes on become the meaningful objects, memory processes, whether they be retention or reconstruction influence meaning. Mead (1956) states, "*We are conscious of what we have done, never of doing it*" (p. 136).

The idea of retrospective SM is derived from Shutz's (1967) analysis of "meaningful lived' experience. The key word, 'lived' is stated in the past tense to capture the reality that people can only know what they are doing after they have done it.

SM is therefore an attentional process to that which has already occurred. Because attention is directed backward from a specific point in time, whatever is occurring presently will also influence what is discovered. And because the subject to be interpreted has actually elapsed and is only a memory, anything that affects remembering will also affect the sense that is made of those memories.

3.5.3 Enactive of Sensible Environments

Weick (1995) uses the word enactment to preserve the fact that in organizational life, people act and in doing so create the materials that become the constraints and opportunities they face. That is, they often produce their own environment (Weick 1995 p. 30). The word 'environment' suggests something that is fixed and set apart from the individual, Weick (1995) calls this type of thinking *"nonsense"* (p. 33). In trying to understand change in the environment, the 'sensemaker' attends to or isolates salient features by bracketing and focusing on particular informational cues. This bracketing subtly 'enacts' a particular environment, that which is being actively 'constructed' by the sensemaker.

3.5.4 Social

So far, much of the discussion on SM has suggested that it is an individual activity. However, it is a profoundly social process as, *"human thinking and*

social functioning...[are] essential aspects or one another" (Resnick, Levine and Teasley 1991 p. 3). Social processes shape interpretations and interpreting, because conduct is contingent upon the conduct of others, whether imagined or physically present.

Although it is important to conceptualize SM as a social activity, it is also important to maintain a differentiated view of the forms social influence may take. Many people discuss shared meaning or social construction as if these concepts say everything there is to say about social SM (Weick *et al* 2005). However, SM is also social when people coordinate their actions on grounds other than shared meanings, as when joint actions are coordinated by for example, overlapping views of ambiguous events (Eisenberg 1984). Czarniawska-Joerges (1992) argues that shared meaning is not what is crucial for collective action, but rather that it is the *"experience of collective action that is shared through retrospective attribution of meanings"* (p. 33).

Some work is emerging questioning the construct of collective beliefs, particularly as it relates to the question of whether shared beliefs are necessary for effective organizational action. The work of Hutchins (1991) on distributed cognition, Weick and Roberts (1993) 'heedful interrelating' and Turner's (1978) earlier work on variable 'disjunction of information'[3] (p. 50) appear to have focused less on assembling and diffusing pre-existing meanings and more on collective induction of new meanings. Weick *et al* (2005) state that when diverse theories are being pursued among numerous parties, the discrepancies and ambiguities among the meanings induced may in fact contribute to more effectiveness when they provide diverse, but equivalent rather than shared meanings.

[3] "a complex situation in which a number of parties handling a problem are unable to obtain precisely the same information about the problem so that many differing interpretations of the problem exist" (Turner, 1978 p. 50).

3.5.5 Ongoing

Flows are the constants of SM (Weick 1995). In order to understand SM, one has to accept that people chop moments out of continuous flows of experience and extract cues from those moments for attention.

Eccles and Nohria (1992) describe the context of managing as the ongoing flow of actions and words in an organization, which are often punctuated by events such as a strategic planning exercise, a budget meeting or a product launch. They state that these events are important because they crystallize meanings in organizations and serve as focal points for different streams of ongoing activity. Similarly Cohen, March and Olsen (1972) state that streams of problems, solutions, people and choices flow through organizations and converge and diverge independent of human intention.

3.5.6 Focused on and by Extracted Cues

Extracted cues are simple familiar structures that are the seeds from which people develop a larger sense of what might be occurring. The importance of these cues in organization analysis was recognized by Smircich and Morgan (1982) when they said. *"leadership lies in large part in generating a point of reference against which a feeling of organization and direction can emerge"* (p. 258).

What an extracted cue becomes depends on context (Weick 1969). First context affects what is extracted in the first place, a process that has been variously described as search (Cyert and March 1963), scanning (Daft and Weick 1984) and noticing (Starbuck and Miilken, 1988). Second, context also affects how the extracted cue is then interpreted.

The process of noticing has been discussed by Starbuck and Milliken (1988) who in contrast to Weick (1995), distinguish noticing from SM stating that

noticing refers to the activities of filtering, classifying and comparing, whereas SM refers more to interpretation and the activity of determining what the noticed cues mean. They prefer the term noticing rather than scanning because scanning sounds more conscious and more under the control of preconceptions. Taylor (1991) reviewing the social cognition literature, concludes that among the things we notice are,

> *things that are novel or perceptually figural in context, people or behaviour that are unusual or unexpected behaviours that are extreme and sometimes negative and stimuli relevant to our current goals* (p. 265).

3.5.7 Driven by Plausibility rather than Accuracy

Weick (1995) states that a reasonable position to start from in studies of SM is to argue that accuracy is nice, but not necessary (Weick 1995 p. 56). Isenberg's (1986) studies of managerial thinking show the importance of plausible reasoning, which are described thus,

> *Plausible reasoning involves going beyond the directly observable or at least consensual information to form ideas or understandings that provide enough certainty....There are several ways in which this process departs from a logical-deductive process. First, the reasoning is not necessarily correct, but it fits the facts, albeit imperfectly at times. Second, the reasoning is based on incomplete information* (p. 242-243).

In a similar vein, Starbuck and Milliken (1988) observe that, *"one thing an intelligent executive does not need is totally accurate perception"* (p. 40). Sutcliffe (1994) has shown that accurate perceptions of environmental variation are affected by different managerial and organizational factors and raises the possibility that inaccurate perceptions, under some conditions, may still lead to positive consequences (p. 1374).

The strength of the SM perspective for management, is that its model is not objective perception, but is more about pragmatics, coherence, reasonableness, creation and invention and it,

> *takes a relative approach to truth, predicting that people will believe what can account for sensory experience, but what is also, interesting, attractive, emotionally appealing and goal relevant* (Fiske 1992 p. 879).

SM is about the embellishment of an extracted cue that links it to a more general idea; quick responses may shape events before they have become crystallized into a single meaning.

3.5.8 Summary

The purpose of the review of SM theory has not been to argue for or against its properties, components or operation in organizations. SM theory enjoys broad acceptance and Weick's (1995) seven properties of SM in particular are used and referred to in the literature as a given in many cases. However, SM theory is more often used as an explanatory framework to explore and explain events, rather than the theory and concept of SM being investigated and evaluated itself.

The picture that is beginning to emerge about SM as it occurs in organizations is that is composed of both substance (meanings made through filtering and framing) and process (communications and social interactions with others, implied or present) and that each aspect both influences and is an outcome of the other. These aspects of SM will be elaborated in the final section of this chapter where a proposed model of SM in organizations is presented. The next section briefly looks at recent research using the SM concept to further inform the model development process.

3.6 RECENT RESEARCH IN SENSEMAKING

Functionalist perspectives have dominated organizational research in the last twenty years or so (Petranker 2005), yet the idea that objective knowledge can

be obtained by subjective means, a SM perspective, has begun to make significant headway (Drazin, Glynn and Kazanjian 1999). Nevertheless, despite the SM process having been cited for its substantial theoretical importance, relatively little empirical research has investigated in detail either the proposed properties or dimensions of SM (Milliken 1990) or their potential link with organizational performance. SM has been criticised for its lack of conceptual coherance (Thomas *et al* 1993) and for having an underlying research methodology that is invisible, incomprehensible, illegitimate or impractical (Pfeffer 1995). The need for more explicit research has been identified by Orton (1997) and while it is clear that a significant research agenda remains, there is already some important research emerging that takes a SM perspective to notions of organizations and organizing.

A SM approach has been used to explain a number of organizational phenomena, including problem sensing (Keisler and Sproull 1982), strategic management (Rouleau 2005; Smircich and Stubbart 1985) and strategic learning (Thomas, Sussman and Henderson 2001), organizational change (Balogun 2006; Isabella 1990), strategic change initiation (Gioia and Chittepedi 1991; Gioia and Thomas 1996), image and identity (Dutton and Dukerich 1991; Ravasi and Schultz 2006), organizational response to disaster (Weick 1993), organizational (Thomas *et al* 1993) and professional culture (Bloor and Dawson 1994), restructuring (Bean and Hamilton 2006; Greenberg 1995), entrepreneurial and innovative activities (Seligman 2006; Hill and Levenhagen 1995), product innovation (Dougherty, Borrelli, Munir and O'Sullivan 2000), organizational conflict (Volkema and Farquar 1996), creativity in organizations (Wagner and Gooding 1997), employee (Bean and Eisenberg 2006) and organization values (Van Rekom, Von Riel and Wierenga 2006; Cha and Edmondson 2006) and human resource management issues (Wayson and Watson 1999).

SM has been primarily used as a conceptual framework for investigation and for explaining other organizational concepts and processes. The research methodologies used, have been predominantly qualitative in nature as the SM process usually occurs within individuals and/ or is mediated between them rendering it difficult to model and measure. The growing body of research using SM as a conceptual framework, in particular the diversity of applications, attests to its usefulness as a conceptual framework for understanding many aspects of organizational activities and behaviours. The following sub-sections synthesize recent salient empirical work aimed at discovering or making more explicit, SM processes in organizations.

3.6.1 Coping with Change through SM

Gioia and Chittepeddi (1991) reported an ethnographic study of a strategic change effort at a large public university. Methodology employed was participant observation and in-depth interviews. The outcomes of the study suggested two major dimensions for an explanatory framework, SM and sensegiving.

Bean and Hamilton (2006) found through interviews in a hi-tech industrial setting with a high proportion of nomadic workers, that downsizing led to idiosyncratic SM by employees. They concluded that nomadic workers adopted frames for SM that lacked organizational coherence and stabilizing discourse; this was said to be due to few geo-social constraints.

Greenberg (1995) employed case study methods to investigate the SM process occurring during departmental change. She found that as leaders did not explicitly direct understanding, organization members had to rely on the available symbolic processes to guide their development of their understanding of the new order. A new reality did not exist as a consequence of organization change, but was rather constructed by members actively engaged in the SM process.

3.6.2 Image and Identity

In a study of organizational identity, Dutton and Dukerich (1991) documented the identity of The New York Port Authority as seen through the perceptions of its employees. Outsiders perceived the Port Authority to be handling a public relations issue badly, thus creating a negative image. Whilst employees initially perceived a positive identity of the organization, this perception increasingly became confused, as negative images presented by external stakeholders affected employees own interpretations of the organization. Employees were then forced to alter the sense they made of those images and in the process redefined their perceived organizational identity.

Ravasi and Schultz (2006) found in their longitudinal study that responses to the environment made by an organization forced organization members to question and reevaluate aspects of organizational identity as it interplayed with construed image. They found that organizational culture served as a source of cues that supported SM processes within the organization.

3.6.3 Innovative Organizations

Dougherty, Borrelli, Munir and O'Sullivan (2000) found that in innovative organizations, people made collectively more sense of more knowledge than their counterparts in less innovative organizations. Interviewing 119 people from 12 large organizations, they argued that SM systems exist in organizations and affect overall OL.

3.6.4 Decision Processes

Wilson and Woodside (2001) investigated decision processes by managers and consumers through examination of extant literature. Research included modeling implicit thinking and decision-making processes, however, 'thick'descriptions of these processes were found more often in the literature. They concluded that automatic thinking rather than explicit or 'strategic'

thinking appears throughout most phases of decision-making and decision-makers are unaware of how such unintended thoughts influence their choices.

3.6.5 Management Cognitions

Rosa (2001) mapped SM as behavioural cognition cycles in managers exposed to ambiguous environmental signals, to determine that managers were influenced by individual cognitive preferences and controlled informational cues. Content analysis and field experiments were used to observe managerial perceptions and SM processes.

3.6.6 Scanning, Interpretation & Action Model

Thomas, Sussman and Henderson (2001) investigated the strategic SM processes of scanning, interpretation and action and how these activities were linked to performance. The methodology employed was content analysis of a multi-informant single case study design. The findings of the research resulted in a proposed model of strategic learning.

3.6.7 Influencing Channel Members

Hopkinson's (2001) work in channel management found that the key to influencing channel members' actions within the channel, was to take managerial actions congruent with the members' SM processes. Narrative analysis was the methodology employed.

3.6.8 Organizational Knowing

Choo (2001) outlined an organizational knowing cycle in the World Health Organization (WHO) that enabled success in their program to eradicate smallpox. This involved interpreting raw data gathered, through a framework of SM processes such as enactment, selection, retention and adaptation

3.6.9 Strategic Issue Interpretation

Kuvaas (2002) found a positive relationship between information processing capacity of management teams and manageability and control over the

environment. It was thought that increasing the flow of information within organizations would equate to increased control and manageability of the environment, but this was not the case. Only those organizations that evidenced increased information processing capacity, that is, where there was evidence of rules, procedures, patterns of interaction and participation, found that there was increased control over the environment. Quantitative analysis was used utilizing pre-existing scales to operationalize information availability and team information processing structure.

The empirical research cited above coalesces around ideas such as frameworks for understanding, these being based on perceived identity, use of memories embedded in cultures, routines and past decisions and the notion that identity is open to adjustment based on its relationship with information processing cycles attached to interpreting external events. Embedded in the literature, but less obvious from the studies (with the exception of Bean and Hamilton's (2006) nomadic employees who experienced increased ambiguity and less coherent SM due to their fewer social interactions within the organization), is the notion that the information processing cycles occur though socialized communication activities within organizations.

The studies cited above explicitly attempt to make more salient, SM processes in organizations. There is growing evidence that SM does occur as Weick proposes (1969; 1979; 1995; 2001), that is through the properties described in section 3.5 earlier. What is also clear is that the observation of those processes is problematic for researchers in that SM is not *directly* observable. However, the exploration of the empirical literature about the process and operation of SM in organizations has enlightened and enlarged the possibilities for components of a working model of SM in organizations capable of being tested and which is developed in the next section.

3.7 TOWARDS A MODEL OF A SENSEMAKING SYSTEM IN ORGANIZATIONS

As stated earlier in section 3.5.8 'Summary of SM Process in Organizations', the picture that is beginning to emerge about SM in organizations is that it is composed of both substance (frameworks for understanding based on prior experiences) and process (communications activities based on social interactions in organizations) and that each aspect both influences and is an outcome of the other. That is, there is an interaction effect or feedback loops operating between the elements of SM. The substance is comprised of past sense made, which resides in 'identity' (who we think we are) and 'memories' (rules of operating, past experiences and decisions made and cultures) and the process occurs through cycles of information processing which operate through communication activities between actors within organizations. Hence, it is proposed that behaviours that would indicate identity, memory and social interactions within organizations should capture the operation of SM within organizations. A set of behaviours that represent these concepts and the interactions that occur between them should present a model of a sensemaking system (SMS) operating in organizations capable of being measured and tested.

Figure 3.3 is proposed as the initial model to inform further exploratory research. The model proposes (P1) that SM or in an operationlized context, a SMS – we cannot directly observe SM – is comprised of three dimensions that interact and therefore co-vary with one another. The three dimensions are: Organizational Identity, Organizational Memory and Social Interaction in Organizations.

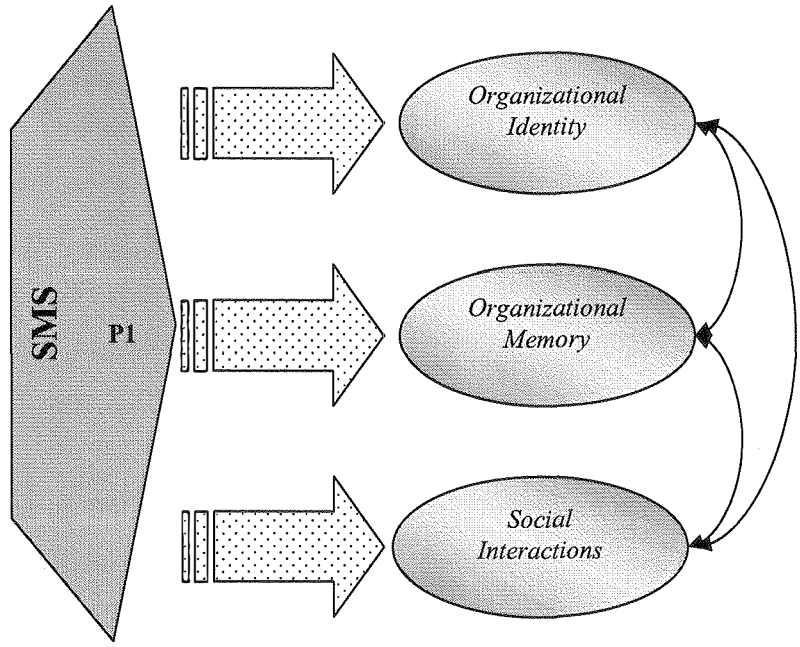

Figure 3.3 A Multidimensional Model of a SMS in Organizations

3.8 CONCLUSION

The purpose of this chapter was to both review the focus theory of the research, SM theory, and to propose a researchable model of MIP based on SM theory, a SMS. SM theory was applied to the research problem as it appears to offer a more finely grained view, when compared to other frameworks, of the mechanics of information processing in organizations. In particular, it is invoked as 'interpretation', 'memory', 'communication processes' and the means by which the context for organizing – the perceived environment – is constructed. The outcomes of SM processes are also said to remain in organizations at higher levels than individual SM in cultures, rules, and procedures. SM theory therefore offers insight into an alternative perspective on organizations that may more accurately depict what is really occurring in an everyday sense as people in organizations deal with imperfect and often distributed information (Weick *et al* 2005).

The chapter has described what SM is and outlined a SM perspective on organizations. The mechanics of SM processes in organizations have also been articulated. The seven properties of SM have been explored in detail and finally, recent research in SM has been reviewed. The review of recent research has determined that there currently exists evidence that SM as conceptualized by Weick (1995) does occur in organizations and that improved SM processes may to lead to organization effectiveness (e.g. Kuvaas 2002; Choo 2001; Rosa 2001; Hopkinson 2001).

In the research outlined in Section 3.6, SM processes have been invoked to explain the findings of OL, managerial cognition and decision-making and organizational information processing. However, neither SM nor its sub-processes have previously been explicitly modeled and tested or linked with performance outcomes in the literature[4].

An initial proposition regarding the construction of a working model of an operationlized SMS in organizations has been presented and developed in Section 3.7. This model consists of three dimensions, Organizational Identity, Organizational Memory and Social Interaction with interaction effects between the dimensions also being proposed. The following chapter continues the model development process, as the proposed SMS and its constituent dimensions require further exploration before field work begins. Chapter four outlines this further development of the conceptual model that guides the research and the hypotheses that emerge from that development.

[4] Kuvaas (2002) measured team information processing (IP) but did not link this to performance, but rather IP was linked to perceived controllability of environment.

CHAPTER FOUR: CONCEPTUAL DEVELOPMENT AND HYPOTHESES

4.1 INTRODUCTION

The objectives of this chapter are to (1) develop constructs that measure the proposed model of a SMS and are capable of being tested, (2) to develop a structural model of MIP in organizations that accounts for information processing in detail, as practiced through the SMS, and that relates it to Sensing, Response and Performance in organizations.

The preliminary conceptual model of a SMS proposed in chapter three comprised three primary dimensions: Organizational Identity, Organizational Memory and Social Interactions, with co-variation effects being proposed between the dimensions. Given the three dimensions comprise complex concepts in their own right, this chapter develops each dimension into a measurable construct through literature examination, forwarding hypotheses concerning the sub-dimensions of each dimension and culminating in a multidimensional hierarchical model of a SMS in organizations. The chapter undertakes this in a stepwise manner beginning with the first dimension, Organizational Identity. Therefore, the ordering of hypotheses begins with H2, as it concerns one dimension of the SMS and then continues through the other two proposed dimensions (H3 and H4) culminating in the final hypothesis, H1, which relates to the construct of the overall SMS itself.

The chapter then proceeds to develop hypotheses related to the relationship of the SMS to other organization variables such as Sensing, Response and Performance. These variables also require the development of constructs capable of measurement and an explanation of this is undertaken, leading to the development and discussion of hypotheses regarding the structural relations between variables in the model. Figure 4.1 illustrates the chapter's framework.

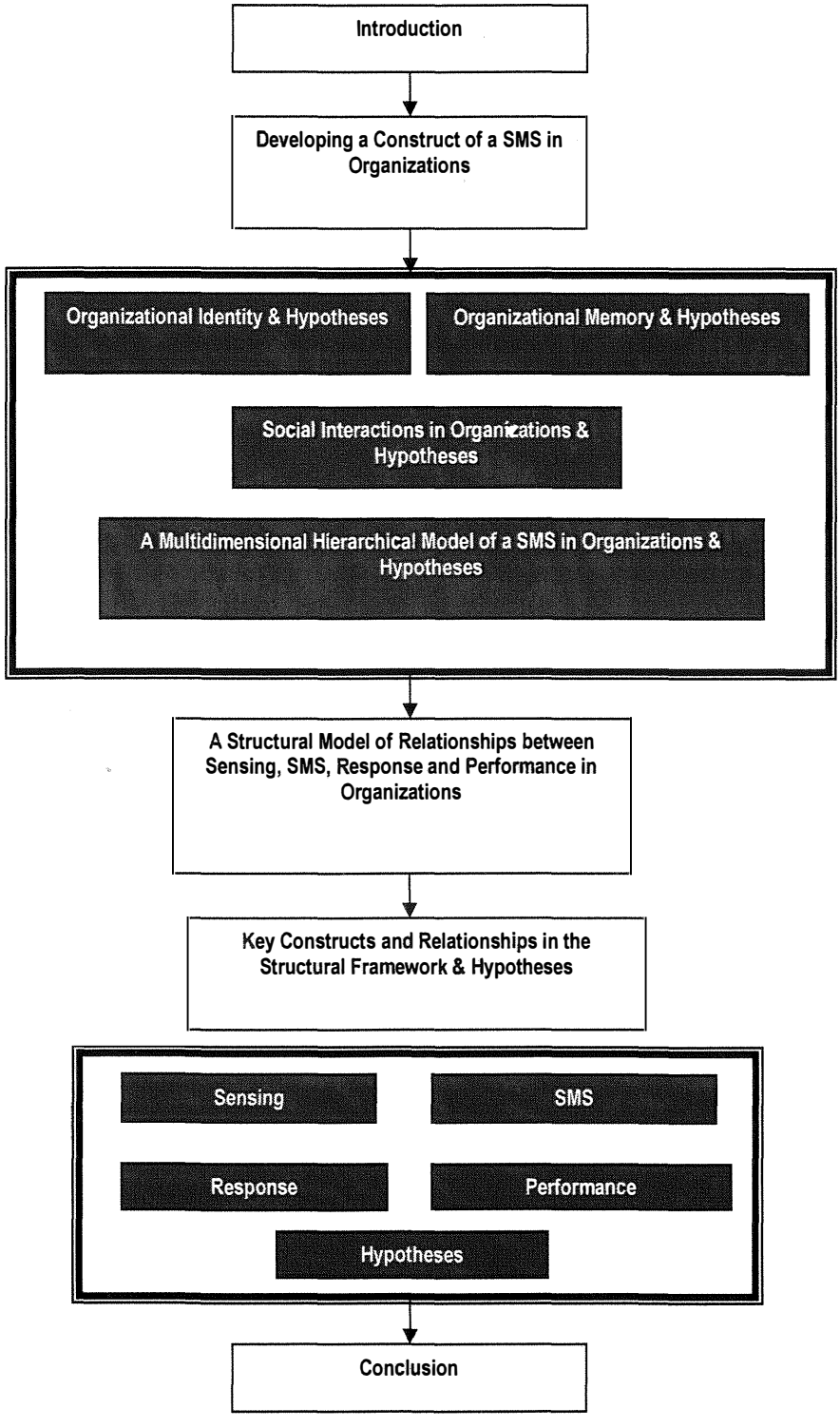

Figure 4.1 Chapter Four Framework

4.2 DEVELOPING A CONSTRUCT OF A SMS IN ORGANIZATIONS

Chapter three proposed a preliminary model of a SMS in organizations comprising three dimensions that interact or co-vary, Organizational Identity, Organizational Memory and Social Interactions. Organizational Identity was included as the first dimension, as the SM process is 'grounded in identity construction' (Weick 1995) and identity is at the root of SM influencing how other aspects of the SM process are understood (Mills 2002). Dutton and Dukerich (1991) identified organizational identity as the key concept that provided an organization with a viable framework for understanding and action. Organizational Memory being the second dimension of the SMS captures the notion of 'retrospection' as *"this characteristic is perhaps the most distinguishing property of sensemaking"* (Weick 1995 p. 24). It also captures the retention aspect of the SM process (see Figure 3.2 p. 47) and the two dimensions – Organizational Identity and Organizational Memory - begin to unfold the filtering processes that determine which events are 'sensed' and how they are remembered and framed for attention. These two concepts interact with one another in that perceived Organizational Identity, that is, 'who' the organization thinks it is or represents, initially determines which events are attended to and how they are interpreted (Erez and Earley 1993). Current interpretations are then embedded in prior interpretations retrieved through memory processes becoming preserved in cultures, rules, procedures and experiences, these then feeding back and shaping perceived identity or the organizational perception of 'who we are'. These two dimensions form the substance, or sense, of the SM process.

Social Interactions is the third dimension of the SMS capturing the process or 'making' aspects of SM. Schall (1983) argues that organizations are entities developed and maintained through continuous communication activities which shape interpretations and interpreting, becoming embedded in a particular culture which then feeds back into the ways in which communication activities

unfold. Hence, the necessity for modeling interaction effects between Organizational Identity, Organizational Memory and Social Interactions.

The following sub-sections address each of the three dimensions of the SMS individually, outlining extant literature and developing hypotheses related to constructs capable of being tested.

4.2.1 Organizational Identity – The First Proposed Dimension of a SMS

Social (collective) identity is recognized as a critical construct in the organizational behaviour literature (Ashforth and Mael 1989). At the organizational level, corporate or organizational identity concerns those features *"that members perceive as central, enduring and distinctive and contribute to how members define their organization"* (Gioia and Thomas 1996 p. 370).

The notion of organizational identity is derived from early research work in the social sciences that identified and defined individual identity (Mead 1934; James 1950; Cooley 1902). Implicit and important in these writings is the key idea that identity is composed of those attributes that are core and consistently traceable over time and which makes individuals 'who' they are. Social identity theory tells us that people construct themselves as having some set of essential characteristics and importantly, that they engage in interpretations and practices intended to affirm the continuity of the self over time and place (Steele 1998).

Social identity theory also tells us that people tend to focus on their distinctiveness *vis-à-vis* others (Tajfel 1982) and that these comparisons offer a way of distinguishing the self from others and allow people to see themselves as similar to other classes of individuals with whom they may wish to associate themselves (Erickson 1964). This maintenance of similarities and differences, or an optimal level of ambiguity (Weick 1995), enables something akin to multiple personalities to exist in one individual, each one best suited to a

specialized role or context; *"a person has many different social selves appropriate for different audiences"* (James 1918 p. 294).

These aforementioned writers converge on a definition of identity as an individualized framework for understanding oneself, formed and sustained through social interaction with others. Therefore, identity is fundamentally a relational and comparative concept (Tajfel and Turner 1985). These important features of individual identity form the basis of the extension of the notion of identity to organizations.

Organizational identity is usually portrayed as that which is core, distinctive and enduring about the character of an organization (Albert and Whetten 1985). Identity captures the essential features of an organization. Similar to individual identity, organizations maintain identity through internal interactions, and externally, with other organizations by a process of inter-organizational comparison over time (Albert, 1977).

Organizations can be viewed as subsuming a multiplicity of identities, each of which is appropriate for a given context or audience. Thus, organizations can plausibly present a complicated, multifaceted identity, each component of which is relevant to specific domains or constituents, without appearing fragmented as an individual might. However, rather than manifesting these multiple identities according to gender, race, or role as individuals might do, organizations instead develop them through core values, practices, and most visibly through goods and services (Gioia in Whetten and Godfrey 1998).

Another point of conceptual difference between individuals and organizations concerns the stability or endurance of identity. Organizational identity appears to be much more fluid than individual identity (Gioia, Shultz and Corley 2000). Although individuals and organizations display central features of identity that are both stable and unstable simultaneously, what is core about organizations

can change much more rapidly than individuals can reinvent themselves (Gioia in Whetten and Godfrey 1998).

Organizational environments can shift rapidly. New features, both contextual and competitive appear and supplant old ones and goods and services undergo change – all of which have an impact that requires ongoing reconstruction of identity so that the organization can maintain flexibility (Corley and Gioia 2004). This could explain why organizations also display tendencies for maintaining some ambiguity in their identities (Gioia in Whetten and Godfery 1998). If the organizational identity is not precisely pinned down, it can accommodate many different actions and complex pursuits and can engage in planned and unplanned change without appearing to violate its basic values.

Recent work by Gioia *et al* (2000) on the mutability of identity, conceptualized the notion of 'adaptive instability'. This concept holds that organizational identity becomes dynamic and mutable consequent to all its interrelationships with image in its various guises[5]. Gioia (in Whetten and Godfrey 1998) suggests that adaptive instability might be managed in terms of managed changes to organizational identity, *"through the projection of an attractive future image that acts like a bandwagon for organizational members to jump on"* (p. 45). Similarly, Gioia and Chittipeddi (1991) state that a desired future image, or visionary perception that the organization would like external others and internal members to have of the organization in the future, serves as a catalyst for identity modification over time.

Therefore, organizational identity consists of enduring core features that are continually being adapted as the organization confronts its environment and, as it must remain flexible to its marketplace, management may attempt to shape and change identity for competitive adaptability through vision for the future. These conceptual feedback loops represent the co-variations one would expect

to find in a measurable construct, as one aspect of identity shapes and is shaped by the other aspects.

4.2.1.1 The Empirical Arena

Given the apparent explanatory power of the concept of Organizational Identity, there is still relatively little empirical research on the topic. The following three studies have contributed empirical credibility to existing theoretical works on Organizational Identity.

Dutton and Dukerich (1991) employed the notion of organization identity in their study of the New York Port Authority's attempt to deal with the problem of homeless people frequenting their facilities. They asserted that organizational identity was the key concept that provided the organization with a viable framework for understanding and action. They also demonstrated that identity simultaneously filtered, constrained and ultimately shaped the Authority's interpretations and actions of an important issue over time.

Elsbach and Kramer (1996) investigated the responses of top administrators of universities to the rankings published by *Business Week.* They explored how the administrators of eight highly ranked business schools dealt with the perceived threat represented by a ranking that challenged their own self-perceptions. This study demonstrated that rankings that threatened valued aspects of identity produced clear effects on SM processes. Selective perception strategies employed to downplay comparisons with other schools allowed the administrators to retain positive and stable perceptions of the organization's identity, in the face of disconfirming evidence that triggered identity dissonance.

Gioia and Thomas (1996) showed that identity and image were critical organizational perceptions that influenced interpretation and action during

[5] See Appendix A p. 248 for Table A.1 'Forms of Image' adapted from Gioia *et al* (2000) which summarizes the literature outlining the various forms of image in organizational research.

strategic change at a university. They found the change context particularly interesting for consideration of the nature of identity. Their evidence suggests that if substantive change is the issue, then identity must change.

4.2.1.2 Model of a Construct of Organizational Identity

No operationalized model of Organizational Identity currently exists that is suitable for inclusion in the SMS model. All empirical work thus far is of a qualitative nature, therefore the concept requires operationalization to determine a construct suitable for testing. Overall, the literature finds that Organizational Identity consists of fundamental core values and is simultaneously stable and unstable over time, through adaptive behaviours (Gioia *et al* 2000). In addition, adaptability behaviours may bridge perceptions of current perceived identity with identity envisaged for the future by management. Given the complex nature of the construct and the earlier demonstration of interaction effects between core values, adaptability and managerial vision, it is hypothesized that:

H2: Organizational identity is a multidimensional construct consisting of sub-dimensions that reflect organizational core values, adaptability and vision, and that these sub-dimensions will co-vary due to their interdependent relationship effects.

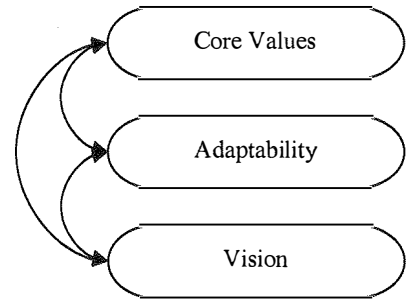

Figure 4.2 Hypothesized Model of Co-varying First-order Factors of Organizational Identity

Figure 4.2 illustrates the proposed construct of Organizational Identity. As it is expected that the co-variations between each factor will be high (>0.50) due to

the interdependent nature of relationships between the elements, it is also expected that it will be possible to model Organizational Identity as a second-order construct (Byrne 2001). Therefore:

H2a: Organizational identity is a higher order construct consisting of three dimensions, core values, adaptability and vision.

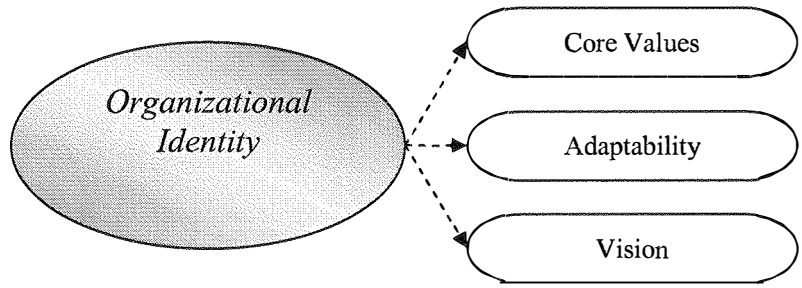

Figure 4.3 Hypothesized Model of a Second-Order Construct of Organizational Identity in Organizations

The purpose of modeling Organizational Identity as both a first-order and second-order factor is explained by the potential managerial usefulness of each model. When tested, the co-variances of the first-order model (Figure 4.2) will indicate the levels of interdependence between each factor (Byrne 2001). This provides an indication of the effect that change in one variable could have on other variables in the model. For example, if 'Core Values' was highly co-variant with 'Vision', managerially speaking, manipulation of the indicators of 'Vision' should influence the indicators of 'Core Values' and *vice versa.*

The second-order factor model (Figure 4.3) provides an estimation of the importance of each factor to the model of 'Organizational Identity', through factor loads or weights (Byrne 2001); it provides some understanding of the relative influence that each factor has on the higher-order factor. If 'Vision' contributes the highest factor load to 'Organizational Identity', then it can be said that 'Vision' is more important to Organizational Identity than the other variables. Additionally if this is the case, then more resources can be allocated

to those aspects of Organizational Identity that are more important and less resources to less important aspects.

Organizational Identity is at the heart of, and feeds back into the selection and retention aspects of the SM process, filtering the information noticed, selected and retained from the 'enacted environment', so that a measure of stability of identity is maintained over time, from which unambiguous action might ensue. From a MIP perspective, this means that information being processed within the SMS is filtered and constrained by Organizational Identity, and that Organizational Identity acts as a repository for deep memories about past actions.

The second proposed dimension of the SMS, Organizational Memory is discussed in the following section. Organizational Memory has been included as a separate dimension of a SMS due to the importance Weick (1995) ascribes the organizational behaviours of 'retrospection' and to capture the processes contained within the 'retention' part of Weick *et al's* (2005) model of SM cycles (See Figure 3.2 p. 48).

4.2.2 Organizational Memory – The Second Proposed Dimension of a SMS

At its most basic level, organizational memory refers to *"stored information from an organization's history that can be brought to bear on present decisions"* (Walsh and Ungson 1991 p. 61). In this sense, acts of retrospection form the basis of SM processes in organizations. Scholarly opinion ranges from organizational memory as a metaphor as *"organizations do not literally remember"* (Argyris and Schőn 1978 p. 11), to the possibility raised by Sandelands and Drazin (1989) that *"organizations are mental entities capable of thought"* (p. 458).

Most references to organizational memory have been in the context of a discussion on organizational adaptation or learning. Some have emphasized its

negative effect on OL (March and Olsen 1976; Nystrom and Starbuck 1984), with research conducted at the individual decision-maker level and focused on biases, world views (Starbuck and Hedberg 1978) and blind spots (Murray 1978). Individuals' belief structures develop according to certain experiences in a given environment and provide the context for form and meaning (Walsh and Ungson 1991); these become biases. They filter perception and can blind managers to aspects of the current environment. The recognition of potentially harmful encased learning, led March and Olsen (1976) to conclude that memory can reinforce a single loop learning style (Argyris and Schön 1978) that prevents certain information being processed, creating blind spots and hindering novel information processing.

The positive aspects of organizational memory, mostly in the context of OL, have also been explored (Schön 1983; Slater and Narver, 1995). Cyert and March (1963) observed that programming facilitates learning and Walsh and Ungson (1991) proposed that *"successful organizations embed their adaptation activities in standard operating procedures"* (p. 72). Since routine activities are handled best by standard procedures, transactional costs associated with search and experimentation are reduced. Hence, by reducing transactional costs, organizational memory helps to implement decisions that have been made and need not be made again. Additionally, Kantrow (1986) argued that new decisions are less likely to be rejected if they are imbued with the tradition and legitimacy of the past; *"Change that works by recapturing something that was there in the past has many resources on which to draw and a whole network of support on which to rely"* (p. 84).

Some theorists also argue that memory can facilitate problem definition, alternative generation and evaluation and choice. Neustadt and May (1986) stated that *"better decision making involved drawing on history to frame sharper questions"* (p. 32). Similarly, Hedberg, Nystrom and Starbuck (1976) reasoned *"footholds in time are the appropriate components for assembling*

trajectories into the future" (p. 41). Duncan and Weiss (1979) agreed that the content of organizational memory does not have to be a constraint. All agree that a facility must exist in an organization in order to store communicable, consensual and integrated knowledge. This facility is an organization's memory (Walsh and Ungson 1991).

Some of the most important agreement between the negative and positive impact perspectives of organizational memory refers to how and where memory is situated within organizations. Walsh and Ungson (1991 p. 64) refers to memory 'retention facilities' in organizations. These consist of (1) individuals, (2) culture and norms, (3) transformations, (4) structures and (5) ecology.

First, individuals have their own recollections of what has happened within and about their organization and therefore retain information based on their own experiences and observations. Individuals also keep personal records. Second, culture embodies past organizational experiences that can be useful when dealing with the future; Deshpande and Webster (1989) define culture as *"the pattern of shared values and beliefs that help individuals understand organizational functioning and thus provide them norms for behaviour in the organization"* (p. 4). Norms are the manifestation of shared values and beliefs (Homburg and Pflesser 2000) and have a higher relevance for actual behaviours (Katz and Khan 1976).

Third, organizational memory is embodied in transformations (Walsh and Ungson 1991) and this refers to the logic that guides a transformation of an input into an output. Weick (1979) refers to standard operating procedures, being the logic behind transformations, as a schema *"that structures dealings with the environment [and] is a frame of reference that constrains exploration and often unfolds like a self-fulfilling prophecy"* (p. 156).

The fourth memory facility in organizations is its structure. Structure has implications for role behaviours which involve the labeling of particular

positions in organizations and are based on behavioural expectations (Gioia and Thomas 1996). Hence, the concept of roles in organizations, links individuals with organizational memory.

Ecology represents the fifth memory retention facility in organizations. This refers to the actual physical structure of the workplace that is thought to encode information about the organization. Physical settings in particular, often reflect the status hierarchy within an organization and consequently shape and reinforce behavioural prescriptions. Oldham and Rotchford (1983) found that employees' negative interpersonal experiences were affected by their organization's physical layout. Similarly, Homburg and Pflesser (2000) found that physical arrangements that supported communications such as discussions and meetings and that made customers feel welcome, had a positive relationship on employees' market oriented behaviours.

Walsh and Ungson's (1991) memory retention facilities as discussed above, are similar to those examined by Van der Bent *et al* (1999), who refer to organizational 'memory carriers' or indicators of memory in organizations such as culture, structures, systems, and procedures (p. 379).[6]

In addition to the aforementioned retention facilities of memory in organizations, one other notion of organizational memory is explored by Walsh and Ungson (1991) *sic, "[perhaps] the most important attribute that is relevant to the study of organizational memory may be the length of service in the organization"* (p. 78). Pfeffer (1983) noted that an understanding of an organization's practices and beliefs comes with long tenure in the organization and that long tenured individuals can facilitate the retrieval of information from organizational memory. Walsh and Ungson (1991) also posited that the absolute length of service in the tenure profile is critical to the effective retrieval of information; *"the organization needs a continuous link to its 'old*

[6] See Appendix A p. 248, for Table A.2 Memory Carriers from Van der Bent *et al.* (1999 p. 379).

timers' to ensure adequate organization memory acquisition and controlled retrieval processes" (p. 78). However, Pfeffer (1983) illustrated how an internal labor market dominated by employees of long standing was not attractive to younger ambitious individuals who may embody or who may be receptive to new ideas, concluding that an organization that has no distinct tenure based cohorts but has an even distribution of experience was likely to be most effective.

In summary, those researchers with a positive perspective of organizational memory argue that a cautious appreciation for the past can enhance the perception of a current situation, that transaction costs are reduced when memory becomes embedded in standard operating procedures, that roles embed memory and help to define expectations, that the physical layout of the organization impacts interpersonal experiences between employees and customers and that careful use of tenured employees can help to effectively facilitate memory retrieval. Finally, there is the belief that organizational memory can facilitate the implementation of managerial decisions, once made.

4.2.2.1 The Empirical Arena

Similar to the construct of Organizational Identity outlined earlier, there is little empirical work on organizational memory; conceptual work has been prevalent. However, the following studies have contributed to understanding the role that organizational memory plays, particularly in relation to a variety of performance outcomes in organizations.

Moorman and Miner (1997) investigated how two organizational memory dimensions, level and dispersion, influence the success of new products, specifically new product creativity and financial performance. Memory level refered to the amount of stored information or experience an organization had about a particular phenomenon. Memory dispersion refered to the degree to which organizational memory was shared throughout the organization unit. The

authors found that memory level enhanced product performance and memory dispersion positively affected both performance and creativity.

Hargadon and Sutton (1997), in an ethnographic study of a product design firm, found that the firm exploited its network position working for multiple clients in diverse industries, to gain knowledge of existing technologies across different industries. Through this process of knowledge acquisition and exploitation, they were able to create new products that were original combinations of pre-existing knowledge. Employees did this by both exploiting their access to other industries and through organization routines for acquiring and storing knowledge in the organization's memory. They were then able to make analogies between current problems and past solutions they had seen, retrieving that knowledge to generate new solutions to design problems in other industries.

Van der Bent, Paauwe and Williams (1999) investigated whether OL took place in a large electronics firm undergoing rapid change over a decade. Longitudinally, they traced memory carriers of structure, systems and procedures to determine whether OL had taken place through retrieval of past learning and whether these memory carriers were bought to bear on current organization change. They found that memory carriers played a stabilizing role in organization change, *"Successful change in many ways is based on success at remembering"* (Van der Bent *et al* 1999 p. 394).

4.2.2.2 Model of a Construct of Organizational Memory

Empirical studies explain the importance of memory to implementation of strategic action in all its guises (for example product and organization change and firm effectiveness). They, and the literature discussed previously, coalesce around notions such as memory 'carriers' for example, (1) structures and cultures that embed 'roles', (2) systems and procedures, (3) the impact of the physical layout on interpersonal relations and (4) effective utilization of experience of individuals, both employees and management. Additionally,

'retrospect' or the practice of *using* memory is evidenced as a salient behavioural process throughout.

Structure and culture are more macro conceptualizations of memory (Homburg and Pflesser (2000), becoming visible through roles in organizations. Therefore they should be subsumed within a construct of organizational memory that indicates their visible aspects (ie. roles). The incidence, importance and strength of systems and procedures would be reflected by the relative clarity and strength that these roles play in the organization. This implies that roles that are clear in organizations should be able to be enacted unambiguously by organization members, enhancing positive 'actions'.

Effective utilization of long tenured personnel for retrieval of past learning is stated theoretically (Walsh and Ungson 1991) as being an important indicator of organizational memory, however no research has explicitly modeled and tested this aspect of memory. Moorman and Miner's (1997) finding that overall memory level positively impacted product performance and that memory dispersion positively impacted both product performance and creativity is in keeping with Pfeffer's (1983) assertion that an even distribution of experience throughout the organization was likely to be more effective than specific cohorts of experienced individuals existing within the organization. In light of the importance of the utilization of experience to memory retrieval processes, this aspect of organizational memory is included in an operationalized construct.

The physical environment or ecology that impacts retrieval of memory by both influencing interaction in organizations and shaping and reinforcing behaviours such as hierarchical structures, impacts on the way people in organizations interact. Therefore, it would be more suitably included in a construct that models interactions in organizations and will be incorporated into the Social Interaction construct explained in the next section.

A construct of Organizational Memory is therefore hypothesized to consist of three sub-dimensions: role clarity, experience use and retrospection – the most distinguishing property of SM (Weick 1995). These three sub-dimensions interact with one another and feedback through mutually reinforcing behaviours. For example, the extent of role clarity is influenced by the extent of utilization of organization experiences through retrospective behaviours that helped to clarify and interpret those roles. These conceptual feedback loops represent the co-variations one would expect to find in a measurable construct, as one aspect of memory shapes and is shaped by the other aspects. Therefore:

H3: Organizational Memory is a multidimensional construct consisting of sub-dimensions that reflect role clarity, experience use and retrospection; these sub-dimensions will co-vary due to their interdependent relationship effects.

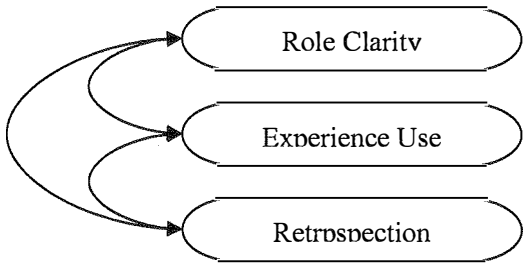

Figure 4.4 Hypothesized Model of First-order Co-varying Factors of Organizational Memory

Figure 4.4 illustrates the hypothesized lower-order factor construct of Organizational Memory. Similar to the case of Organizational Identity previously, it is anticipated that the co-variations between each factor will be high (>0.50) due to the interdependent relationships between the sub-dimensions. Therefore, it is anticipated that it will be possible to model Organizational Memory as a second-order model (Byrne 2001). Hence:

H3a: Organizational Memory is a higher order construct consisting of three dimensions, role clarity, experience use and retrospection.

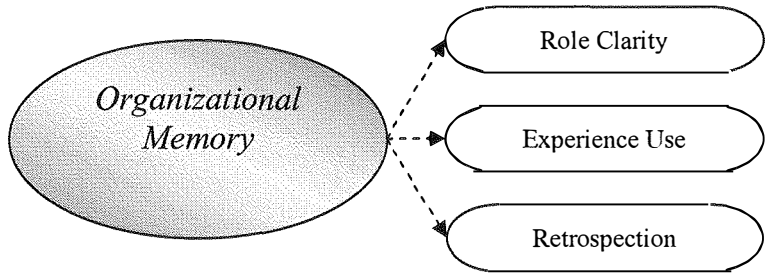

Figure 4.5 Hypothesized Model of a Second Order Construct of Organizational Memory in Organizations

The third proposed dimension of the SMS, Social Interactions is outlined next. This dimension encompasses the 'making' aspect of SM.

4.2.3 Social Interaction – The Third Proposed Dimension of a SMS

The preceding discussion of Organizational Identity and Organizational Memory, have described 'what' an organization does in order to make sense of equivocal or uncertain information and situations. Effectively, these two factors filter, transform, constrain and embody current and past information processing within the organization. They do not however describe 'how' organizations or rather individual actors or groups of actors within organizations actually process information. These activities are more visible in organizations as behaviours related to communication practices through social interaction.

SM is crucially about processes and activities (Weick 1995). According to Weick (1995), the fourth property of SM is that it is inherently social. Turner (1988) states that 'the interact' forms the basis of SM theory and is the primary unit of 'action' in organizations. Walsh and Ungson (1991) comment that an organization is a network of intersubjectively shared meanings that are *"sustained through the development and use of a common language and everyday social interaction"* (p. 60). Social interactions are for the purpose of information exchange, they are the medium by which organizational members

process information in order to make sense of equivocal and ambiguous situations.

Social interaction may occur from physical presence or it may occur when the thoughts, feelings and behaviours of individuals are influenced by the actual, imagined or implied presence of others:

> *In working organizations decisions are made in the presence of others or with the knowledge that they will have to be implemented or understood or approved by others. The set of considerations called into relevance on any decision–making occasion has therefore to be one shared with others or acceptable to them* (Burns and Stalker 1961 p. 118).

Clearly, SM can be an individual process. However, individual SM does not necessarily imply solitary SM, because what a person does internally is also contingent on others,

> *What I say and single out and conclude, are determined by who socialized me and how I was socialized, as well as by the audience I anticipate will audit the conclusions I reach* (Weick 1995 p. 62).

The actions one plans are contingent upon the actions of others; what is planned may be opposed by others or at least constrained by how others might react to our plans.

Inspection of literature in social psychology and sociology enlightens the fundamentals of 'the interact' in social situations. Turner (1988) states that *"social interaction is the most elementary unit of analysis in sociology"* (p. 27). When people interact they develop shared cognitive perspectives and frameworks for ordering their responses, especially with regard to how they think, interpret, signal and view the self (Mead 1934). Hence it is reasonable to assume that the greater the quantity or frequency of interactions between people in organizations, the more likely it will be that shared or overlapping understandings will develop. Frequency of interaction is likely to lead to a

deeper understanding between organizational actors. The literature on social cognition provides insights into this phenomenon. People who communicate frequently have been found to become close to one another (Blau 1964). Frequency of interaction is therefore important for the development of shared or overlapping understandings.

In organizational life, mere frequency may not be sufficient however, to develop finely tuned understandings. It is known that some informational encounters are more or less rich in their ability to resolve uncertainty (Daft and Lengel 1986). For example, face to face interactions provide more informational cues to people interacting than memos or reports (Daft and Lengel 1986). Information richness is defined as *"the ability of information to change understanding within a time interval"* (Lengel and Daft 1988 p. 226). Social interactions that can clarify ambiguous and equivocal information to change understanding in a timely manner are considered rich. Social interactions that enable immediate feedback, utilize multiple cues and channels of delivery (Daft and Lengel 1986), impart emotional understanding through personalization (Lengel and Daft 1988) and utilize language variety (Daft and Wiginton 1979) are said to be rich. Rich social interactions facilitate ambiguity reduction by overcoming differing frames of reference and by providing the capacity to process complex subjective messages. However, not all situations require rich information to remove uncertainty. Well understood situations and organizational issues, particularly if standards and meanings have already been negotiated between organizational members, require less rich and less frequent social interaction in order to reach understanding.

In addition to richness and frequency, information diversity provides a broad range of informational display from which selections are made for managerial decisions needed for strategy formulation (Lengel and Daft 1988). Diversity of interaction in organizations refers to the breadth, range or variety of information exchanged in an interaction. Daft, Sormunen and Parks (1988) found that high

performing firms scanned their environments more broadly than lower performing firms. Support for this finding can be deduced from Ashby's Law of Requisite Variety (1956) which states that it takes variety to destroy variety. This means that processes must have the same level of order or chaos in the process itself as there is in the input to these processes. Put more succinctly, if an orderly process is applied to a chaotic set of information inputs, then only a small portion of these inputs will be attended to and made unequivocal. So it appears that chaotic situations may be better understood with a diverse array of seemingly less relevant information, in order to identify 'what's going on here?'.

The actual physical arrangements or workplace ecology of an organization encode and thus reveal information about the organization as discussed in the sub-section dealing with organizational memory. Walsh and Ungson (1991) describe 'ecology' as a retention facility of memory in organizations. Van der Bent *et al*, (1999) include work surroundings in their notion of culture. For the purpose of this discussion of social interaction, the notion of workplace ecology can be better understood in the context of Sommers (1969) classic work that illustrates the behavioural bases of physical design.

Workplace environments communicate an organization's culture, its identity and image, and reflect its values. Organizational spaces impact upon organizational members' social behaviours and activities by either constraining or facilitating social interactions. In particular, spatial layout influences the social interactions that are necessary both for effective task performance and satisfaction of social needs in organizations. The work environment can be understood as a stimulus field with certain influencing properties that permit some behavioural patterns to take place while restricting others.

From the perspective of ecological psychology, the physical environment is an important component in the overall behavioural setting (Sommers 1969); it

sustains and encodes social structures. Physical arrangements that supported internal communication and customer interactions were a part of the cultural artifacts dimension tested by Homburg *et al.* (2000) and were found to have a strong positive effect on market-oriented behaviours such as information generation and dissemination in organizations.

The study of physical settings has not received much attention in the mainstream organizational behaviour literature. This is not surprising given the fact that people, rather than places, are considered of primary importance in organizational life. However, physical arrangements have a place in work dynamics. People's intentions, action, interactions and meaning they ascribe to work cannot be considered apart from the context in which they occur.

Social interaction in organizations has been accepted as given in the literature without clear indications about its characteristics or properties. However, on closer examination of related findings, it is possible to determine certain underlying characteristics – frequency (Blau 1964), richness (Daft and Lengel 1986), diversity (Daft, Sormunen and Parks 1988) and physical arrangements (Oldham and Rotchford 1983; Sommers 1969) that help capture the dimensions of how social interaction would operate in organizations.

There are many studies dealing with knowledge sharing in the knowledge management literature and social skills in the human resource management literature, however, overall scant attention has been paid to the properties of the actual information exchanged and the influence of context on information properties or the exchange process itself. The following section outlines two salient empirical studies that detail the properties of information exchange in organizations.

4.2.3.1 The Empirical Arena

In their study of intelligence dissemination across functional boundaries, Maltz and Kohli (1996) found a frequency effect of information exchange between

organizational actors. The frequency effect evidenced (a threshold effect) found that information was only perceived as useful after a given number of interactions had taken place. Up until such a point of interactions had been reached, receivers of information had not learned how to decode the sender's information because it was received in relatively unfamiliar formats. They also found that the level of formality of the information disseminated had an effect on the use that was made of that information. Market intelligence that was disseminated through formal means was used to a greater extent that that which was disseminated through informal means.

Daft, Sormunen and Parks (1988) interviewed 50 manufacturing companies and found that CEO's in higher performing firms scanned their environments more broadly than lower performing firms. The CEO's tailored and adjusted their scanning frequency to perceived uncertainty in particular market sectors. In addition, higher performing companies' CEOs' used more divergent modes or sources of information than lower performing companies; it was suggested that this provided a more complete picture of the environment.

4.2.3.2 Model of a Construct of Social Interaction in Organizations

The preceding literature discussion and empirical snapshot provide an overview of some of the properties of social interaction as it occurs in organizations. It appears to have multiple sub-dimensions that are related to both the properties of the information exchanged and the context of that exchange. It is therefore hypothesized that social interaction is a multidimensional construct composed of three informational properties and the physical context of that informational exchange, hence:

H4: Social Interaction is a multidimensional construct consisting of sub-dimensions that reflect frequency, richness, diversity and physical arrangements and these sub-dimensions will co-vary due to their interdependent relationship effects.

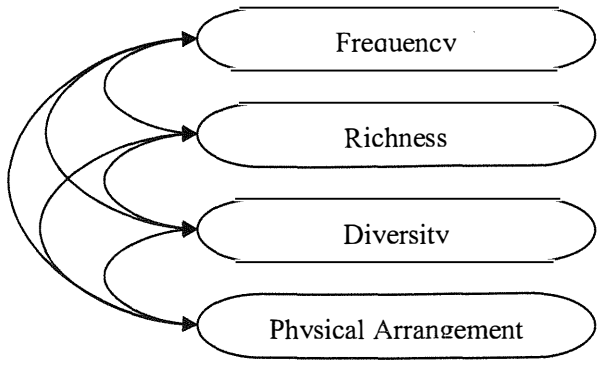

Figure 4.6 Hypothesized Model of Co-varying First-order Factors of Social Interaction

Figure 4.6 illustrates the proposed lower-order factor construct of Social Interaction. Similar to Organizational Identity and Organizational Memory, it is expected that the co-variations between each factor will be high (>0.50) due to the interdependent relationships between the sub-dimensions, therefore it is anticipated that it will be possible to model Social Interactions as a second-order model (Byrne 2001). Hence it is hypothesized that:

H4a: Social Interaction is a higher order construct consisting of four dimensions, Frequency, Richness, Diversity and Physical Arrangements.

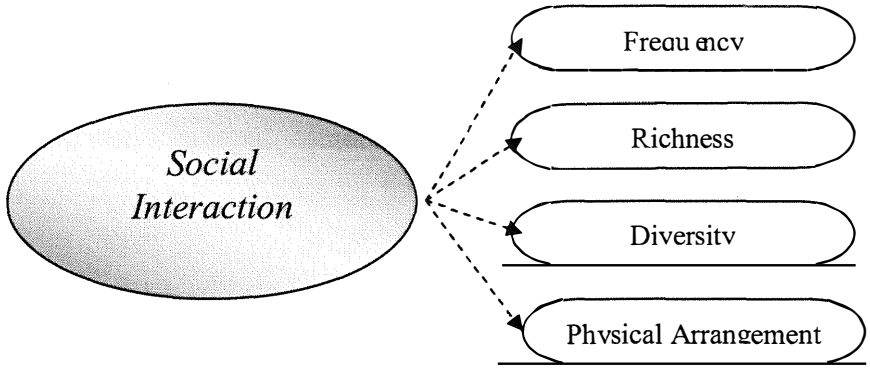

Figure 4.7 Hypothesized Model of a Second-Order Construct of Social Interaction in Organizations

So far, each hypothesized dimension of a SMS (Organizational Identity, Organizational Memory and Social Interactions) has been modeled as both first-order factors that co-vary and also as second-order models. These three primary dimensions and hypotheses form the basis for testing during the quantitative phase of the current study. The following section outlines and summarizes the conceptualization of the full model of the SMS in organizations incorporating each of the three primary dimensions (Organizational Identity, Organizational Memory and Social Interactions).

4.2.4 A Multidimensional Hierarchical Model of SMS in Organizations and Hypotheses

So far, the hypotheses forwarded (H2, H2a, H3, H3a, H4 and H4a), have been connected with the constructs developed for each of the three primary dimensions of a proposed model of a SMS. Figure 4.8 illustrates a more complete model of a SMS in organizations, now incorporating each primary dimension as hypothesized. It is the model proposed at the conclusion of chapter three (Figure 3.3 p. 62) with the addition of lower-order factors as discussed thus far throughout this chapter. The co-variations hypothesized between the three primary factors are based on the literature and empirical research that illustrates that organizational identity is formed and re-formed as an ongoing accomplishment through the retrieval of memories and the sense made of memories as they are applied to new operating contexts. This process is accomplished through communication activities embedded in social interactions. It is now possible to forward hypotheses related to the overall construct of a SMS in organizations. Therefore:

H1: A SMS is a multidimensional second-order construct consisting of 3 factors that co-vary: Organizational Identity, Organizational Memory and Social Interactions and 10 first-order factors.

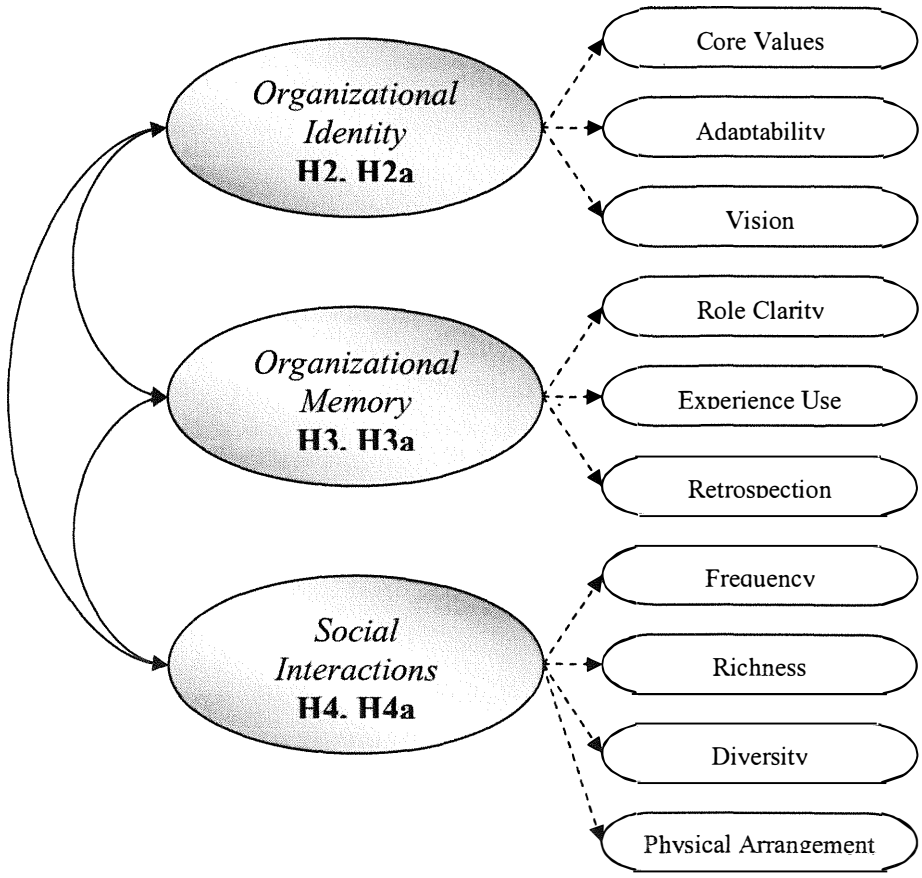

Figure 4.8 A Multidimenional Second Order Model of a SMS in Organizations with Co-variations between Second Order Factors

The SMS, is expected to have high co-variances between the three primary factors, similar to the models hypothesized for Organizational Identity, Organizational Memory and Social Interactions. Therefore, it is also hypothesized that:

H1a: A SMS is a third-order hierarchical construct consisting of 3 second-order factors, Organizational Identity, Organizational Memory and Social Interaction and 10 first-order factors.

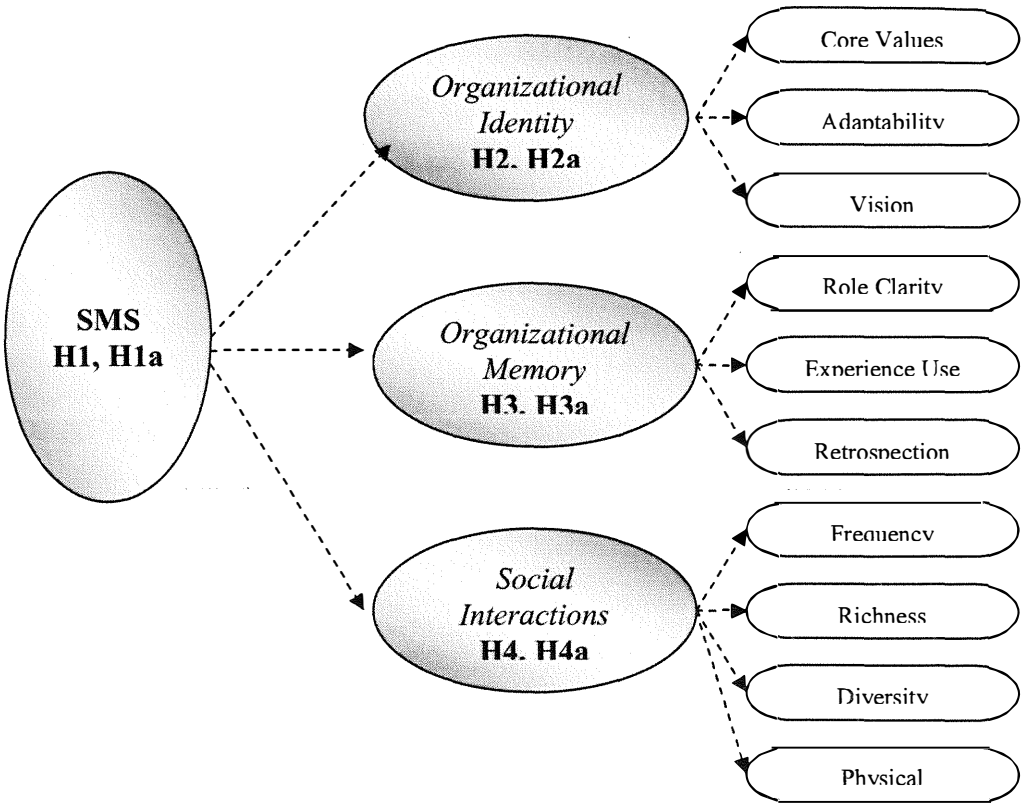

Figure 4.9 A Multidimensional Third Order Hierarchical Model of a Sensemaking System in Organizations

4.3 DEVELOPING A STRUCTURAL MODEL OF RELATIONSHIPS BETWEEN SENSING, SMS, RESPONSE AND PERFORMANCE IN ORGANIZATIONS

The objective of this research is to determine the organizational SM behaviours concerned with how market information is filtered and framed for interpretation – Organizational Identity and Organizational Memory - and disseminated – Social Interaction - in organizations and how these behaviours ultimately relate to performance. This objective was derived from gaps in the literature related to the *"organizational black box"* (Baker and Sinkula 2002 p. 6), which is said to consist of MIP behaviours and OL processes that are expected to result in higher performance outcomes for the organization.

The first objective of this chapter involved developing testable constructs that measure the hypothesized model of a SMS. The second objective is to determine the links between a SMS and performance in organizations. In order to achieve the second objective, a model to guide the research is presented in Figure 4.10. The model illustrates and overviews the proposed structural relationships between the main variables.

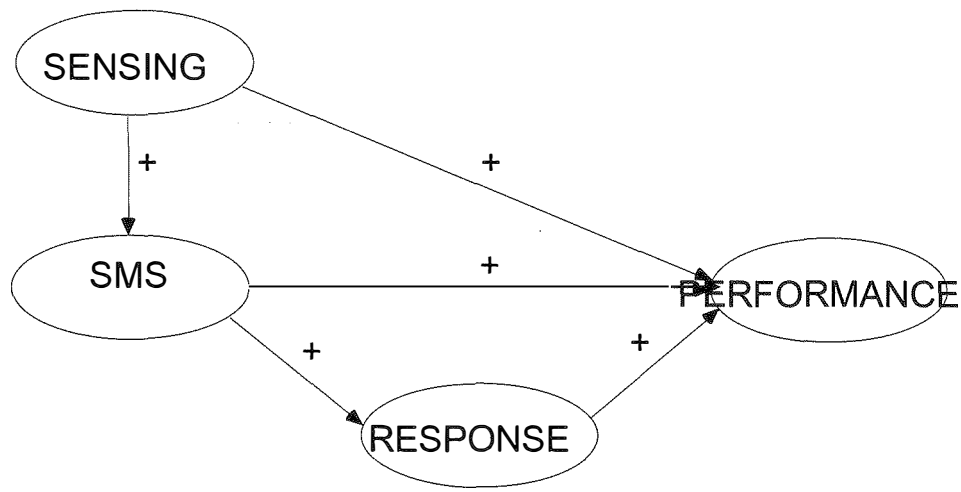

Figure 4.10 Model of Structural Relationships between Sensing, SMS, Response and Performance in Organizations.

Each of these variables are discussed below with hypotheses being forwarded progressively.

4.3.1 Key Constructs and Relationships in the Theoretical Framework

4.3.1.1 Sensing

Sensing has been variously described as information acquisition (Moorman 1995) intelligence gathering (Kohli and Jaworski 1990) and scanning (Choo, 1998). Managers sense signals or 'stimulii' (Weick 1995) from the environment that can be either actively gathered or passively received. These various descriptions can impart an impression that the organization gathers 'facts' or information impartially, objectively and equally about various parts of the environment, but past studies refute this assumption (Daft and Wiginton 1979;

Leavitt 1975). Because the terminology used in conceptual development is important in that it communicates and transmits meaning to the reader, the term 'sensing' is used for the current conceptual model. 'Sensing' also connotes some sense of subjectivity to the information gathering process, in that it implies a 'sensemaker' whom forms part of the information processing equation and who filters information through current requirements and past knowledge.

Research into managerial scanning behaviour suggests that frequency of scanning indicates amount of information obtained about the environment (Hambrick 1982). Aguilar (1967) found that some managers were relatively passive and simply 'viewed' the environment, while other managers actively 'searched' for desired information. Additionally, Eisenhardt (1990) found that faster decision-making managers from higher performing firms gathered more information more broadly than their slower and less successful counterparts.

From an MIP perspective, the environment is important because it creates uncertainty for managers. Past research has treated the environment as a single entity (Duncan 1972; Jaworski and Kohli 1993) or focused on one or two sectors of the environment (for example customers and competitors in Kohli and Jaworski (1990) and Narver and Slater (1990)). Later work in MO has sought to extend the environmental focus from customers and competitors to other environmental variables. such as industry and technological factors (Slater and Narver 1995). In addition, several studies have decomposed the environment into various sectors, each of which may have distinct influence on policy making and organizational actions (Brown and Utterback 1985; Boulton, Lindsay, Franklin and Rue 1982; Hambrick 1982).

Kohli and Jaworski (1993) measured intelligence gathering though indicators that had a frequency effect concerned with gathering information or data about customers and competitors, while Daft *et al* (1988) measured the scanning

frequency behaviours of executives by measuring scanning across all environmental sectors. It is plausible that, for some companies under certain market conditions, scanning sectors, for example, such as the technological sector, could be more important than scanning for information about competitors. Therefore, an adaptation of Daft *et al*'s (1988) scale to measure frequency of scanning across all environmental sectors including customer, competitor, technological, supply, economic, regulatory and sociocultural will be used to operationalize and measure 'sensing' in the current study's model.

Daft and Weick (1984) proposed that search strategies are aligned with interpretive strategies. That is, information acquired must somehow be interpreted by management and the organization. They also assert (Daft and Weick 1984) that if management believes the environment to be too complex, unknowable or difficult to analyze, information search may be reduced. What this means is that if management deems the environment more knowable or easier to interpret and analyze, then there should be a positive relationship between scanning - information acquisition - and interpretive capabilities (as measured by the SMS in this research). Therefore:

H 5: Sensing will be positively and directly related to the 'SMS' in organizations.

Additionally, Daft *et al* (1988) found a link between scanning frequency and performance in 50 manufacturing firms. This direct link could be attributable to particular types of interpretative mechanisms, perhaps personal interpretations by management, which may not be captured by the current study's measure of a SMS in organizations. Therefore:

H5a: Sensing will be positively and directly related to performance in organizations.

The following section outlines hypotheses related to the SMS itself as it relates to Performance and Response in organizations.

4.3.1.2 SMS

The SMS acts as both an holistic conceptualization of interpretation processes, structures and systems in organizations and a measure of information processing capabilities in organizations through its three main dimensions that capture SM cycles (See Figure 3.2 p.48). The relative strength of the SMS, indicates the strength of Organizational Identity (which reflects the distinctiveness of the organization and its capacity to modify itself over time through vision and adaptability), Organizational Memory (which reflects the level of retrospection employed, use of organization experience applied to events and the relative clarity of roles that should indicate levels of procedural order) and Social Interactions (which reflects opportunities for information exchange and clarification to occur).

The SMS can also be viewed as a learning system that results in progressive learning (Daft and Weick 1984) through actions taken and made sense of retrospectively. These actions may occur at a micro level in the organization, for example staff could 'learn' through interaction with one another and through feedback from customers, that a particular sales approach is not effective and take corrective 'action' as the next transaction occurs. In this sense, the organization has 'learned' to read, interpret and adapt to its environment. This may be one of the reasons that SM has traditionally been studied through qualitative and narrative research techniques. Based on the assumption than many micro 'actions' or adaptations are occurring in organizations with a strong SMS (through interpretation-action-learning, cycles) and that these would indicate adaptive and learning capabilities embedded within the organization, its constituent parts and its members, these organizations should enjoy better overall performance consequent to the micro adaptations. In addition, Hult, Ketchen and Slater (2005) found a link between MIP (the SMS subsumes MIP behaviours) and performance. Therefore:

H6: The SMS is positively and directly related to performance.

4.3.1.3 Response

'Action' may occur at more macro levels than that described in the preceding section, as senior management make adaptations to corporate strategy based on changing environments. The interpretation – response link is reflected in the work of Ranson, Hinings and Greenwood (1980) who argued for the importance of management's understanding of a situation to the organizational actions taken. 'Response' could entail change or adjustment in response to changes in the organization's environment. It can range from small-scale forms of adjustment such as changes in procedures, to larger scale forms such as product/ service changes, revisions in overall strategy and the redesign of organizational structures (Dutton and Duncan 1987). For the purpose of the current research, organizational response is defined as, the organizational capacity to detect change in the marketplace and respond quickly to that change. An adaptation of the scale used by Jaworski and Kohli (1993) is used to measure response for this study.

Smith, Grimm, Gannon and Chen (1991) found that high numbers of organizational responses were linked to the profitability of airlines. Hult, Ketchen and Slater (2005) state that, *"the activities associated with market information processing (MIP) allow the firm to take better actions, which in turn should enhance performance"* (p. 1174). Therefore:

H6a: The SMS's relationship to Performance is mediated by Response.

Effective organizational action in response to strategic issues depends on an ability to implement decisions based on scanning strategies and subsequent interpretations of strategic information (Thomas *et al.* 1993). Implementation of strategic decisions is more successful if supported by standard procedures

embedded in organizational memory (Walsh and Ungson 1991). Decisions are also legitimized, and therefore more likely to be implemented, if they are founded upon some aspect of identity or memory, "*something that was there in the past*" (Kantrow 1986 p. 83). Therefore:

H7: SMS is directly and positively related to Response.

4.3.1.4 Performance

The link between effective action and successful performance by organizations is a fundamental presumption in the OL, MO and strategic management literature. The argument proposed in the MO literature is that those organizations that are market oriented can better satisfy customers and hence perform at higher levels by responding to customer needs (Jaworski and Kohli 1993).

In the strategic management literature, it is thought that because of turbulent environmental conditions facing many competitive organizations, actions in the form of new products and services (Edgett 1996) might be expected to endow a firm with a competitive advantage. Learning literature has focused predominantly on the scanning-interpretation-action-learning links, with some exceptions. For example, Thomas, Clark and Gioia (1993) found in their research of hospitals, that those organizations that interpreted issues as controllable, were more able to implement product/service changes through cognition-action mechanisms and performed better on all performance measures.

In the current study, it is necessary to have a performance referent because differences in organizational performance, should be related to the ability to carry out the three MIP tasks of Sensing, SM and Response. Additionally, examining the performance implications of MIP in organizations can provide a basis for understanding how the information processing structures of firms might be designed (Thomas *et al* 1993). This is the contribution that a construct

of an operational SMS can make to managerial practice. For the purposes of this research, performance is defined as the subjective rating of overall performance and achievement of mission, strategic and financial objectives.

4.4 CONCLUSION

Table 4.1 reviews the hypotheses forwarded in this chapter. It shows how they are linked to and developed from the research questions first forwarded in chapter one (p. 5).

Table 4.1 Hypotheses developed from Research Questions that guide the Research

Research Questions	Hypotheses
How is SM operationalized in organizations?	***H1:*** *SMS is a multi dimensional model comprised of Organizational Identity, Organizational Memory and Social Interaction in Organizations with co-variation effects between the variables.* ***H1a:*** *SMS is a third-order hierarchical construct consisting of 3 second-order factors; Organizational Identity, Organizational Memory and Social Interaction and 10 first-order factors* ***H2:*** *Organizational Identity is a multidimensional construct composed of dimensions that reflect core values, adaptability and vision with co-variation effects between the variables.* ***H2a:*** *Organizational Identity is a higher order construct consisting of three dimensions, core values, adaptability and vision.* ***H3:*** *Organizational Memory is a multidimensional construct composed of dimensions reflecting retrospection, experience use and role clarity, with co-variation effects between the variables.* ***H3a:*** *Organizational Memory is a higher order construct consisting of three dimensions; retrospection, experience use and role clarity.* ***H4:*** *Social Interaction in organizations is a multidimensional construct reflecting dimensions of frequency, richness, diversity and physical arrangements, with co-variation effects between the variables.* ***H4a:*** *Social Interaction is a higher order construct consisting of four dimensions; frequency, richness, diversity and physical arrangements.*
How is the SMS related to Sensing?	***H5:*** *Sensing is positively and directly related to the SMS.* ***H5a:*** *Sensing is positively and directly related to Performance.*
How is the SMS related to organizational performance?	***H6:*** *SMS is positively and directly related to Performance.* ***H6a:*** *SMS's relationship to performance is mediated by Response*

How is SMS related to organizational response?	***H7:*** *SMS is positively and directly related to Response*

The objective of this chapter was to build a theoretical framework to guide the research. The construct of the SMS was initially proposed in Chapter three consequent to literature review of SM theories in organizations. The SMS was further developed in this chapter through literature exploration of its three main dimensions; Organizational Identity, Organizational Memory and Social Interactions. This resulted in hypothesized models of each dimension being constructed to include sub-dimensions that attempt to capture their internal complexity, including hypothesized interdependent relationships between lower-order factors. The SMS is presented ultimately as a third-order multidimensional hierarchical construct. This complex model has been hypothesized as such, because of the complex nature of the interdependent effects as information is cycled through SM processes, within and between individuals and their organizational selves.

The SMS itself, has been hypothesized to have relationships with other organizational variables such as Sensing, Response and Performance. These hypotheses are premised on the fundamental idea evidenced in OL, MO and MIP literatures, that organizations better able to learn about and understand their environment and their place in it, and to formulate and implement strategies to cope with change, will outperform those organization less able to do so.

The model of the SMS hypothesized in this chapter has some aspects that require further exploration in the field before a fully operationalized construct is tested. For example, there have been no quantitative studies in SM, Organizational Identity, Organizational Memory or Social Interactions performed previously, therefore no prior measurement models yet exist of the

constructs. Additionally, the models as hypothesized, have many aspects that require clearer operationalization. For example, how do core values operate in organizations?; how are tenured employees made use of? and what are the operands of diverse social interactions? In addition to these questions, there is also the possibility that the literature from which these ideas were derived is incomplete; there may be additional aspects of either the SM process itself or Organizational Identity, Organizational Memory and Social Interactions that have not been explored previously. Therefore, the research is designed to occur in two phases; phase one constitutes the qualitative exploratory phase where these questions are further probed for plausible answers; phase two reflects quantitative exploration resulting in findings about the SMS itself and its relationships to other organization variables.

The following chapter, chapter five, outlines the methodological logic, methods employed and findings related to phase one, the qualitative phase. Chapter six outlines and justifies the quantitative methodology used and chapter seven presents the analysis of data and quantitative findings of phase two of the research .

CHAPTER FIVE: TWO PHASE APPROACH AND THE QUALITATIVE STUDY

5.1 INTRODUCTION

The overall research methodology for this thesis is designed to achieve two main objectives; first, identification of the operands of a SMS in organizations by qualitative means. This SMS would represent an holistic measure of SM processes and their indicators. This first objective is accomplished through phase one of the research, the qualitative phase. The second objective is to test the SMS developed, through quantitative means incorporating the SMS into a structural model that relates it to organizational performance. The second-phase quantitative methodology is outlined in the following chapter, chapter six.

The proposed measurement model of the SMS as outlined in the previous chapter, is complex and multidimensional. The exploratory nature of the qualitative study outlined in this chapter, is justified in order to ensure that the initial conceptualization outlined in chapter four, captures all aspects of SM processes in organizations. The qualitative phase outlined in this chapter does not seek to test hypotheses, but rather to more clearly formulate them for testing in the quantitative phase of the research. Once the SMS construct has been operationalized through this qualitative phase, it can be included in a survey instrument suitable for testing the model by quantitative means which is further explained in chapter six..

Explanation of the differences between exploratory and explanatory research, qualitative and quantitative research methods, is provided in the next section.

5.2 TWO-PHASE APPROACH

The choice of a research approach depends on the nature of the information required. It is generally accepted that the selection of the theoretical framework

and research methodology should be derived from the issue or issues under investigation (Denzin and Lincoln 1994). This research required a theoretical framework that could explore, explain and make inferences about managerial and organizational SM and its links with organizational performance.

Learning and SM theories are the research frameworks for the inquiry. These frameworks have been argued to have underlying research methodologies that are invisible and incomprehensible (Pfeffer 1995). It was therefore essential to make more visible the elements under scrutiny. Since the research question involves inferences about how relatively invisible elements relate to one another and other organizational variables (such as Sensing, Response and Performance), the use of some form of explanatory approach was justified. Hence, qualitative research of an exploratory nature was undertaken to make the invisible more visible, and a quantitative explanatory approach was adopted to explain, confirm and infer relationships among variables.

5.2.1 Exploratory Versus Explanatory Research

Exploratory research is conducted to provide tentative understanding of the research problem and should be used as input to further research (Malhotra 1999). For the purposes of this research, exploratory research includes literature review (chapters two to four) and in-depth interviews to gain insight into the SMS measurement model and to aide in the generation of items to operationalize the model. Essentially, qualitative research was used for induction (Aaker, Kumar and Day 2001). This approach to data collection discovers information from the perspective of the interviewee about phenomena such as behaviours and attitudes that are not directly observable, that is, *"in someone else's mind"* (Patton 1990 p. 278). Findings of the qualitative research were not used to test a theory, but rather to build a theory for further testing through quantitative methods (Aaker *et al* 2001; Marshall and Rossman 1995).

Explanatory research on the other hand, aims to provide evidence of cause and effect relationships (Aaker *et al* 2001). Typically, the researcher manipulates the independent variables of interest and controls for the influence of other variables (Davis and Cosenza 1993). The current research used the survey method to determine the dimensions of the SMS measurement model and its relationship with other organization variables – Sensing, Response and Performance - called the structural model. Information for this second phase of the research was collected using a field survey of key informants and analyzed using SEM techniques.

5.2.2 Qualitative versus Quantitative Research

Quantitative and qualitative methods are cited as the two broad approaches to research (McDaniel and Gates 1996). A brief comparison of the characteristics of these two approaches is presented to explore why both techniques are appropriate for this study. The main differences between the two are summarized in Table 5.1

Table 5.1 Qualitative versus Quantitative Research

Comparison Dimension	Qualitative Research	Quantitative Research
	Exploratory	**Descriptive or causal**
Purpose		
Ability to Replicate	*Low*	*High*
Objective	*To gain a qualitative understanding of the underlying reasons and motivations*	*To quantify the data and generalize the results from the sample to the population*
Orientation	*Process-oriented*	*Outcome-oriented*
Data Collection		
Administration	*Special Training and skills required*	*Fewer special skills required*
Types of data gathered	*Real Rich and deep*	*Hard and replicable*
Data collection	*Unstructured*	*Structured*
Sample Size	*Small*	*Large*
Data Analysis		
Type of analysis	*Subjective and Interpretive*	*Statistical summarization*

The induction characteristic of qualitative methodology was a requirement for the first stage of this research for two reasons. First, SM has not been operationalized previously. While there is recent work implying that SM processes are occurring within organizations (Sinkula 2002), no research has explicitly focused on the processes themselves, nor have they been modeled or measured in organizations. In the early stages of theory development, where phenomena are not known, prematurely used quantitative research methods can lead to inconclusive findings (Denzin and Lincoln 1994). Hence, a qualitative method was required to explore the topic in more depth and to generate ideas rather than to evaluate ideas (Crimmons 1988). Qualitative research allowed for flexibility in the gathering of information and in-depth exploration of issues in a less structured format with a smaller number of respondents than quantitative methods would have permitted (DeRuyter and Scholl 1998).

The second reason for initially using qualitative methods relates to the *type* of information required for this stage of data collection. The depth and detail of data required to understand complex phenomena can be obtained only by getting psychologically close to the phenomena under study; *"the closer the researcher gets to the phenomena, the clearer it is understood"* (Carson and Coviello 1996 p. 55). Qualitative research allows the researcher to gain an in-depth understanding of the underlying reasons, motivations and attitudes and to obtain 'rich', 'real' and 'deep' information with non statistical data analysis (Deshpande 1983 p. 103).

Quantitative research on the other hand, to be used in phase two of the research, can provide statistical generalizations because of its larger samples and significance levels provided (Yin 1994). These aide in the application of the findings to the population (Neuman 2000).

In summary, qualitative and quantitative research methods were used as complements to each other for both theory building and theory testing

(DeRuyter and Scholl 1998; McDaniel *et al* 1996). Qualitative research enables the acquisition of 'in-depth' and 'real' information about how managers make sense of their marketplace and their place in it. It also provides a sound basis for development of the survey items through statements made by participants. The quantitative research enables confirmation of the structure of the SMS measurement model and the structural relationships between it and other organizational variables through statistical testing which should indicate how well and in what form the hypothesized model 'fits' reality.

This chapter explores the qualitative methodology used in the first phase of the research. It evaluates the use of in-depth interviews as the chosen qualitative method as opposed to alternative methods, then describes and justifies the integration of both direct and indirect exploratory techniques of interviewing. The determination of an appropriate sample is also justified. Tests for validity and reliability are described and the development of the interview protocol is outlined. Interview administration is described, the findings are presented and implications for and relationships to phase two, the quantitative study discussed in chapter six, are presented. See Figure 5.1 for an overview of the chapter framework.

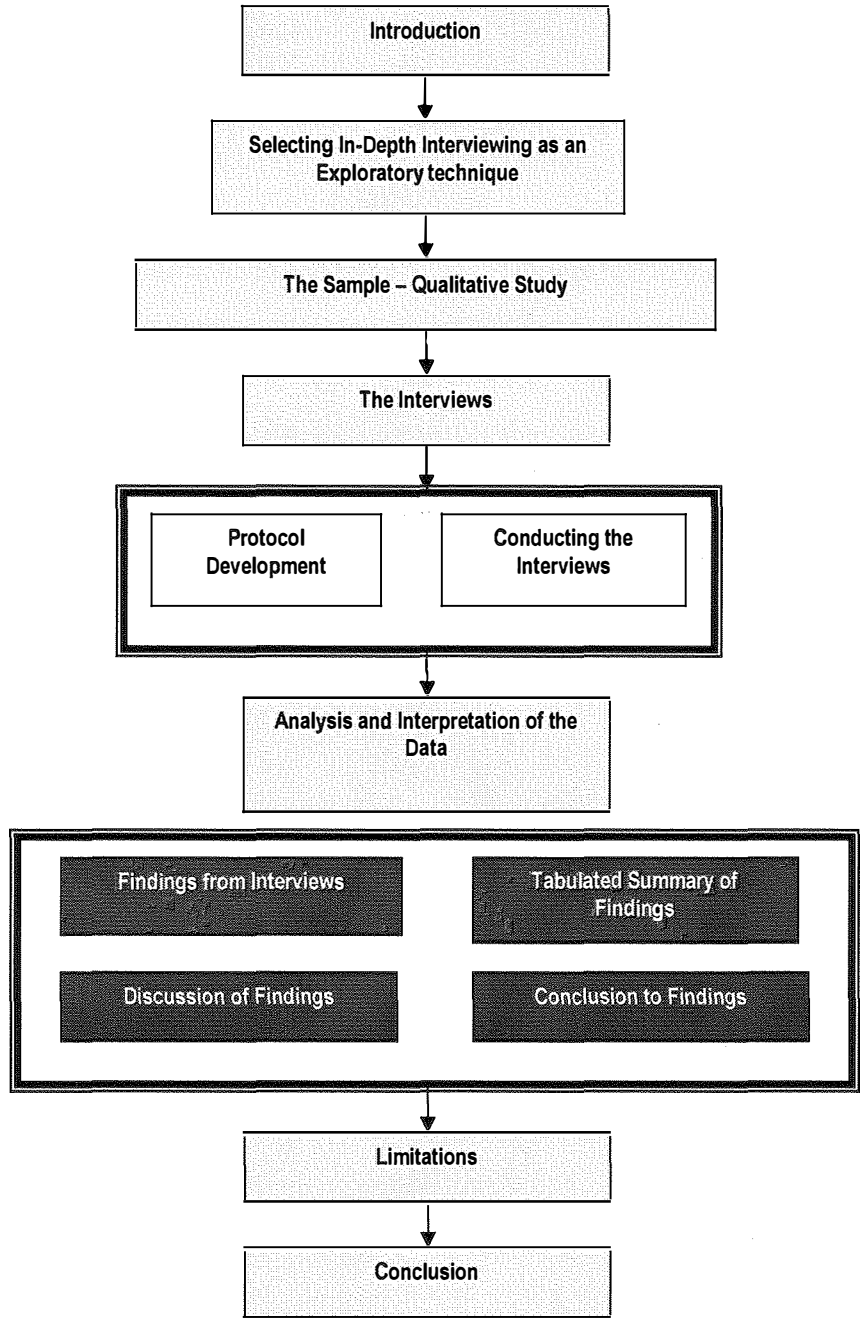

Figure 5.1 Framework of Chapter Five

5.3 SELECTING IN-DEPTH INTERVIEWING AS AN EXPLORATORY TECHNIQUE

This section outlines the different types of exploratory techniques and justifies the choice of in-depth interviews as the chosen strategy. It evaluates non-directive and semi-structured techniques and looks at the differences between in-depth interviews, focus groups and case study methods.

Individual in-depth interviews are interviews that are conducted face to face with the respondent, in which the subject matter is explored in detail. There are two basic types of in-depth interviews, **non directive** and **semi structured** (Aaker, Kumar and Day 2001) and their differences lie in the amount of guidance the interviewer provides.

In **non-directive** interviews the respondent is given maximum freedom to respond within the bounds of topics of interest to the interviewer. Sessions can be one or two hours long and may be tape recorded with the permission of the respondent. Success at this technique can depend on establishing a relaxed and sympathetic relationship with the interviewer and the skill of the interviewer in probing the responses without biasing the content (Aaker, Kumar and Day 2001).

In **semi-structured** or focused individual interviews, the interviewer attempts to cover a specific list of topics or sub areas. The open structure ensures that unexpected facts or attitudes can be pursued easily. One of the challenges for the interviewer is establishing rapport and credibility in the early moments of the interview. The authority of the interviewer, in terms of relating to the respondent on their own terms (Aaker, Kumar and Day 2001), is critical to the potential openness of the respondent and hence the information obtained.

For the purpose of this research, it was determined to integrate both semi-structured and non-directive techniques within each interview for two reasons.

First, non-directive techniques allowed the respondents to 'tell a story' (McDaniel and Gates 2002) about how they made sense of a novel business situation either past or current, and the managerial, personal and organizational processes they engaged in to resolve the inherent ambiguities within that situation. Second, semi-structured techniques were then employed to explore more fully the model developed from the literature and outlined in chapter four, in addition to an exploration of the seven properties of SM (Weick 1995) to ensure that all avenues of theoretical exploration were addressed.

5.3.1 Non Directive or Storytelling Methods of Interviewing

Following from Weick (1995), who states that the SM phenomenon demands a methodology that can access its subtle manifestations, this research pursued a similar approach as that adopted by Gergen and Thatchenkery (1996) and Gergen and Davis (1985), called a socialist constructionist approach. This was used to research managers' perceptions of how they understood, interpreted and resolved an unanticipated business situation. Thus, this story telling approach was adopted whereby a timeline structure was imposed in the relating of the story. Respondents were asked to relate key moments, experiences, thoughts and actions (Dunford and Jones 2000). It rests on the presumption that each person has a unique personal construct system that cannot be identified through traditional qualitative and quantitative research methods. Analysis then identifies important patterns or themes in this technique. By telling their story, respondents also provide an interpretation that is historically and culturally grounded (Taylor, Fisher and Dufresne, 2002).

5.3.2 Semi Structured Methods of Interviewing

These methods were employed to yield more detailed information on components of the model and the seven identified properties of SM in organizations. Hence, an interview protocol was developed for this purpose (See section 5.5.1). Another purpose for this exploration was related to

generating items for the survey for testing as indicators of the dimensions and elements of the SMS model identified in chapter four (Figure 4.9 p. 89).

The strengths of in-depth interviewing will now be discussed *vis-à-vis* other frequently used methods such as focus groups and case research techniques. Table 5.2 presents a summary of methods and differences between them.

Table 5.2 Differences between Qualitative Methods

Qualitative Method Characteristics	In-depth Interviews	Case Research	Focus Groups
Interview Method	*One to one in-depth interview*	*One to one in-depth interview/s*	*Group interaction*
Main Objective	*To obtain rich and detailed information*	*Varies from theory building to theory testing*	*To obtain insights and ideas*
Level of Prior Theory Requirement	*Low*	*High*	*Low*
Process	*Flexible – unstructured to structured.*	*Structured to standard procedures*	*Flexible – unstructured to structured.*
Content	*Unstructured to structured*	*Very structured*	*Unstructured*
Probing in Interview	*High*	*Low to medium*	*Low to medium*
Strengths	*Replication*	*Replication*	*Synergistic effect in a group setting*
Weaknesses	*Results can be biased by interviewer; not suitable for theory testing.*	*Requirement of sufficient prior theory*	*Conforming effects in a group setting.*

Source : Developed from Carson *et al* 2001; Rao & Perry 2003; Yin1994.

5.3.3 In-depth Interviews versus Focus Groups

A focus group is different to an in-depth interview as it entails obtaining ideas or ways of thinking about the world from a group of respondents through interactive discussion. The emphasis in this method is on the results of group interaction when focused on a series of topics introduced by the discussion leader. Each participant in the group is encouraged to express opinions on each

topic and to elaborate on or react to the views of others. The objectives are similar to unstructured in-depth interviews, but the moderator plays a more passive role than an interviewer does.

As a form of exploratory research, a focus group can be costly and yield misleading results. It also requires that participants are willing to give up their time and participate at a location arranged for the convenience of all participants or the moderator. Given that the exploratory research for this study entailed accessing information from managers of businesses, it was deemed that they might be unwilling to share information within a group of other managers from other businesses and also that their schedules might not allow a commonly acceptable time and location to be arranged.

5.3.4 In-depth Interviews versus Case Studies

A case study, in the research sense, is a comprehensive description and analysis of a single situation. The data for a case study is usually obtained through a series of lengthy unstructured interviews with a number of people involved in the situation, perhaps combined with internal data sources.

Admittedly, case research can be used to investigate a new research area or contemporary phenomenon within a dynamic real life context, (Carson, Gilmore, Gronhaug and Perry, 2001; Dyer, Wilkins and Eisenhardt 1991; Yin 1994) as in the current research. However, many researchers emphasize the importance of entering case research with substantial prior supportive theory (Eisenhardt 1989). Examples of case studies already exist in the SM literature and these provide a foundation for SM theory that describes the properties of SM in organizations. However, case analysis would not necessarily provide a pattern of consistent managerial behaviours across cases as most case analysis is situation specific. The purpose of the current exploratory method was such that common managerial behaviours might be found to represent general SM

processes in organizations and that these might serve as behavioural indicators for later scale development and testing.

The three-dimensional model of the SMS (Organizational Identity, Organizational Memory and Social Interactions) established in chapter four and its theoretically derived dimensions, provided a basis for structure in the interviews. In addition, the seven known properties of SM (Weick 1995) were also used in the development of interview protocol in order that comprehensive behaviours and activities of managers could be probed.

5.3.5 Validity and Reliability of the Qualitative Research

Several checks were built into the research design of the qualitative phase to provide validity and reliability (Healy and Perry, 2000). These in-built checks and controls for qualitative research can be summarized under four tests of the research design: construct validity, internal validity, external validity, and reliability (Yin 1994). Table 5.3 outlines these tests for validity and reliability of the research associated with phase one of the research design.

Table 5.3 Tests for Validity and Reliability of Qualitative Research Design.

Tests	Research Design	Phase of Research
Construct Validity	• *Data collected from multiple sources (number of interviews) provides multiple measures of the same phenomenon*	• *Research Design and data analysis*
	• *Establishment of triangulation of interview questions*	• *Research Design and data analysis*
	• *In-built negative case analysis*	• *Data analysis*
	• *Flexibility of the proposed theoretical framework*	• *Research design and data collection*
Internal Validity	• *Sample selection for information richness*	• *Research Design*
External Validity	• *Sample selection for theoretical replication*	• *Research Design*
Reliability	• *Interview guides are developed for the collection of data.*	• *Data collection and analysis*
	• *Structured process for administration and interpretation of interviews*	• *Data collection and research design*
	• *Use of steering committee*	• *Data collection and analysis*

Source – Developed for this research based on Yin (1994) and Healy and Perry (2000).

Construct validity refers to the formation of suitable operational measures for the concepts being investigated (Emory and Cooper 1991). The interviewing technique achieved construct validity through three tactics. First, triangulation of interview questions was established in the research design stage through two or more carefully worded questions that looked at the subject matter from different angles. Second, the interview method contained an in-built negative case analysis technique, whereby after each interview and before the next, the interviewer attempts to disprove emerging explanations interpreted in the data (Dick 1990). Third, the interviewer was able to take a flexible approach to the interviews in that it was possible to redesign both small aspects of the content and the process of the interview program itself in an iterative fashion as the program of interviews progressed.

Internal validity refers to the extent to which the observed results are due solely to the experimental manipulation (Parasuraman, Grewal and Krishnan 2004) and not due to extraneous factors. Internal validity in this case was achieved through sample selection on the basis of the requirement of *'information richness'* (Patton 1990 p. 181) for the analysis.

External validity is concerned with the findings of the research to be generalized beyond the current study (Emory and Cooper 1991; Sekaran 2000). For phase one of the research, some external validity was achieved through theoretical replication in respondent selection. That is, managers from a cross section of industries were selected to ensure that a cross section of 'stories' about diverse business situations was provided.

Reliability refers to how consistently a technique measures the concepts it is supposed to measure, thereby enabling other researchers to replicate the study and attain similar findings (Sekaran 2000). This research sought to secure

reliability through four tactics. First, through the structured process of the interviews and second, through organizing a structured process for recording writing and interpreting the data; this will be discussed further in this chapter. Third, reliability was sought, by comparing the taped interviews between two researchers and finally, the use of a steering committee to assist in the design and administration of an interview program is another way that reliability can be achieved. I consulted with my supervisor and colleagues about the findings throughout the interview program. That is, they acted as sounding boards for my interpretation of the data. Thus reliability was addressed as best as the situation would allow.

In summary, tests of validity and reliability were applied at the first phase of the research. The next section details the sampling process which is of particular import to internal and eternal validity as outlined in the previous table, Table 5.3

5.4 THE SAMPLE

The following three sub sections outline and justify the determination of sample size, sample selection method and the nature of the final sample selected for the qualitative phase of the research.

5.4.1 Determining Sample Size

Selecting the optimal sample size for the interviews, depends on what is to be found and why, how the findings are to be applied, and the researcher's available resources (Patton 1990). Research has suggested differing sample sizes for in-depth interviewing techniques. Dick (1990) suggested that the sample size should be 1% of a target population up to 200 and as a minimum sample size must not be less than 12 people. Others argue that sample size is determined by the achievement of stability, that is, when agreement between interviewees about issues is achieved and disagreement is explained (Yin 1994). This second process has been used in prior marketing research, for

example, Nair and Riege (1995) suggested that stability could occur after only six interviews and Woodward (1997) found convergence after five interviews. The stability achieving approach was adopted in the current research to determine the number of interviews. That is, maximum information gathering was the primary aim of the in-depth interviewing technique and this was achieved when stability occurred. This research conducted a total of twelve interviews before stabilization, as described above, was achieved.

5.4.2 Determining the Sampling Method

In addition to selecting the size of the sample, the method of selection must also be determined. In qualitative research such as this, the sample needs to be as heterogeneous as possible and relevant to the issues being explored (Dick 1990). Thus, a purposeful or non-probability sampling method is more appropriate.

Judgmental sampling was deemed a suitable method to achieve the research objectives for phase one, the qualitative study. When a sample size is to be very small, a judgmental sample will be more representative than a probability sample (Aaker, Kumar and Day 2001). Therefore each respondent /case was purposely selected to provide access to the phenomena of interest (Eisenhardt 1989), the SM process. Nine firms were initially selected and a further three were required to ensure stability and convergence of findings was realised (Yin 1994).

5.4.2.1 Purposive Sample Selected

The sample selected consisted of CEOs or owner/managers of twelve Australian businesses. Each firm chosen was selected on the basis of the purpose of the research, to obtain rich and deep information about SM processes within organizations. It is known that dynamic and unique operating environments provide conditions that are occasions for SM (Weick 1995 p. 100). Managers facing such ambiguous situations must deal with information evaluation and meaning making in uncertain environments, therefore it was

anticipated that SM processes would be most evident in firms operating under these conditions.

The firms and the respondents were sourced through the University of Newcastle Executive and Corporate Programs (ECP) and the Newcastle and Hunter Business Chamber (NHBC). It was known through these links, that the firms had recently faced particular uncertainty and change in their markets and marketplace. All firms had both production and service dimensions to their operations and represented a diverse range of industry and sized businesses as evidenced by the number of employees, ranging from micro businesses to a multi national corporation to a public utility provider. See Table 5.4 below for characteristics of firms researched and positions held by respondents.

Table 5.4 Characteristics of Firms Researched

	Informant	Age of Firm in Years	No. of Employees
1	*Owner/Manager*	*4*	*10*
2	*Owner/Manager*	*15*	*9*
3	*Manager*	*30*	*20*
4	*Owner/Manager*	*25*	*16*
5	*Owner/Manager*	*5*	*10*
6	*Owner/Manager*	*20*	*2*
7	*Owner/Manager*	*11*	*3*
8	*Owner/Manager*	*4*	*4*
9	*Owner/Manager*	*25*	*15*
10	*CEO*	*85*	*9000*
11	*CEO*	*45*	*280*
12	*CEO*	*75*	*600*

5.5 THE INTERVIEWS

This section outlines the broad interview process undertaken including interview protocol development, conduct of the interviews and analysis techniques employed on the data collected.

5.5.1 Protocol Development

The protocol developed for the interview was derived from the seven-stage process of SM outlined by Weick (1995) and the proposed model of a SMS developed in chapter four (p.89).

The interview protocol was created to tap into the SM process as told through an organizational story, in particular to access the major components of the initial model developed from the literature – Organizational Identity, Organizational Memory and Social Interactions in organizations. The seven properties of SM: (1) SM is grounded in identity construction, (2) is retrospective, (3) enacts its own environments, (4) is socially constructed, (5) is ongoing, (6) is focused on and by extracted cues and (7) is driven by the need for plausibility rather than accuracy (Weick 1995) - outlined in chapter three (pp. 48 - 55) were also investigated. The interview protocol is presented in Table 5.5.

Table 5.5 Interview protocol developed prior to conduct of interviews

SM Story	Initial Question	Probing Depth Questions
SM Story	*Can you tell me a story related to a novel, unique or difficult to understand business situation that your organization has been facing or has faced in the recent past?*	*What sort of things have you done in order to better understand and deal with these events?*
Model Component	**Initial Question**	**Probing Depth Questions**
Organizational Identity	*Can you tell what the notion of organization identity means to you and the organization?*	*What organizational activities come to mind when you think about this?*
Organizational Memory	*What sort of things do you think about when thinking about the memory of the organization?*	*What organizational activities come to mind when you think in terms of this?*
Social Interactions	*When thinking about interactions within the organization, what forms do these take? What are some of the things you do in the organization in order to interact with one another?*	*Are there some forms more important than others? Can you illustrate?*

Table 5.5 Interview protocol developed prior to conduct of interview (Contd.)

SM Property	Initial Questions	Probing Depth Questions
1. ***Identity***	*What, in your mind, are the things that constitute the identity of this organization?* *When thinking about this, what activities does this organization engage in that encapsulates its identity?*	*How does this play a part in interpretation of events?* *Can you give me an example?*
2. ***Retrospection***	*Can you tell me how remembering plays a part in your business?* *What things constitute the memory of the organization?* *What activities are examples of this?*	*What part does memory or acts of remembering, play in interpreting events?*
3. ***Enactive of Environment***	*What constitutes the environment for this organization?* *What part does this organization play in creating the dynamics of that environment?*	*Could you illustrate with a recent example of a situation where this occurred*
4. ***Social***	*When thinking about how people in this organization interact for the purpose of getting on with business, can you tell me about any particular practices or issues that come to mind?*	*What part do these play in interpretation of information or events?*
5. ***Ongoing***	*When thinking about interpretation of information, at what point do you cease interpreting and think about, say acting or deciding?*	*Could you give me a storyline that exemplifies this process?*
6. ***Extracted Cues***	*When thinking about how you approach information gathering and interpretation of that information, could you describe how you decide where to look for the correct information for your needs at the time? In other words, how does the process begin?*	*Could you provide an example that illustrates this?*
7. ***Plausability***	*When thinking about the gathering of information for managing this organization, at what point or points do you decide that you have enough information?*	*Can you illustrate this with an example?*

5.5.2 Conducting the Interviews

This section examines how the interviews were conducted within the sample. It also examines the planning and management issues relating to in-depth interviewing and is based mainly on the steps recommended by Carson, Gilmore, Gronhaug and Parry (2001) which are illustrated in Table 5.6.

Table 5.6 Steps Involved in Conduct of In-Depth Interviews

Steps involved in Conducting In-Depth Interviews
1. Contacting the respondent
2. Time and Setting
3. Establishing Rapport and Neutrality
4. Opening Questions
5. Probe Questions
6. Inviting a summary
7. Concluding the Interview

Source – Developed from Carson *et al* (2001)

5.5.2.1 Step One – Contacting the Respondent

The informant was a CEO, manager, or owner manager to ensure access to overall strategic information about the organization. Each respondent was initially contacted by phone seeking permission for an in-depth interview. After being given an overview of the research and the purpose of the interview, that is, as part of academic research, respondents were then asked to participate. When agreement was reached, a suitable time for the interview was decided.

5.5.2.2 Step Two – Time and Setting

A mutually agreeable time was set for the interviews and respondents were told that each interview would last approximately one hour. In all cases interviews were terminated only when no further information could be gained (Dick 1990) and interviews eventually lasted between one and three hours each with those at larger firms taking the longest. Also, during the later interviews, more time had to be allocated as probe questioning increased. All interviews were carried out face to face at the respondent's place of business as it was easier to establish rapport and to capture rich information cues such as body language and to be able to observe respondents in their organizational setting. All interview times were confirmed prior to the interview (Rao and Perry 2003).

5.5.2.3 Step Three – Establishing Rapport and Neutrality

All interviews began with a brief tour of the physical environment of the workplace conducted by the respondent. This was offered by the first

respondent and proved to be a successful ice-breaker with other respondents; it also provided additional information through observations that could later be investigated in the interview. Therefore, this practice was organized prior to the conduct of remaining interviews. This aided in establishing rapport through preliminary conversation and garnered important impromptu information prior to the interview taking place.

Interviews began with a brief explanation of the purpose of the interview to encourage rapport and cooperation (Carson *et al* 2001). Interviewees were also informed of the confidentiality of the interview and permission was sought, and granted, for the interviews to be taped. Written notes were also taken, particularly tracking informational clues not captured by tape, such as body language or facial expression.

5.5.2.4 Step Four – Opening Questions

The opening question needs to be framed in a way that encourages interviewees to reveal attitudes about the research topic without placing boundaries on the responses (Dick 1990). That is, the objective is to provide a broad starting point that may lead to further probe questions (Nair and Riege 1995) and to define the nature of the topic without imposing any constraints on the response (Carson *et al* 2001). Hence, the opening question asked that the interviewees recall a unique or uncertain situation the firm was currently confronting, or had confronted in the recent past, and to answer the questions in the frame of reference of those events. This allowed interviewees to 'tell a story' (Taylor, Fisher and Dufresne 2002) without placing them under any pressure to think about specific theoretical issues.

The opening question/s used for this research was, *"Can you tell me a story about a unique or uncertain situation that your firm is facing either now or recently and how you have handled that in terms of understanding what's going on?"* and *"How did you make sense of this situation?"* Thus, the question/s did

not put any pressure on the respondents to think about specific theoretical issues, nor did they have to intellectualize or justify their responses.

5.5.2.5 Step Five – Probe Questions

Probe questions follow the opening questions and help to keep interviewees talking and the interview focused. A formal interview protocol was developed as a broad means of focusing the interview and keeping within the time constraints (see Table 5.5 p.114 for initial questions). This was provided to interviewees at the start of the interview. This procedure helped to focus the interview and keep it within the time constraints.

Three types of probe questions were used during the interviews: detail oriented probes – to gain more details on issues being raised, elaborated probes – to get respondents to continue to talk about a topic and keep the interview focused, and clarification probes – to clarify any areas where it was difficult to understand what was being said by respondents (Patton 1990; Woodward 1997). For example, questions such as, *"would you give me an example of this?"* and *"will you elaborate about this?"*

In particular, for this research, probe questions asked about respondent's processes of understanding their business environment and also how these understanding processes become actions and responses the organization takes. Respondents were asked to further explore and elaborate on aspects of their experience as it related to issues derived from the initial working model of a SMS in organizations (Figure 3.3 p. 62), for example, 'what does organization identity mean [to them] in the context of their experience and could they elaborate about their experiences with an example illustrating this'. Last, they were asked questions related to the seven SM properties (Weick 1995).

5.5.2.6 Step Six – Inviting a Summary

When it was apparent that little more information was to be gained, closure was begun by inviting the respondent to pick out the key points from what had been

discussed thus far. For this research, the question to invite summary was *"what are the key points that you have mentioned, in terms of the processes that the organization has been through, in dealing with the recent novel situation?"* Also, *"what in your opinion, are the important issues and why?"*

5.5.2.7 Step Seven – Concluding the interview

When the interviewee could no longer add further information, the interviewer summarized the main points of the interview to ensure that all planned questions were investigated and to confirm responses. The interviewee was thanked for his/ her cooperation and a summary copy of the data analysis was offered. Further reassurance was also offered at this point regarding the confidentiality and anonymity of the information obtained.

So far, the *methods* of collecting the data for phase one of the research, have been discussed. This section will outline the procedure used for analyzing and interpreting the in-depth interviews and the final section will present the findings of the interviews.

5.6 ANALYSIS AND INTERPRETATION OF THE DATA

Content analysis was the preferred analytical technique employed to analyze the data obtained from the interviews. Among the various types of content analysis, the most frequently used technique is subject analysis, consisting of cutting the text into short sequences, grouping these short sequences into homogeneous categories and calculating their frequencies of appearance according to pre-established rules. The in-depth interviews were taped and transcribed and analyzed using a structured analysis of narrative technique whereby, word counts and thematic propositions were drawn out from the narratives (Bonet and Pachet 2005). The thematic propositions consist of phrases around and actant – the person doing the action – and an act, and can sometimes be broken into subject, object and verb terms.

In addition to the taped conversations, during the interviews, notes were made of key words and broad answers to questions. In addition, within one hour of the conclusion of each interview a summary of key issues raised by each respondent was written. A progressive interpretation report was prepared after the first interview and was compared to the transcript of each subsequent interview (Dick 1990; Nair and Riege 1995).

Fundamentally, the purpose of the data analysis was to seek patterns in the interview data so that the measurement model of the SMS could be explored, also so that indicators that operationalized the dimensions of the SMS construct could be developed. Because respondents converged on similar issues quickly, only twelve interviews were necessary as discussed in section 5.4.1 'Determining Sample Size' (p. 111).

The frameworks for the research developed in chapter four (Figure 4.8 p. 90 and Figure 4.9 p. 89), were based on theoretical assumptions grounded in prior empirical work in diverse disciplines. While the literature search was as broad as possible, interviewees provided further information and understanding to that provided by the literature, particularly with regard to the complexity of the SMS construct that is to be tested in the quantitative study. This aided in a more detailed construction of the SMS with some minor adjustments being made to the hypothesized SMS measurement model. These adjustments will be outlined in detail in Section 5.6.4 'Summary of the Findings' later in this chapter.

5.6.1 Findings from the In-Depth Interviews

The theoretical frameworks developed in chapter four were derived from the literature, being based on both theoretical and predominantly qualitative empirical research. The overall finding is that the frameworks *do* assist in understanding how managers make sense of marketplace events. Additionally, interviewees provided further information and understanding to that gleaned

from the literature, particularly as it concerned the three main dimensions of the SMS construct.

In this section, a discussion of each of the research issues derived from the preliminary research framework is presented. The information may appear detailed, but it is appropriate for investigating this research's research problem and represents the first empirical investigation of the issues involved in the theoretical framework.

This section presents the findings of the interviews in two ways. First, a summary of the results of the interviews are tabulated and discussed. Second, quotations will be used to provide evidence of patterns that were found in the data and to support the discussion.

In addition to theoretical confirmation and as part of the operationalization process, interviewees articulated details about managerial *behaviours* that were to be used in phase two of the research as indicators of latent constructs. Where these concepts had not been previously identified through initial literature review, further literature exploration was undertaken to clarify the findings. This three-stage approach was employed by Van der Bent, Paauwe and Williams (1999) when operationalizing their carriers of organizational memory.

By superimposing and matching interviewee comments across a final theoretical matrix, a set of items or indicators to be subsequently surveyed, were generated directly from the transcripts and taped conversations. These contributed to the final survey instrument used to explore the SMS constructs and structural model constructs. This method of item generation is recommended by Holmes-Smith (2001) as being the most accurate method for questionnaire development when measuring latent constructs.

5.6.2 Summary of Interview Findings

The first question asked was a broad and general question developed to establish rapport and to create a flow of thinking on the part of interviewees (See Table 5.5 p. 114). Respondents were asked initially to tell a story about a unique, novel or difficult to understand business situation they were currently facing or had faced in the recent past. While answers to this question are not included in Table 5.7 'Summary of Interview Findings', answers for the remaining questions are summarized and categorized in order to find patterns among them. Table 5.7 shows that the interviewees confirm the theoretical frameworks associated with the SMS and its structural relations with variables such as Sensing, Response and Performance.

Table 5.7 Summary of Results from In-Depth Interviews

Comments	Interviewees											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Sensing of Market Information												
• Selection based on most urgent need	√	√	√	√	√	√	√	√	√	√	√	√
• Prioritizing of information about different aspects of the market according to need	√	√	√	√	√	√	√	√	√	√	√	√
• Broad spectrum of information gathered for future use	√	√	√	√	√				√	√	√	√
• Different information sources for different uses.	√		√	√	√				√	√	√	√
• Information gathered for one purpose but used for another – alternative applications		√	√	√	√	√	√	√	√	√	√	√
• Element of surprise can occur in information gathered if constant flows accessed periodically												
2. Interpretation of Market Information												
• Current situation filters new information	√	√	√	√	√	√	√	√	√	√	√	√
• Interpret according to relevance to objectives	√	√	√	√	√	√	√	√	√	√	√	√
• Seek alternative explanations from closest			√	√	√	√	√		√	√	√	√

	1	2	3	4	5	6	7	8	9	10	11	12
resources eg. Employees, industry contacts	√	√			√				√	√	√	√
• Sort information by relevance to problem	√	√	√	√	√				√	√	√	√
• Use current interpretation systems	√	√	√	√	√	√	√	√	√	√	√	√
3. Response	√	√	√	√	√		√	√	√	√	√	√
• Tied to objectives	√	√	√	√	√				√	√	√	√
• Rapid feedback sought re success of actions		√			√	√	√	√				
• Slower readjustment if changes needed	√		√	√	√				√	√	√	√
• Need to focus staff on objectives for effective actions	√	√		√	√	√	√	√				
• Not directly tied to actions of competitors.												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
4. Performance			√	√	√				√	√	√	√
• Comparison to competitors	√	√	√	√	√	√	√		√	√	√	√
• Comparison to objectives	√	√	√	√	√	√	√	√				
• Readjustment of objectives if performance not going to be achieved												
5. Organizational Identity												
• Organization objectives define identity	√	√	√	√	√	√	√	√	√	√	√	√
• Organization identity is enduring quality about organization			√	√		√	√	√	√	√	√	√
• Aspects of organization identity have changed over time	√	√	√		√				√	√	√	√
• We have a future vision	√		√						√	√	√	√
• Important to communicate vision with employees	√			√	√				√	√	√	√
• Effort made to communicate objectives to employees	√		√	√	√			√	√	√	√	√
• Effort made to 'sell' objectives and vision to employees	√	√	√	√	√				√	√	√	√

	1	2	3	4	5	6	7	8	9	10	11	12
6. Organizational Memory												
• Memory resides in job descriptions	√	√	√	√	√	√	√	√	√	√	√	√
• Memory resides in the 'way things are done around here'	√	√	√	√	√	√	√	√	√	√	√	√
• Utilize organizational experiences	√	√	√	√	√				√	√	√	√
• Utilize employee experience in other organizations	√	√	√	√	√				√	√	√	√
• Utilize previous management experience	√	√	√	√					√	√	√	√
• Utilize memory of old timers in organization			√		√	√		√				
• Do not allow employees to look to the past.										√		
7. Social Interactions in Organizations												
• Regular information exchange systems	√		√	√	√				√	√	√	√
• Frequent information exchange	√	√	√	√	√				√	√	√	√
• Value face to face interactions with management team	√	√	√	√	√				√	√	√	√
• Value face to face with employees	√	√	√	√	√	√	√	√		√	√	√
• Pass information to all levels informally	√	√	√		√			√	√	√	√	√
• Pass information to all levels formally	√	√	√	√	√	√	√		√	√	√	√
• Employee opinions sought	√	√		√	√		√	√	√		√	√
• Information exchange with outside sources	√	√	√	√	√				√	√	√	√
• Open plan offices			√	√					√	√	√	√
• Physical arrangements – multiple sites etc – impede information flow	√	√	√						√	√	√	√
• Efforts made to overcome physical isolation of different staff.										√	√	√
Seven Stage Process of SM (Weick 1995)												
8. Identity – As per item 5	√	√	√	√	√	√	√	√	√	√	√	√
9. Retrospection – As per Item 6	√	√	√	√	√	√	√	√	√	√	√	√
10. Enactive of Environment												

• We play a part in the creation of our operating environment • We have little control over our operating environment	√	√	√			√	√	√	√	√	√	√
11. Social – As per Item 7	√	√	√	√	√	√	√	√	√	√	√	√
12. Ongoing • Sometimes you have to stop to get a sense of where you are now and where to go next.	√	√	√	√	√	√	√	√	√	√	√	√
13. Extracted Cues • We attend to information that is interesting or might be interesting • We put out 'feelers' for interesting information.	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √	√ √
14. Plausibility • You only need sufficient information from which to take action.	√	√	√	√	√	√	√	√	√	√	√	√

5.6.3 Summary Discussion of Interview Findings

The following sections discuss the findings from the interviews relative to the framework developed throughout chapter four.

5.6.3.1 Sensing Market Information

All interviewees agreed that selecting market information from a pool of possible information, is based on the most salient information needs at the time, that is, managers notice what is important in their minds at the time. So sensing seems to be prioritized by informational need, from most urgent to less urgent as perceived by the manager, "*you have to get the information you need for the problem at hand, then when that is sorted, you can just generally have a chat, all the while knowing how important this will be too*" (Participant 11). Having said that, problems that are hard to define for example, are often put aside in favour of those easier to comprehend, so information needs while salient, may be put off until unavoidable, *"I tried to ignore what was going on with the suppliers, I just couldn't work out how this could possibly happen, but it has and now I guess I have to deal with it as best I can as I go along"* (7). Information is also gathered *"just in case it is important later on"* (3).

Information is recycled when deemed relevant for a new application. Information can be either actively gathered or passively received and can include an element of surprise, *"we weren't expecting to find out about this, but the rep accidentally found out when he was talking to the staff of one of our customers"* (4).

5.6.3.2 Interpretation of Market Information

It is difficult for respondents to articulate the process of interpretation through which they proceed, when trying to understand a business situation, or to process market information. So rather than explicitly asking this question, the data obtained for this research issue was accessed through the telling of a story about a business situation and the careful utilization of probe questions to tease out the interpretation process undertaken by managers.

From this analysis, it was apparent that all interviewees filtered information through an existing knowledge framework, whether that was aligned to a current need or related to specific business objectives. Indeed *"what we want to achieve in terms of our objectives, tends to be a good way to stay on track with information coming in, that way we can get to the real issues faster"* (3). It was also evident that incoming information tended to be processed through pre-existing systems, however informal they appeared to the manager, *"by the time we all get to think and talk about things, if we all still agree that it is relevant, then it probably is. This is how we sort out what is good information and whether it is reliable or not"* (9).

5.6.3.3 Response

Similar to the interpretation issue above, it was difficult for managers to define explicitly how the actions they take in response to incoming market information are formulated. Therefore, the storytelling and probe strategy was used to explore this research issue.

Many researchers state that organization actions are contingent upon the interpretation made of the business situation (Thomas, Clark and Gioia 1993;

Ranson, Hinings and Greenwood 1980). This was validated in the interviews in an indirect way; in that managers stated that organization *objectives* dictated organization actions (9); and that objectives were formulated from interpretation of the situation. Hence, necessary adjustments to actions meant that organization objectives were called into question if information disconfirmed the effectiveness of current actions. Rapid feedback was sought once actions had been implemented, however, it was at times difficult to make adjustments where necessary (11). This was perceived as an implementation issue rather than a strategy issue, that is, managers questioned staff capacity for rapid change and reinforced the importance of focusing staff on objectives and action plans in order to implement effective responses (12).

5.6.3.4 Performance

Organization performance is one of the variables tested in the structural model. While many measuring instruments exist, the opportunity to explore this variable further and to validate existing measures was taken. Some interviewees (12; 11; 10; 9; 5; 4; 3; 1) mentioned that one of the criteria by which they evaluated their performance was against objectives; financial and strategic. These tended to be the larger sized firms. Other interviewees using intuition, benchmarked against competitors to evaluate performance (2; 6; 7; 8; 10) and these tended to be smaller sized firms.

5.6.3.5 Organizational Identity

Identity appears to be implemented in multiple ways in organizations with strategic objectives, vision and the internal marketing and reviewing of these objectives being the operands of identity identified from the sample. What was salient to these respondents about who they were (i.e. organizational core values) was consistent with the current objectives, which of course were open to revision from time to time. All interviewees could articulate some sense of organizational identity and without exception all interviewees felt that this was also a reflection of some aspects of their personal identity, in other words they identified with the firm. However, the importance of clear and steadfast

strategic and operational objectives was consistently mentioned as being key to the manifestation of the firm's identity, *"our objectives are how we define who we are"* (9). The firm's vision or future objectives – where it wanted to go - was also said to constitute part of the organization's identity, *"we strive to stay true to who we are, to what we know and are known for, but we also know that we can do more than we have in the past, so we are trying to leverage that reputation into other markets. Some of the old timers are a bit uncomfortable, but we have to move forward to survive and grow"* (11).

In addition to objectives being key, managers stated that it was equally important to 'internally market' those objectives to all levels in the organization and to provide systematic feedback on how different levels were meeting their set objectives (12). This was achieved through systematic meetings, ranging from weekly to annually to inform employees about whether targets were being met. Other 'internal marketing' tools mentioned were signage, informal managerial talks with employees and regular planned social events. An emphasis was placed on the predictability and reliability of social events by employees, *"social events must be an ongoing part of the culture rather than being initiated on an ad hoc or as needed basis, employees must see consistency in the way things are organized, they need to be able to count on you"* (9).

5.6.3.6 Organizational Memory

Few interviewees explicitly mentioned retrospection as part of how they made sense of their environment. However, much was mentioned about 'experience', 'corporate memory' and the effective utilization of people in the organization who had long tenure, to inform new events *"we pride ourselves on the fact that the average time an employee has worked here is over 4 years, and many have gone somewhere else only to come back here"* (9); *"we are the best at what we do because everyone around here is in touch with our history, knows where we have come from and where we want to go"* (11).

Several interviewees, mentioned the importance of clear and unambiguous job descriptions or roles for employees to fulfill to effectively implement actions and strategies, *"we ensure that everyone knows the part they have to play in our success, they know how their job relates to our objectives and to our ultimate success"* (10).

Prior experience, sometimes in other industries, of both management and employees was brought to bear on ambiguous events *"I have found that my work in the army has enabled me to bring good systems and forms of communication into the business"* (5). The harnessing of this experience was mentioned as critical; with one exception. One large organisation had recently undergone an employee purge as a result of restructuring; *"it's not so much keeping corporate memory intact as controlling the rate at which it is lost"* (9).

5.6.3.7 Social Interaction

Social interaction for information exchange in organizations, has been accepted as a given in the literature without clear indications about its characteristics. This research represents the first exploration into this phenomenon in organizations.

SM is social, was confirmed by all the interviews, however, the small firm managers discussed limited opportunity for complex interrelationships within the firm; they mentioned strategies such as maintaining relationships within their industry through industry bodies, informal social exchange relationships with competitors and suppliers, trade fairs and relationships with outside professionals as alternative tactics for interaction.

Within the large firms, meetings, either informal or formal seemed to be the mainstay of interpreting events and information exchange. Frequency of meetings was confirmed as critical to the creation of common understandings and meanings, *"All we seem to do is have meetings, but that allows us to come*

to an understanding sooner, we learn to use the same terms and meanings etc.; this makes explaining much that much easier" (12).

Managers discussed the importance of face-to-face interaction for information exchange. This type of interaction is deemed rich, in that there is a greater quantity of informational cues exchanged. Free flowing office spaces, often open or semi open plan were said to contribute to this type of exchange. One manager in a large recently restructured multi-national organization met face to face with colleagues on the other side of the world on a fortnightly basis *"until we get to know how we can work together better as a team"* (10).

There was also anecdotal evidence for diversity of information exchange through social interaction, with two managers citing recent examples of accessing diverse information not concerned with the issue at hand. In one case employees working in an unrelated part of the firm were accidentally included in a meeting. Due to their unforeseen involvement, they were able to see a problem in a different light, thus enabling management to arrive at a quick solution. In another case a very junior employee was included in an executive meeting and unknowingly provided a solution for a current problem. These are examples of '*scrambling*' (Weick 1969) techniques where a diversity or variety of information is accessed.

The physical arrangement of the office space or workshop was also found to impact on the quantity and quality of interaction opportunities. This is in keeping with the finding that culture is composed of artefacts and physical arrangements that influence behaviours in organisations (Homburg and Pflesser, 2000).

Physical arrangements were explicitly mentioned by all interviewees as having an impact on the convenience of interaction. When social interaction was seen as inconvenient, or impeded by the existing physical arrangements, managers

deemed it of sufficient importance to make the appropriate changes to the work environment as necessary to facilitate exchange; for example, rearranging office space, acquiring buildings that enabled more frequent interaction and the use of innovative technological solutions to enable free interaction between organizational members.

5.6.3.8 Enactive of Environment

"Sensemaking is enactive of sensible environments" (Weick 1995 p. 121) means that the environment is not fixed, but rather that the organisation through its actions, contributes to the creation of the environment it faces. The findings from the interviews confirmed that those managers who were able to articulate a strong firm identity, also felt that they exerted an influence on their environment, in other words they took action based on these beliefs. This action then confirmed their initial beliefs *"other firms look to us to set the benchmark, we don't wait for them"* (9); *"we always want to be ahead of the rest, I take pride in being the first to try something new"* (2).

5.6.3.9 Ongoing

"Sensemaking is ongoing" (Weick 1995 p. 43) means that we are immersed in stream of events, whether they are problems or solutions. The view from interviewees did not contradict this notion, however, managers mentioned the punctuation of this continuous flow with time set aside for reflection, retreats, celebrations of targets met and *"gathering their wits about them"* (9).

5.6.3.10 Extracted Cues

"Sensemaking is focused on and by extracted cues" (Weick 1995 p. 49) relates to how firms select from an ongoing stream of information, a seed or cue of information from which they can begin to develop a sense of what might be happening. It is difficult to observe this actually occurring in organisations. However, the information from the field confirmed that organisations do tend to pick up on seeds of information that are interesting to them; this interest is defined through their strategy and objectives. They then further explore this information by putting out "feelers" or talking to others in the environment –

customers, competitors and suppliers, attempting to refine the possible long term implications of the information for their organizations.

5.6.3.11 Plausibility

"Sensemaking is driven by plausibility rather than accuracy" (Weick 1995 p. 55) was overwhelmingly confirmed by the interviews. *"Just enough information from which to take small actions"* (7) was all that was required.

5.6.4 Summary of Findings from Phase One of the Research

The in-depth interviews were the *first* step in investigating how market information is processed in organizations and how this might be related to organizational performance. The concepts of Sensing, SM (through interpretation and memory), Response and Performance were explored through a theoretical framework derived from OL, MO, MIP and SM literatures. Using the seven-step process of SM (Weick 1995) as a suitable theory to further explore interpretation and memory in organizations, findings from the field were consistent with the literature, clustering around the previously three identified dimensions of the SMS – Organizational Identity, Organizational Memory and Social Interactions. This result presents an initial confirmation of the hypothesized multidimensional SMS construct, which is to be measured in phase two of the research. However, some findings were 'newly discovered' through the interview process. They relate specifically to the lower-order sub-dimensions of the SMS, specifically the construct of Organizational Identity, and have implications for the operationalization process, therefore require elaboration.

Chapter four outlined a hypothesized third-order hierarchical model of a SMS in organizations (Figure 4.9 p. 89) in which the concept of Organizational Identity was one of three SMS dimensions. The concept of Organizational Identity was confirmed as a dimension of the SMS in organizations through the interviews. The original model of Organizational Identity is revisited in Figure 5.2.

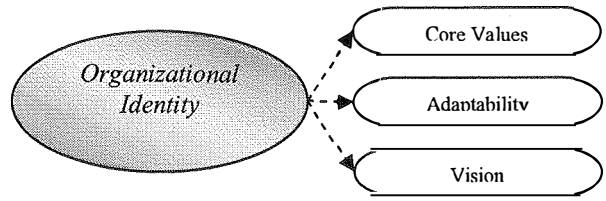

Figure 5.2 Second-order Hypothesized Model of Organization Identity

The most salient findings from the interviews, concern the *operationalization* of sub-dimensions that make up the Organizational Identity construct. Organizational Identity was initially operationalized as having three underlying sub-dimensions – Core Values, Adaptability and Vision – these elements being deduced from empirical findings and literature concerned specifically with Organizational Identity. The field findings confirm the operation of Adaptability and Vision factors, however Core Values seemed to operate through objectives *"our objectives are how we define who we are"* (Respondent 9) plus the internal communication of objectives as efforts were made to 'sell' and communicate objectives throughout the organization. In light of these findings, the Organizational Identity construct is revised to more closely reflect the *operation* of Organizational Identity in organizations as found in through the interviews. Hence, the hypotheses are adjusted accordingly:

H2: Organizational identity is a multidimensional construct consisting of sub-dimensions that reflect Objectives, Internal Marketing, Adaptability and Vision and these elements will co-vary due to their interdependent relationship effects.

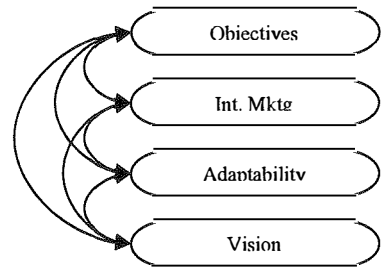

Figure 5.3 Hypothesized Model of Co-varying First-order Factors of Organization Identity

And in addition:

H2a: Organizational Identity is a higher order construct consisting of four underlying sub-dimensions: Objectives, Internal Marketing, Adaptability and Vision.

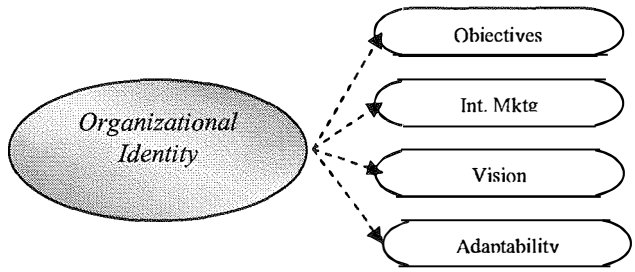

Figure 5.4 Hypothesized Model of a Second-Order Construct of Organization Identity in Organizations

Overall, the interviews found that the 'sensing' of market information was focused by managerially perceived need which itself was grounded in perceptions based on past knowledge. This was then interpreted through pre-existing knowledge frameworks. The findings also initially suggest that Sensing and SM have a relationship to Response and Performance, though these may not always be direct relationships. The limitations of the qualitative phase are now addressed.

5.7 LIMITATIONS

Many of the limitations of qualitative research are not so much to do with shortcomings of findings, but to do with the susceptibility of the findings to misuse (Aaker, Kumar and Day 2001). There can be a great temptation to accept small sample exploratory results because they are often so compelling in their reality. The dangers of this practice are twofold. First the results are not necessarily reflective of what may be found in the population and hence cannot be projected and second, there is typically some ambiguity in the results.

The results obtained from in-depth interviews with twelve senior managers are necessarily exploratory due to the small sample size and care must be taken when interpreting results. The findings from the interviews are to be included in the quantitative research phase therefore further scrutiny of findings is to be undertaken through quantitative research. The flexibility that is the hallmark of the in-depth interview technique gives the interviewer great latitude in directing questions. Similarly, the researcher when analyzing the data may interpret the findings selectively to support a particular point of view. To mitigate both these occurrences, particular strategies were enacted. First, in order that generalization of the qualitative research findings would not occur, a second confirmatory and quantitative phase of the research was designed. Second, to help reduce interviewer bias in second and subsequent interviews, a time lapse of at least one week occurred between interviews whereby no reviewing of previous information collected occurred. This had the effect of 'clearing' the interviewer's mind of information collected. In terms of analysis bias, all interview findings were blind reviewed by two additional analysts until convergence of content analysis was reached.

Finally, it is acknowledged that the number of interviews undertaken, twelve, may not necessarily In view of these limitations, the qualitative methods outlined were used strictly for insights into the phenomena being investigated, and to generate items for inclusion into the survey to test the model and constructs in phase two of the research.

5.8 CONCLUSION

The preceding sections have justified the use of a two-phase research design. They have outlined the qualitative study employed to explore the proposed measurement model of the SMS and to obtain suitable indicators of its operation in organizations. These indicators will now be included in the quantitative study that tests the hypothesized construct of the SMS. Once the

SMS construct had been evaluated, it will be included in a structural model that depicts the relationships between the SMS and other organization variables – Sensing, Response and Performance.

This chapter discussed and justified the qualitative methods employed for the first and exploratory phase of the research. The use of in-depth interviews has been justified and the sampling procedures been described and justified. The process of protocol development and the conduct of interviews have also been outlined. Findings from the exploratory qualitative study have been presented, and confirm and augment the theoretical framework and hypotheses developed from the initial theoretical exploration.

The following chapter now outlines and justifies the methodology employed for phase two of the research. That is, to test hypotheses regarding the construction of the SMS measurement model, and also to test hypotheses concerned with its relationship to Sensing, Response and Performance in organizations.

CHAPTER SIX – THE QUANTITATIVE STUDY

6.1 INTRODUCTION

Chapter five outlined the rationale, processes and findings of the qualitative phase of the research. The main outcome of this phase was confirmation of the construct of the SMS measurement model and its operation in organizations.

This chapter begins with an explanation and justification of phase two's methodology, the quantitative study, as shown in Figure 6.1. Following this, the survey procedures are described with specific areas, including questionnaire design and administration (Section 6.3), sampling (Section 6.4) and proposed data analysis strategies (Section 6.5) being discussed. Finally, ethical considerations are considered (Section 6.6) and the chapter concluded (Section 6.7). See Figure 6.1 for an overview of the chapter sections.

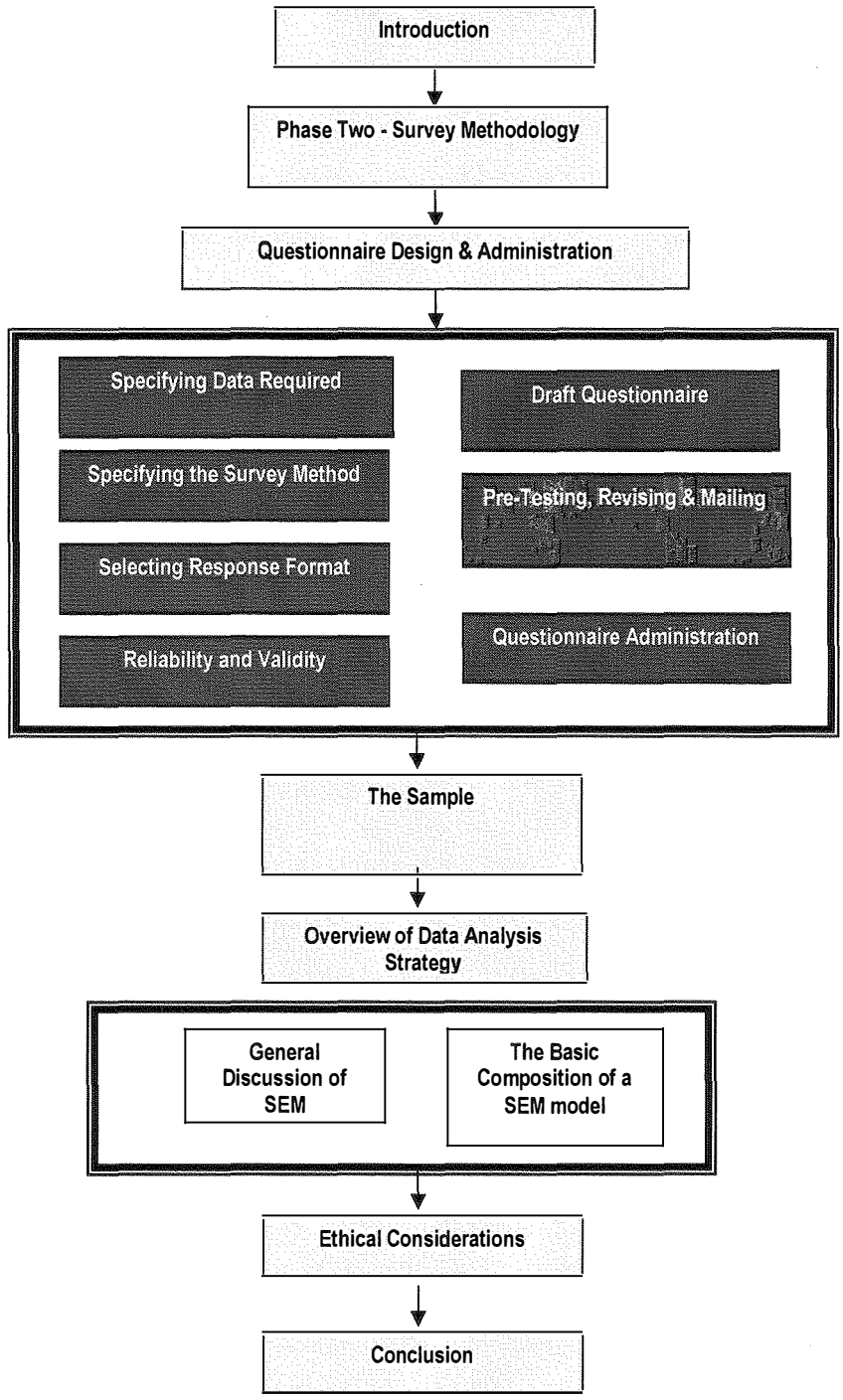

Figure 6.1 Framework of Chapter Six

6.2 PHASE TWO - SURVEY METHODOLOGY

Information for the second phase of the research was collected using a field survey of key informants and analyzed using Structural Equation Modeling (SEM). This research design was appropriate for the study for two reasons: first, the variables of interest were difficult for the researcher to manipulate (Emory and Cooper 1991) and second, it was suitable because respondents could not be easily assigned to treatment and control groups on *a priori* basis as in experimental studies. Indeed, this type of quantitative study is an established approach to the study of organizational and industrial relationships, *"field survey research employing key informant reports and structural equation modeling, is well accepted by marketing academics"* (Anderson, Hakansson and Johnason 1994 p. 12). Thus, survey research was an appropriate approach to examine the research hypotheses advanced in this study.

Three further areas of the research design are addressed in the following section. They are questionnaire design and administration (Section 6.3), sampling issues (Section 6.4) and data analysis strategies (Section 6.5).

6.3 QUESTIONNAIRE DESIGN AND ADMINISTRATION

This section outlines and describes the process of questionnaire formulation for obtaining accurate and complete information about the research problem (Malhotra, 1999). Specifically, the questionnaire for the study served a number of functions by translating research objectives into a series of questions. First, the questions and response formats were standardised so that all respondents faced the same stimuli. Next the questionnaire was designed in a way to provide comprehensible questions to motivate respondents to cooperate and complete accurately all the questions asked. Finally, it facilitated and simplified administrative and data processing because the questions used a standard response format (Frazer and Lawley 2000; Malhotra 1999).

Designing a questionnaire requires artistic as well as scientific skills and experience (Malhotra 1999). The questionnaire used in this research[8] (Appendix B p. 250) and its seven-step process of design and administration are summarized in Fig 6.2 and discussed in the following sections (Churchill 1995; Frazer and Lawley 2000; Malhotra 1999).

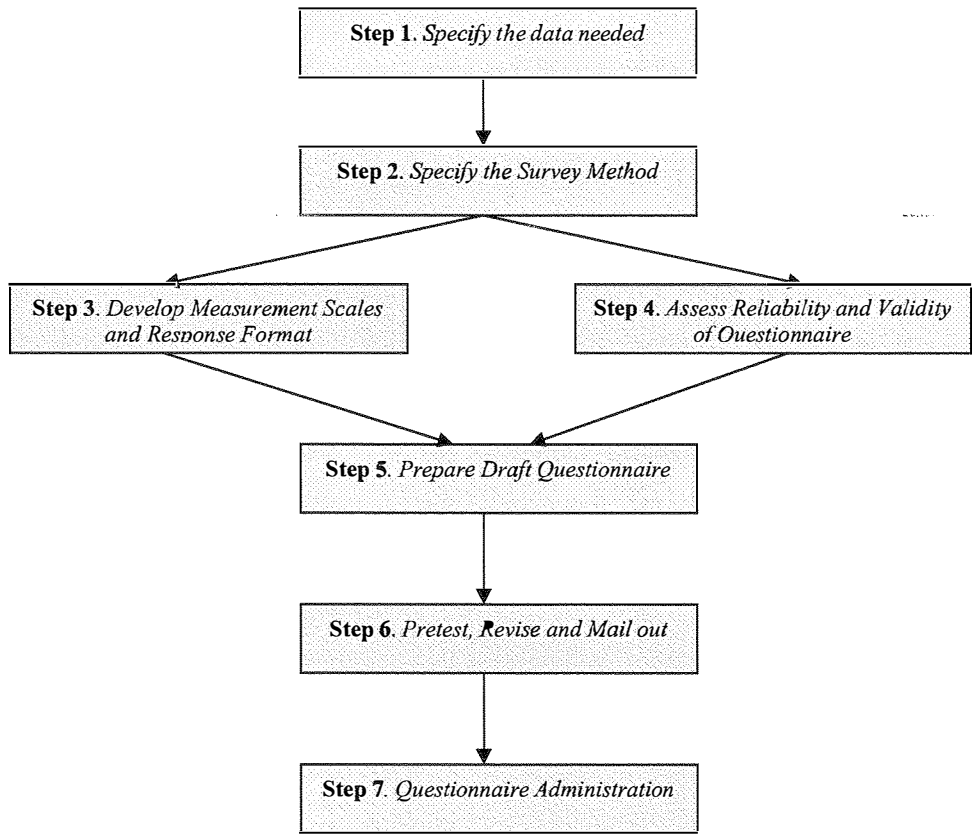

Figure 6.2 Questionnaire Design and Development Process
Source : Synthesized from Malhotra (1999) and Chirchill (1995).

6.3.1 Step One: Specifying Data Required and Operational Definitions

The first step in questionnaire design is to determine the information required to achieve the research objectives.

In addition, before data is collected about these variables, operationalization of the SMS construct and its underlying dimensions had to be achieved. This was

[8] See Survey Questionnaire in Appendix B.

accomplished through literature review in chapter four and further confirmed through phase one's qualitative study outlined in chapter five. The following sections present the operational definitions for the constructs included in the SMS model and the use of these variables in the research model as either dependent or independent variables.

6.3.1.1 Conceptualization and Operationalization

The measurement development process involved both conceptualization and operationalization of each construct of interest. Conceptualization is the process of applying the theoretical or abstract definitions to a concept (Neuman 2000). For example, the construct of Organizational Identity is defined as 'the organization's communicated objectives, vision and adaptability'. This definition was based on initial exploration of those attributes that are core, distinctive and enduring about the character of an organization (Albert and Whetten 1985), but that may be adaptable in order that the organization maintains its distinctiveness (Gioia, Shultz and Corley, 2000) when compared to other organizations as the environment changes (Albert, 1977).

Operationalization is the process of precisely delineating how a conceptualized construct is to be measured (Davis and Cosenza 1993; Hair, Bush and Ortinau 2000). That is, constructs have to be specified in such a manner as to be potentially observable or manipulated (Neuman 2000). The measures or indicators used in this study were chosen because of their alignment with conceptual definitions and in most cases directly derived from statements from interviewees. Most of the theoretical constructs in this research are not yet well established in the literature, therefore the appropriateness of each measurement model is presented in this section.

The conceptual and operational definitions of the constructs of the model that drives the research that was developed in chapter four, are listed in Table 6.1. Note the delineation of the three main dimensions of the SMS model. Alongside the conceptual definitions are corresponding operational definitions

derived from phase one of the research and the relevant survey questions designed to collect the data required. Responses to all the questions for the constructs in the survey were gathered using a seven-point Likert scale.

Table 6.1 Constructs, Definitions, Survey Questions and Scales Used in the Research

Construct	Conceptual Definition	Operational Definition	Survey Questions	Scale
Sensing	*Higher performing firms scan more frequently across both task related and broader market sectors (Daft et al 1988)*	*Respondent sensing is measured by a frequency measure across market and environment sectors*	*Qustions L1-7; M1-7; N1-7; O1-7; P1-7; Q1-7; R1-7.*	*Interval*
Org'l Identity	*Organizational identity is portrayed as that which is core, distinctive and enduring about the character of an organization (Albert and Whetten 1985). Organizational identity is simultaneously stable, yet adaptive and unstable over time, while core values are retained, their interrelationship with the changing environment can create changing meanings of these core values to organizational constituents (Gioia et al 2000).*	*Organizational Identity is made up of organization objectives, internal marketing activities, vision and adaptability.*	*A1-6; B1-6; C1-6; D1-7*	*Interval*
Org'l Memory	*Organizational memory refers to "stored information from an organization's history that can be brought to bear on present decisions" (Walsh and Ungson 1991p. 61).*	*Organizational memory is composed of organization retrospection activities, role clarity and utilization of employee knowledge.*	*E1-6; F1-6; G1-6*	*Interval*
Social Interact'n	*An organization is a "network of intersubjectively shared meanings that are sustained through...everyday social interaction" Walsh and Ungson (1991 p. 60)*	*Social Interaction is characterised by 3 general properties of information – frequency, richness and diversity and the physical environment in which they occur.*	*H1-6; I1-6; J1-6; K1-7*	*Interval*

Table 6.1 Constructs, Definitions, Survey Questions and Scales Used in the Research (Contd.)

SMS	*The subject's, active 'making' of meaning (Weick 2001). Interpretation involves the development or application of ways of comprehending the meaning of information and entails the fitting of information into some structure for understanding and action (Gioia & Thomas 1996).*	*Third and second order latent factor construct = Organizational Identity + Organizational Memory + Social Interaction.*	*Weighted factor scores of composite constructs.*	*Interval*
Response	*Action taken in response to intelligence that is generated and disseminated (Jaworski and 1993)*	*Actions taken in response to information from the market environment and interpretations made concerning that information..*	*S1-9*	*Interval*
Perform'e	*Favourable Business Performance (Jaworski and Kohli 1990)*	*Managerial subjective evaluation of overall performance which includes financial and competitive performance, customer satisfaction and achievement of strategic objectives.*	*T1-6*	*Interval*

The constructs have been either wholly derived through exploratory findings in phase one of the research or based on constructs developed in prior research and adapted for the research. The SMS, derived from exploratory findings is hypothesized as, (1) a third-order factor comprised of three second-order factors Organization Identity, Organization Memory and Social Interaction, and 10 first-order factors and as (2), a second-order construct consisting of the same three dimensions, but with co-variations between them. The Sensing construct is derived from Daft, Sormunen and Parks (1988) with Response and Performance constructs being adapted from Jaworski and Kohli (1993).

6.3.1.2 Independent and Dependent Variables

Variables, whether they be observed or latent, can be defined as either dependent or independent variables. An independent variable is a variable that is not influenced by any other variable in the model. A dependent variable is a

variable that is influenced by another variable in the model. In SEM, any latent variable that is predicted by other latent variables is known as a latent dependent variable (Schumacker and Lomax 2004). Any latent variable that is not predicted by another variable in the equation is known as an independent latent variable or an exogenous latent variable.

In this research, when testing the measurement constructs prior to inclusion in the structural model, all variables will be independent. However, in the structural model, after confirmation of each of the measurement models, Sensing will be the independent variable, while SMS, Response and Performance will be dependent variables. In the full latent variable model (see section 6.5.3.3), Sensing will be the independent variable with SMS and Response mediating variables, and Performance the dependent variable.

Based on earlier literature review and model development outlined in chapter four, the independent and the dependent variables were identified as shown in Table 6.2.

Table 6.2 Independent and Dependent Variables for Each Research Issue

Research Issue	Independent Variable	Dependent Variable
1. How do managers select market information?	*Sensing*	
2. How do organizations interpret market information?	*SMS*	
3. How is interpretation related to action?	*SMS*	*Response*
4. How is action related to firm performance?	*Response*	*Performance*
5. How is the selection of market information related to firm performance?	*Sensing*	*Performance*
6. How is interpretation related to performance?	*SMS*	*Performance*

6.3.2 Step Two: Specifying the Survey Method

The next step in the questionnaire design is to specify how the data will be gathered using the survey method. Data can be collected by a number of

methods, including face-to-face or telephone interviews, observation, personally administered or internet mediated and mail surveys (Aaker, Kumar and Day 2001; Burns and Bush 2000; Malhotra 1999; Sekaran 2000). The relative advantages and disadvantages of each type of method were considered in relation to this study. The decision for using mail survey is justified below.

Each survey method had advantages and disadvantages in relation to the research as summarized in Table 6.3. Hence none of the of the survey methods is superior in all research situations. Each method must be evaluated based on balancing the research objectives (Malhotra 1999) against factors such as time, costs, the accuracy level required, the availability of facilities, the expertise of the researcher and the characteristics of respondents (Ranchhod and Zhou 2001; Sekaran 2000) as Table 6.3 illustrates. The decision to choose a mail survey for this research was based on a subjective assessment of the advantages and limitations of mail surveys compared to other data collection methods as well as the research objectives and the constraints of the research in this instance. This choice is justified in the next section.

Table 6.3 Comparison of Survey Methods

Dimensions	Survey Methods			
	Mail	Teleph'e	Personal	Internet
1. Complex questionnaires	*Poor*	*Good*	*V. Good*	*Poor*
2. Control of data collection environment	*Poor*	*Fair*	*V Good*	*Poor*
3. Control of interviewer effects	*V. Good*	*Fair*	*Poor*	*V. Good*
4. Costs	*Fair*	*Good*	*Poor*	*Good*
5. Diversity of Questions	*V. Good*	*Poor*	*V. Good*	*Fair*
6. Follow up	*Good*	*V. Good*	*Poor*	*Poor*
7. Geographically dispersed sample	*V. Good*	*Good*	*Poor*	*V. Good*
8. Item non-response	*Fair*	*V. Good*	*V. Good*	*Poor*
9. Interviewer probing and explanation	*Poor*	*Good*	*V. Good*	*Poor*

Table 6.3 Comparison of Survey Methods (contd.)

10. Obtaining sensitive information	*Good*	*Fair*	*Fair*	*Good*
11. Quantity of data	*Fair*	*Good*	*V. Good*	*Fair*
12. Respondent anonymity	*V. Good*	*Fair*	*Poor*	*V. Good*
13. Respondent cooperation	*Poor*	*Good*	*V. Good*	*Poor*
14. Opportunity to think about questions	*V. Good*	*Poor*	*Poor*	*V. Good*
15. Response rate	*Fair*	*Poor*	*Good*	*Fair*
16. Sample control	*Good*	*Good*	*V. Good*	*Poor*
17. Scheduling requirements	*V. Good*	*Fair*	*Poor*	*V. Good*
18. Speed	*Poor*	*V. Good*	*Fair*	*V. Good*

Source: Synthesized for this research from Larson 2005; Aaker *et al* 2001; Burns and Bush 2000; McDaniel and Gates 2002; Emory and Cooper 1991; Frazer 1997; Malhotra 1999; Sekaran 2000; Zikmund 2000.

6.3.2.1 Choosing Mail Survey

Overall, it was determined that mail survey would achieve the research objectives better than other methods for the following reasons. First, mail survey was an attractive method because the target population would have been difficult to reach by any other method. That is, given the number of respondents sought for valid and accurate data analysis, it would be very difficult to sample representatively from the population of interest by other means. Second, this method produces more reliable answers (Aaker, Kumar and Day 2001) by reducing response error, interviewer bias and sampling distribution problems (Larson 2005). Third, it is appropriate for reaching a geographically dispersed population as in this study and fourth, there is consistent evidence that mail surveys yield more accurate results (Aaker, Kumar and Day 2001).

6.3.2.2 Limitations of Mail Surveys

Mail surveys also have limitations. For example, while a large number and diversity of variables can be included, complex questionnaires can reduce response rates. In consideration of this, the survey was constructed to appeal to potential respondents in terms of readability, visual appeal and simplicity. While complex issues *were* addressed in the survey, they were broken into

component parts for question design. Questions associated with these issues were worded as straightforwardly as possible and were pilot tested for face and content validity to simplify responses. In addition, if respondents needed assistance with the questionnaire, they were invited to contact either the researcher or the research supervisor at any time. Fifteen respondents took advantage of this opportunity (via email and telephone) to discuss minor issues such as whether they were to answer on behalf of their division only, or whether they felt the survey was relevant to their business situation. None of the respondents had concerns with the questions themselves.

Another major limitation of mail surveys is their poor response rate and hence the high possibility for non-response bias. The best way to reduce this is to improve the response rate. Dillman (2000) offers a detailed review of the voluminous response rate literature. His 'Tailored Design Method' draws on social exchange theory to develop *"survey procedures that create respondent trust and perceptions of increased rewards and reduced costs for being a respondent"* (Dillman 2000 p. 4). Survey researchers can provide rewards to respondents in a variety of ways, such as enclosing monetary incentives, aligning with professional groups, making questionnaires interesting, and offering a summary of results. Researchers in turn can reduce respondent costs by providing stamped and addressed return envelopes, keeping questionnaires as short and simple as possible, assuring confidentiality or anonymity, etc. Finally, researchers can establish trust with respondents using such techniques as university (rather than corporate) sponsorship and follow-up mailings to make the task of questionnaire completion appear important. Apart from the inducement of financial incentives and the use of follow-up mailings (due to expense), all the above procedures were followed in this mail survey.

In brief, this research chose a mail survey because of its good overall rating relative to other survey methods for the purpose of the research. It may have been the only viable option when a large quantity of data needs to be obtained

through structured questions from a geographically dispersed sample under moderate cost constraints (Sekaran 2000). Additionally, consideration of access to the target population was an issue.

6.3.3 Step Three: Selecting Response Format

Closely related to the design of the questions, is selecting the format of responses for measurement. In this research, measurement designates the operations carried out to determine the amount of a variable that an object possesses (Churchill 1995; Emory and Cooper 1991; Malhotra 1999). The types of measurement scales used in this research were listed in Table 6.1 previously.

Interval scales are probably the most frequently used in marketing research (Bagozzi 1994). Numbers are assigned to indicate differences in the degree of a characteristic along a continuum, such that the differences from number to number are equal across the range of the scale. In this research, the Likert scales used in questions can be treated as interval scales (Byrne 2001).

Although many social scientists accept that Likert scales are approximately interval in character (Bagozzi 1994), there is some controversy about whether a Likert scale is interval or merely ordinal (Neuman 2000). There are two reasons for treating Likert scales as interval scales in this research. First, scales have been found to communicate interval properties to the respondent and therefore produce data that can be assumed to be interval scaled and second, in the marketing literature, Likert scales are almost always treated as interval scales (Aaker, Kumar and Day 2001).

The Likert scale used in this research is a seven-point scale with all points labeled, ranging from strongly disagree to strongly agree. This type of scale is used firstly, because it is widely used in marketing research (for example Morgan and Hunt 1994) and secondly, it allows for degrees of intensity and feelings to be expressed. This provides a direct measure of a respondent's

opinions (Luck and Rubin 1987), makes the responses easy to administer and code and is adaptable to statistical analysis with SEM applications. A seven-point scale was chosen over a five-point scale to allow for greater dispersion among possible answers for the analysis technique employed - SEM. Meanings were attached to the numbers, and related to respondents in the survey, for example, Strongly agree, agree, somewhat agree, agree nor disagree, somewhat disagree, disagree and strongly disagree, so that consistency of meaning could be imposed on all responses.

6.3.4 Step Four: Assessing Reliability and Validity of Questionnaire

One of the main issues with any questionnaire is that it accurately and consistently measures what it is supposed to measure, that is, that it should be valid and reliable (Sekaran 2000). Thus, the next step was to assess the validity and reliability of the questionnaire used for the study. Each of the basic types of validity and reliability are discussed below first by definition, then the strategies undertaken to test for and ensure high levels of validity and reliability in the questionnaire. The discussion is summarized in Table 6.4.

Table 6.4 Assessment of Validity and Reliability of the Questionnaire

Types of Validity and Reliability	Definition	Assessment Strategies
Validity	*The accuracy of measurement, that is, a valid scale that measures what it is designed t for (Bollen 1989; Davis and Cosenza 1993)*	• *Approaches taken to scale development (Churchill 1979).*
Content or Face Validity	*The degree to which the content of an indicator reflects the intended concept (Parasuraman 1991; Neuman 2000; Burns and Bush 2000).*	• *Literature review* • *Feedback from experts* • *Pre-testing of questionnaire* • *Confirmatory factor analysis (CFA)*
Construct Validity	*The degree to which a construct achieves empirical and theoretical meaning (Brown, Trevino, Harrison 2005).*	• *Literature Review* • *Pre-testing of questionnaire* • *Data analysis*
Convergent Validity	*The degree of association between the two different measurement scales which are supposed to measure the same concept (Davis and Cosenza 1993).*	• *Data analysis*

Table 6.4 Assessment of Validity and Reliability of the Questionnaire (contd.)

Discriminant Validity	*The degree to which the measurement is different from other scales supposed to measure different constructs (Davis and Cosenza 1993).*	• *Data analysis*
Reliability	*A measure is reliable to the extent that independent but comparable measures of the same trait or construct agree (Churchil 1979).*	• *Clear statement and multiple indicators in the questionnaire.* • *Scale Reliability co-efficient alpha*

Source: Adapted from Rao (2002) and other sources acknowledged in table.

Validity is concerned with the accuracy of measurement, that is, a valid scale measures what it is designed to measure (Davis and Cosenza, 1993; Churchill 1995). *External validity* concerns the generalizability of this research to the target population, while *internal validity* is concerned with whether the relationship among the variables measured is genuine. Thus, the research design controlled for accurate and unambiguous measurement of the variables of interest and tried to eliminate or neutralize systematic and random error (Emory and Cooper, 1991; Neuman 2000).

Several types of measurement validity are relevant to this study. *Measurement validity* is the extent to which a measure captures the concept of interest and is assessed both theoretically (chapter four) and empirically (chapter seven) in this research (Kervin 1992; Parasuraman *et al* 2004). *Face or content validity* is the degree to which the content of an indicator reflects the intended concept (Burns and Bush 2000; Neuman 2000). To strengthen content validity, the research followed several recommended procedures (for example Davis and Cosenza 1993). Initially, insights gained from the exploratory phase provided some background and understanding of the issues involved. That is, prior literature was examined to identify possible dimensions in chapters three and four, interviews were conducted in phase one of the research and findings related in chapter five. In addition, other experts in the field were asked to suggest any amendments to the items. This comprehensive knowledge strategy enabled relevant measures to be devised. The questionnaire was then developed and

modified to reflect the feedback received from experts. In brief, content validity was achieved through careful research design.

While construct validity occurs when the theoretical implications that drive the concepts are consistent with the resulting empirical evidence (Parasuraman *et al* 2004), convergent validity occurs when multiple indicators operate in a consistent manner to form a single measure (Neuman 2000). Multiple items were used for this research to measure all the constructs (as discussed previously in Section 6.3.1), thus providing high convergent validity. Construct validity is established when the data are statistically analyzed in chapter seven.

While validity is concerned with the accuracy of measurement, reliability is concerned with its stability and consistency (Davis and Cosenza 1993; Sekaran 2000). A reliable measure is one that provides consistent results and is relatively free from random error (Malhotra 1999).

For this research, reliability was achieved by clearly conceptualizing constructs, by ensuring precise and consistent measurements, by using multiple indicators of constructs and by pre-testing and replicating measurements (Neuman 2000). First, clear conceptual and operational definitions were developed and interval levels of measurement were used wherever possible as shown in Table 6.1 earlier. Next, all constructs were operationalized by the use of multiple indicators, because multiple indicators of the same concept are likely to be more reliable and less likely to have the same systematic error than a single indicator (Oettingen, Little, Lindenberger and Baltes 1994). Finally, the instrument was pre-tested and modified before being administered as discussed further in section 6.3.6. Thus, reliability was designed into the study. A more detailed assessment of validity and reliability requires data to be collected and analysed and this will be reported in chapter seven where the data is statistically analysed.

6.3.5 Step Five: Preparing Draft Questionnaire

The next step in questionnaire development is to draft the questionnaire with the knowledge of the objectives of the research, who the respondents will be, the communication method to be used and the approximate length of the questionnaire. Issues such as question content and wording, response format, sequence of the questions and characteristics of the questionnaire were all considered. Principles of good question design were adopted to minimize measurement error (Davis and Cosenza, 1993; Emory and Cooper, 1991; Frazer and Lawley, 2000; Malhotra 1999; Sekaran, 2000) and are discussed next.

Principles of good question design were applied to the content, wording and structure of each question. First, in relation to word *content,* only brief legitimate and applicable questions needed to collect the data were asked. Double-barreled and sensitive questions were avoided and only a modest amount of effort was required to complete the questionnaire. Second, care was taken with question *wording*. For example, words chosen had only one meaning, key words were emphasized with italics, there were no double negatives, no leading or bias inducing words or phrases, no abbreviations or incomplete sentences were used and all questions were stated positively as recommended (Herche and Engelland 1996). Even negatively coded questions were stated positively, for example, *"This organization is unclear about its objectives."* (QA5).

Third, all questions had a clear *structure.* The scaled questions were close-ended with specific ordered choices that are less demanding for the respondent (Salant and Dillman 1994).

Questions were *ordered* from the most interesting and topic-related at the beginning to those most likely to be objectionable at the end and questions on the same subject were put together (Bourque and Fielder, 1995; Salent and Dillman, 1994). Further, within subject areas, questions of similar structure

were grouped together. That is, the model related questions were placed in the same sections of the questionnaire (Section 1-4; Questions A1 – K7) with the potentially sensitive topic of business performance in the latter section (Section 4) and questions related to respondents' demographics put near the end (Section 5) (See Survey in Appendix B p. 250). Additionally, transition terms were used to help respondents navigate their way through the questionnaire and add a conversational tone (Dillmam 2000; Salant and Dillman 1994). For example, words such as 'next' and 'following' were placed strategically throughout the questionnaire to aide the respondents' navigation through the questionnaire.

Finally, in relation the overall readability and visual presentation, vertical flow was designed, instructions before each set of questions were in boldface, statements and response formats were in light type-face and instructions about answering were given where needed. In addition to the formal questionnaire, a letter of invitation to participate was included on university letterhead, outlining the importance of the research and how valued would be the contribution of the respondents'. Contact details were also included.

In relation to the visual presentation of the survey itself, the title page was in full gloss colour and included the title and university logo. In particular, the title was carefully chosen to be informative, unambiguous and meaningful to respondents, for example, the term 'sensemaking' was not used but rather the more unambiguous 'knowledge generation'.

The balance of the survey was printed in black and white and sized as an A4 booklet. The first page offered a reassurance of anonymity and information about return and the reply paid envelope. The following page re-informed in a conversational tone and using a numbered list, about who should answer the questionnaire, how it should be answered and contact details reiterated. It was posted in an A4 university envelope with the reply paid envelope the same. Thus, the formal questionnaire conveyed a feeling of importance and status

about the research to potential participants. At the conclusion of the survey, a note of appreciation for respondents' participation was included.

6.3.6 Step Six: Pre-testing, Revising and Mailing the Questionnaire

Another stage in the development of a new survey instrument involves pre-testing it with a small sample of the population to detect and remedy any possible errors in its design (Emory and Cooper, 1991; Malhotra 1999). In this research, two groups of people were used to scrutinize the survey (Dillman 2000); four academics and ten people drawn from the population to be surveyed - these were sourced through the University of Newcastle Graduate School of Business. On the basis of pre-test feedback, some minor changes were made to the questionnaire wording and ordering of sections within the questionnaire, before the questionnaire was printed and mailed. For example, pre-testing revealed that the instructions for answering section two were somewhat confusing to potential participants; these were re-written and tested again to avoid confusion. Pre-tests also picked up one or two typographical errors and some inconsistencies between the usage of the words 'organization' and 'business'. These were corrected prior to mailing.

The questionnaire was then mailed in an A4 envelope with University of Newcastle letterhead. Included were the questionnaire itself, consisting of ten pages including title and instruction pages, plus a separate one page letter of introduction with an invitation to participate including instructions for questionnaire completion and contact details. Also included was another reply paid A4 envelope with University of Newcastle letterhead for completed questionnaires.

6.3.7 Step Seven: Questionnaire Administration

Following pre-testing, the survey was administered to the whole sample. The sample will be discussed in detail in Section 6.4. Care was taken when administering the survey in order to achieve as high a response rate as possible.

Mail surveys are known for their unreliable response rates and studies have shown that opinions from respondents may differ from those of non-respondents (Parasuraman, Grewal and Krishnan 2004). Hence it was important to maximise the response rate and reduce the possibility of non-response bias (Malhotra 1999).

6.3.7.1 Response Behaviour

The established total design method of conducting surveys was adopted (Dillman 2000). It is based on a view about why people respond to questionnaires and combines this with attention to detail in survey design and administration to form an effective method for conducting mail surveys (Emory and Cooper 1991; Neuman 2000). It prescribes three courses of action to encourage responses: minimise social costs, provide rewards to respondents and establish trust that the rewards will be delivered.

First, to minimise respondents' costs, the questionnaire was designed so that it would appear relatively quick and easy to answer. The amount of time to complete the questionnaire was confined to about thirty minutes in the pre-testing stage of questionnaire development. The use of sensitive questions was kept to a minimum. Consideration was given to the status of the targeted respondents in terms of rewards offered. It was on this basis that a decision was made not to offer a monetary incentive for response. One reason was the lack of empirical support for the effectiveness of monetary incentives in business surveys (Brennan 1992). Another was that it may be considered demeaning for people of management status to be induced by a token monetary incentive. Thus, non-monetary incentives were used instead. A report of the final results' summary was offered to respondents and the importance of the study in terms of respondents' benefits was emphasized (Malhotra 1999). Finally, to establish trust with respondents, the introduction of the survey explained why the study was important and a promise of confidentiality was made. In addition, because the researcher's university was named as a sponsor of the survey, its perceived legitimacy may have enhanced responsiveness (Zikmund 2000).

6.3.7.2 Validity of Responses

Response bias occurs when respondents answer questionnaire items with a certain slant (Zikmund 2000). *Social desirability bias* occurs where respondents over-report desirable characteristics and under-report undesirable ones, or create a relationship where none exists (Lockhart and Russo 1996). In this research, social effects were minimized by emphasizing confidentiality of answers, by not implying any desirable state in question introductions and wording, and by emphasizing the importance of accurate reporting of managerial perceptions to the study outcomes. Although individual managers in organizations responded to the questionnaire, they did so, on behalf of their organization. That is, the focal constructs measured organizational behaviours.

Similarly, *acquiescence response*, or the tendency to disagree with the questionnaire items regardless of the content, could influence this research (Alreck and Settle 1985). To reduce its impact, respondents were given no indication which answers were most desired by the researcher and were encouraged to answer honestly from their own perspective. Additionally, *negative affectivity bias,* being the disposition to experience stressful emotional states which could operate as an inflator, suppressor or moderator variable (Lockhart and Russo 1996) to answers given, was considered. To counter this, respondents were given an opportunity for emotional expression at the end of the survey where they could freely express their opinions about the topic of the survey in general.

Additionally, the *level of questionnaire difficulty* affects the validity of the measuring instrument to the extent that respondents fail to understand the instructions, specific questions and response alternatives (Lockhart and Russo 1996). To minimise the impact of questionnaire difficulty in this research, attention was given to careful design and pre-testing, as discussed above.

Finally, consideration must be given to non-respondents. Because there are positive and negative aspects of non-response, there is no agreed minimum acceptable response rate (Fink 1995). For example, non-response bias may be beneficial for the survey because subjects disqualify themselves from the survey if the topic is irrelevant to them, or because they may have difficulty in answering the questions, or feel that they do not know enough about the topic (Lockhart and Russo 1996). Conversely, the level of non-response in surveys may bias the results (Alreck and Settle 1985; Fink 1995) with higher response rates not necessarily decreasing bias because there are individuals who respond simply because of their interest in the survey topic (Lockhart and Russo 1996). In this research, because the topic is a popular and emerging management topic and care was taken with questionnaire design, a satisfactory response rate was achieved as outlined in the following section.

6.4 THE SAMPLE

An area of concern when conducting a field survey is to determine which subjects should be surveyed to obtain the appropriate information for the research problem (Malhotra 1999). The steps in selecting the subjects for this research have been synthesized from Davis and Cosenza (1993), Emory and Cooper (1991), Fink (1995), Luck and Rubin (1987), Malhotra (1999) and Zikmund (2000) and are illustrated in Table 6.5

Table 6.5 Steps in the Sampling Process in this Research

Steps	Description	Application in the Research
1. Selecting the population related to the research problem and research design	*Includes elements (the units from which the data is collected), sampling units (non-overlapping elements), extent and time.*	*Element – Managers of Business Organizations. Extent – In Australia Time – December/January 2003/2004*
2. Selecting the sampling program	*The means of representing the population.*	*Businesses selected from Australian Business Limited database.*

Table 6.5 Steps in the Sampling Process in this Research (contd.)

3. Determining the size of the sample	*The selection of the number of people or objects of the population to be investigated.*	*3000 assuming a response rate of 10% = 300 which falls within the range for SEM.*
4. Selecting a sampling technique	*The method by which a sample is selected whether probability or non-probability. In probability sampling every element in the population has a known, non-zero probability of selection.*	*Non -Probability. Judgment sampling.*

Source : Synthesized for this research from Aaker *et al* (2000),Davis and Cosenza (1993), Emory and Cooper (1991), Fink (1995), Luck and Rubin (1987), Malhotra (1999) and Zikmund (2000).

6.4.1 Step One: Selecting the Population Related to the Research Problem and Research Design

In this research, the target population consisted of all commercial organizations within Australia. It was crucial to access a wide variety of organizations, in terms of industry, size and market conditions.

6.4.2 Step Two: Selecting the Sampling Frame

The sampling frame is a list of elements from which the sample may be drawn (Sekaran 2000; Zikmund 2000). Because the purposes of the two phases are different – the first qualitative phase is exploratory and the second quantitative phase is deductive - the sample frames should be different.

At the qualitative stage, the purpose was to explore the organizational behaviours that reflect SM processes in organizations. Thus, the sample chosen must provide access to the phenomena of interest, but must also include elements of the population – commercial organizations in Australia. Hence, the convenience or judgement sample selected for the first exploratory phase had to meet these criteria. Access to the phenomena of interest meant that the organization had to be currently experiencing or had recently experienced a novel business situation that created ambiguous or uncertain conditions for the organization. Representative of the population meant that the business

organizations selected for this phase should reflect size and industry diversity as in the Australian organizational population. The firms selected for phase one of the research were sourced through personal contacts and in association with the University of Newcastle Executive and Corporate Programs. This was achieved by initial screening phone calls to managers of likely organizations to ascertain whether the criterion of access to the phenomena of interest and representativeness of Australian business organizations would be met.

Phase two of the research tests the theoretical model and therefore required access to a sample frame representative of the Australian business population. The sample frame selected was that of the membership of four Australian Business Chambers: two major metropolitan business chambers and two regional business chambers, through Australian Business Limited (http://www.australianbusiness.com.au). The four business chambers had a diverse membership in terms of industry, size of firms, geography and market conditions. The membership databases of these organizations were chosen for two reasons: their representativeness of the broader business population in Australia and cost effectiveness for a mail survey.

6.4.3 Step Three: Determine Sample Size

Determining sample sizes for probability samples involves financial, statistical and managerial issues (Davis and Cosenza 1993; Kervin 1992; McDaniel and Gates 2002). Usually, experienced researchers regard 100 respondents as the minimum sample size when the population is large (Alreck and Settle 1985). In this research, the minimum requirements for SEM were also considered in determining sample size as SEM requires certain conditions be met for parameter estimation. A sample of 200 satisfies the SEM data analysis technique (Arbuckle 2003; Hair, Anderson, Tatham and Black 1998; Holmes-Smith 2001; Nunnally and Berstein 1994; Schumacker and Lomax 2004) and as a general rule, across a number of model types, a sample of 200 is required to give parameter estimates with any degree of confidence (Gerbing and Anderson

1993). Assuming a conservative response rate of about 10% for a mail survey, a size of about 3000 for the sample was used to provide approximately 300 responses, taking into account that all may not be useable.

6.4.4 Step Four: Select a Sampling Technique

The form of sampling chosen was a non-random method. The chosen sample was selected based on its representativeness of the population and its availability; this is generally termed a convenience method (Aaker *et al* 2000). The problem of convenience samples however, particularly in relation to the issue of representativeness, is twofold: are such samples representative of their populations, and what are the confines of generalizability to the populations themselves? (Tse, 1995). First, according to Rothman and Mitchell (1989) in their study of sampling methods in commercial markets, only 17% of surveys of organizations were based on random samples. In addition, in many instances there was a lack of information reported regarding the method of sample selection. These results indicated that most organizational survey research was carried out on samples of organization respondents that were selected without recourse to random sampling (Hyman and Yang 2001). Second, the issue of random sampling is particularly significant in view of the widespread use of significance tests in organization research. When a non-random method is employed, it is doubtful whether such testing is appropriate. Naumann and Lincoln's (1989) view is instructive in this regard stating that almost all empirical studies published in organization research journals use convenience, not probability samples.

It was therefore determined that the chosen sample would provide data at least equivalent to the data used by many other researchers in previous organization research. Special care needed to be exercised in the selection of a convenience sample with regard to the representativeness of that sample. In addition, the significance of findings to the population in general was understood to be limited.

6.5 OVERVIEW OF DATA ANALYSIS STRATEGY

This section broadly overviews the data analysis strategy selected including statistical and theoretical justification for using SEM.

6.5.1 A General Discussion of SEM

SEM is a statistical methodology that takes a confirmatory (i.e. hypothesis testing) approach to the analysis of a structural theory bearing on some phenomenon (Byrne 2001). Typically, this theory represents 'causal' processes that generate observations on multiple variables (Bentler 1988). The term *structural equation modeling* coveys two important aspects of the procedure: (1) that the causal processes under study are represented by a series of structural (i.e. regression) equations, and that (2), these structural relations can be modeled pictorially to enable a clearer conceptualization of the theory under study. The hypothesized model is tested in a *simultaneous* analysis of the entire system of variables, to determine the extent to which the model is consistent with the data. If the fit of the data to the model is adequate, the model then argues for the plausibility of postulated relationships among the variables; if it is inadequate, the tenability of such relations is rejected (Byrne 2001).

Several aspects of SEM set it apart from other multivariate procedures (see Fornell 1982). First, it takes a confirmatory rather than an exploratory approach to the data analysis, (although aspects of the latter can be addressed). Furthermore, by demanding that the pattern of inter-variable relations be specified *a priori*, SEM lends itself well to the analysis of data for inferential purposes. By contrast, some other multivariate procedures are essentially descriptive by nature (e.g. exploratory factor analysis). Second, although traditional multivariate procedures are incapable of either assessing or correcting for measurement error, SEM explicitly provides estimates of these error variances. Alternative methods, those rooted in regression or the general linear model, assume that error in the explanatory variables vanishes. Third, although data analyses using the former methods are based on observed

measurements only, those using SEM procedures can incorporate both observed and unobserved (latent) variables. Finally, there are no widely and easily applied alternative methods for modeling multivariate relations.

6.5.2 The Basic Composition of a SEM Model

The basic SEM model can be decomposed into two sub-models: a measurement model and a structural model. The *measurement model* defines relations between the observed variables (indicators) and the unobserved latent variables (factors). The measurement model specifies the pattern by which each indicator loads on a particular latent variable. In contrast, the *structural model* defines relations among the latent variables. So it specifies the manner by which particular latent variables either directly or indirectly influence (i.e. cause) changes in the values of certain other latent variables in the model.

6.5.2.1 Latent versus Observed Variables

In the social sciences, researchers are often interested in studying theoretical constructs that cannot be observed directly. Such is the case in the current research. These abstract phenomena are termed *latent variables* or *factors*. Examples of latent variables in economics are social class, in management, employee motivation, in marketing, brand awareness and market orientation.

Because latent variables are not observed directly, it follows that they cannot be measured directly. Thus, the researcher must operationally define the latent variable of interest in terms of behaviours believed to indicate its presence. In this way, the unobserved variable is linked to one that is observed, thereby making its measurement possible. Behaviours can mean scores on a particular measuring instrument that measures attitudes, behaviours or observations of a task. These measured scores are termed *manifest* or *observed* variables in SEM methodology; they serve as *indicators* of the underlying *factor* they are presumed to represent.

6.5.2.2 The Full Latent Variable Model

The full latent variable model allows for the specification of a regression *structure* among *multiple latent variables*. That is, the researcher can hypothesize the impact of one latent variable on another in the modelling of causal direction. This model is termed "full" or "complete" because it comprises both a measurement model and a structural model (Byrne 2001 p. 7).

6.6 ETHICAL CONSIDERATIONS

This final section deals with the ethics of data collection. The authority to conduct research is related to the researcher's responsibility to protect the interest of both the sponsor and the respondents (Neuman 2000). This study gained approval from the University of Newcastle Human Research Ethics Committee and strictly followed ethics guidelines provided by them.

In particular, ethical surveying means that while respondents are encouraged to respond, they are not pressured to do so in an offensive way, their confidentiality is assured (Salent and Dillman 1994) and they are protected from misrepresentation and exploitation (Kervin 1992; Zikmund 2000). In this research, in-depth interviewees and survey participants were advised of the purpose of the research and encouraged to respond, but they were not pressured, nor was the purpose of the research misrepresented to them in any way and their confidentiality was preserved as the questionnaire confirms. That is, participants gave *informed consent* to be involved. Moreover, they were not asked for their names or addresses, hence their anonymity was also preserved.

In-depth interviewees were sent a copy of the summarized findings and a follow up phone call thanking them for their contribution was made. A summary of the findings was sent to those survey respondents who requested one. The results were used only for their stated purpose. Major ethical guidelines of the University of Newcastle were followed in all stages of the research.

6.7 CONCLUSION

This chapter described the research design process and the design implemented, steps taken in design and administration of the questionnaire and the sampling strategies adopted for this second phase of the research. Conceptual and operational definitions underlying all the model constructs have been described and justified and then articulated as variables within a structural model to be tested. Measurement development issues were identified and justified and the validity and reliability of the survey instrument was established as much as possible. Sample selection and processes and the data analysis methods have been outlined and justified. Finally, ethical considerations related to the data collection methods were discussed. In the following chapter, the collected data is analysed and findings presented in relation to the research objectives.

CHAPTER SEVEN: ANALYSIS AND FINDINGS

7.1 INTRODUCTION

This chapter reports how the data were analyzed in order to address the research questions and to test hypotheses. The hypotheses are concerned with four fundamental research questions: (1) how is SM operationalized in organizations? (2) how is the SMS related to Sensing? (3) how is the SMS related to organizationl Performance? and (4) how is the SMS related to organizational Response? The hypotheses associated with each research question are outlined in Table 7.1.

In order to test the hypotheses, two main stages of data analysis need to occur. First, a measurement model of the SMS, which represents the operation of SM in organizations must be validated, and second, the measurement model of the SMS must be incorporated into a structural model that includes it's relationship to Sensing, Performance and to Response. Given that all variables to be included in the structural model are latent constructs, they also need to be validated as measurement models before incorporation into the final structural model.

The testing of the hypotheses depends therefore on obtaining a measurement model of the SMS that is suitable for inclusion into a final full latent structural model. Hypothesis 1 derives its solution from the solutions to Hypotheses 2, 3 and 4; these are the hypotheses concerned with the 3 main dimensions of the SMS.

Table 7.1 Research Questions and Hypotheses

Research Questions	Hypotheses
How is SM operationalized in organizations?	***H1:*** *SMS is a multi dimensional model comprised of Organizational Identity, Organizational Memory and Social Interaction in Organizations with co-variation effects between the variables.* ***H1a:*** *SMS is a third-order hierarchical construct consisting of 3 second-order factors, Organizational Identity, Organizational Memory and Social Interaction and 10 first-order factors* ***H2:*** *Organizational Identity is a multidimensional construct composed of dimensions that reflect organizational self-perception, vision and adaptability, with co-variation effects between the variables.* ***H2a:*** *Organizational Identity is a higher order construct consisting of three dimensions, core values, adaptability and vision.* ***H3:*** *Organizational Memory is a multidimensional construct composed of dimensions reflecting retrospection, experience use and role clarity, with co-variation effects between the variables.* ***H3a:*** *Organizational Memory is a higher order construct consisting of three dimensions, retrospection, experience Use and role clarity.* ***H4:*** *Social Interaction in organizations is a multidimensional construct reflecting dimensions of frequency, richness, diversity and physical arrangements, with co-variation effects between the variables.* ***H4a:*** *Social Interaction is a higher order construct consisting of four dimensions, frequency, richness, diversity and physical arrangements.*
What is SM's relationship to Sensing?	***H5:*** *Sensing is positively and directly related to the SMS.* ***H5a:*** *Sensing is positively and directly related to Performance.*
How is SM related to organizational performance?	***H6:*** *SMS is positively and directly related to performance.* ***H6a:*** *SMS's relationship to performance is mediated by Response.*
How is SM related to organizational response?	***H7:*** *SMS is positively and directly related to Response.*

The hypothesized full hierarchical measurement model of the SMS (H1) is presented in Figure 7.1; it will be included in a structural path model after all measurement models have been resolved for the three main dimensions and a final hierarchical measurement model solution obtained.

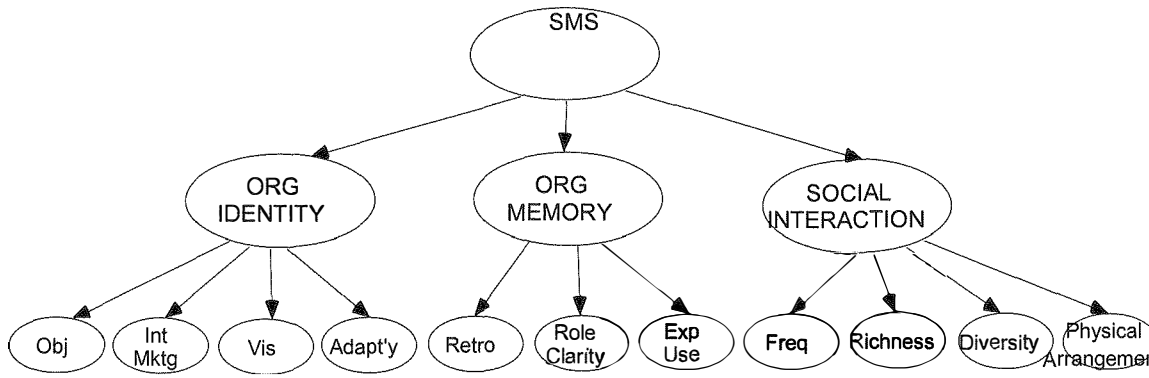

Figure 7.1 Hypothesized Measurement Model of the SMS.

The full structural model requires that suitable measurement models are first obtained for the latent variables before their inclusion in a structural model. The hypothesized structural model is represented in Figure 7.2 and the paths represent hypothesized relationships between the variables.

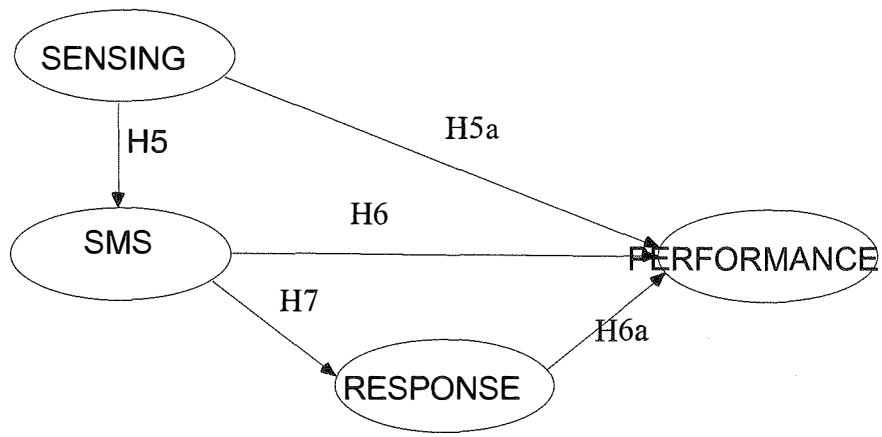

Figure 7.2 Hypothesized Structural Model

A two-stage approach to model validation (Anderson and Gerbing 1988) is used in this thesis. The first stage involves using confirmatory factor analysis (CFA) to estimate the 'measurement model/s'. A measurement model specifies the relationships between selected indicators (questionnaire items) and underlying factors (Hair *et al* 1998). This test of a measurement model assesses the extent

to which the specified relationship between the indicators and the construct is represented in a given set of data (Anderson and Gerbing 1988).

One of the first steps for obtaining valid and reliable measures of constructs is to explain and specify clearly, the key concepts that underlie the organizational phenomena of interest (Sureshchandar, Rajendran and Anantharaman 2001). The key organizational phenomenon of interest in this thesis is organizational SM, as operationalized through the SMS and its relationship with the other variables of Sensing, Response and Performance. This first step in obtaining valid and reliable measures was fulfilled by literature review related to SM in organizations (chapters three and four) and exploratory in-depth interviews with managers (chapter five). The key dimensions of the SMS, Organizational Identity, Organizational Memory and Social Interaction were presented for inclusion in the final hypothesized model of the SMS developed in chapter four (Figure 4.9 p. 89).

The second step in developing the measures, involved the designing of questions and the survey instrument itself. This was achieved by theoretical examination of the concepts to be tested and inclusion of items to measure each of the constructs hypothesized to occur in the final structural model. The selection and inclusion of items for measuring the SMS was outlined in chapter five (section 5.6.1. pp. 120-121) which described the process by which the items were generated. This process used statements and direct quotes by interviewees and also critical evaluation of the literature. For those constructs used from previous research, Sensing, Response and Performance, face and content validity for the questionnaire design was ensured by adapting established scales from scholarly studies and pre-testing of the survey instrument.

Having established a viable measurement model or models, Anderson and Gerbing's (1988) second stage involves estimating the structural relations

between the constructs (measurement models) of interest. Parameters of the measurement models are 'fixed' prior to estimating the structural model. That is, the regression paths and co-variances are set according to the parameter estimates derived from the measurement model's initial validation. This is done in order to control for the biasing effects of measurement error and to maximize the interpretability of the measurement and structural models (Hair *et al* 1998).

Before the process of model evaluation can begin, data preparation processes are required to evaluate the robustness of the data collected and determine its suitability for use in the full data analysis strategy. Therefore, this chapter first discusses data preparation processes then proceeds to outline in detail the measurement model evaluation through confirmatory factor analysis (CFA), structural model evaluation and hypotheses testing.

Chapter seven has five sections as summarized in Figure 7.3. First, an analysis of the key informant responses and the profile of the sample are undertaken (Section 7.2) in order to provide an overall understanding of the sample characteristics. Second, data preparation is described; this includes the procedures used for data cleaning, screening and response bias (Section 7.3). Third, hypotheses are tested in their order of presentation in chapter four using SEM (Section 7.4) which includes assessment of individual measurement models (Section 7.5) followed by assessment of the hypothesized structural model (Section 7.6). Conclusions will be presented in section 7.7.

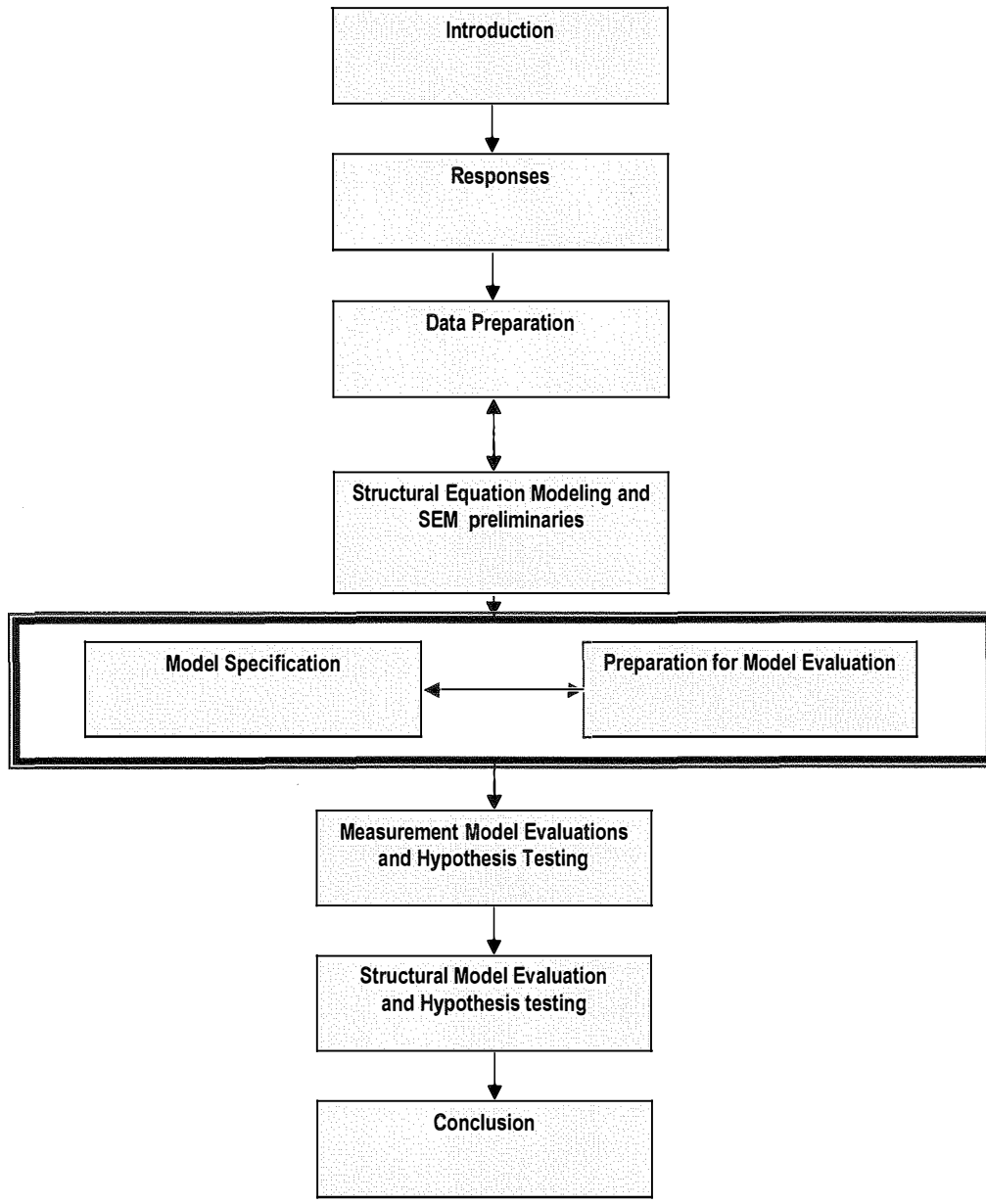

Figure 7.3 Framework of Chapter Seven

7.2 RESPONSES

A viable sample of 283 respondents provides the foundation for the empirical analysis. Two thousand eight hundred and twenty two (2822) mail surveys were mailed to the listed membership of four Australian Business Chambers following the procedures outlined in chapter six (section 6.4.2. p. 157) This

membership comprised two metropolitan and two regional business chambers sourced through Australian Business Limited (http://www.australianbusiness.com.au/). These were selected, to tap into a population that would encompass a broad cross-section of Australian firms operating in a variety of market conditions. See Table 7.2 for membership numbers by each selected Australian Business Chamber.

Table 7.2 Business Chambers Used

Australian Business Chamber List	Membership Numbers
Metropolitan # 1	*482*
Metropolitan # 2	*732*
Regional # 1	*1060*
Regional # 2	*548*
Total	*2822*

Of the posted surveys, 102 were returned due to incorrect addresses. Twenty-one respondents e-mailed or telephoned to suggest that they were unable to complete the data due to various reasons, including lack of time, not being permitted by company policy etc. Therefore, the usable surveys amounted to 283 with a final response rate of 10.5%. This response rate is just within the 10 percent to 20 percent average range for top management survey response rates (Menon, Bharadwaj and Howell 1996). See Table 7.3 for summary of response rate calculations.

Table 7.3 Estimate of Response Rate for the Phase Two Survey

Response Type	Frequency
Total Sample frame	2822
Returned due to incorrect or changed contact address	102
Returned due to unwillingness to participate	21
Ineligible Responses	0
Useable Surveys	2699
Responses	283
Response Rate	10.5%

7.2.1 Non Response Analysis

To assess the possibility of non-response bias in the data, an extrapolation procedure was conducted as recommended by Armstrong and Overton (1977). Based on the return dates of the surveys, the first 75% were classified as early with the remaining 25% classified as late respondents. The latter 25% of responses were treated as representative of actual non-respondents. As Table 7.4 illustrates, t-tests were applied to the early and late responses on key variables with no significant differences (p >.05) being found. It is concluded that non-response bias was not evident through statistical testing, however, given that almost 90% of potential respondents did not respond for whatever reasons, care will be taken in interpreting findings.

Table 7.4 Non-Response Analysis

Construct	Mean (Early Respondents)	Mean (Late Respondents)	T-Test (Equal variances assumed)	Sig. (2 Tailed)
Sensing	3.9100	3.7265	1.294	.197
Organizational Identity	5.6380	5.4942	1.229	.220
Organizational Memory	5.1444	5.0335	1.187	.236
Social Interaction	5.5533	5.3742	1.673	.095
Response	4.8603	4.6865	1.721	.086
Performance	5.4413	5.4110	1.243	.808

7.2.2 Profile of Respondents

The key informant strategy employed in the research required the respondents to be in senior level management positions. This was to ensure that they had a sufficiently broad overview of the concepts in question. Respondents were asked to state their current position within the organization to confirm this. The descriptive analysis reported in Table 7.5, indicates how respondents described their position with 57% of respondents stating they were 'CEO's', 'managing directors' or 'owners', 21% stating 'managers' and the remaining 20% of respondents describing themselves as 'operations managers', 'HR managers',

'site managers' and 'business development managers'. The instructions for the survey clearly stated that if the most senior manager was not able to complete the survey, then another manager could complete it on their behalf and from senior management's perspective. Therefore, these surveys were included in the final count of useable surveys. However, four cases had missing values on this variable and these values were not substituted by any method as they were descriptive by nature. The cases were highlighted in the data set and when it became clear through data cleaning that these four cases did not constitute outliers on any questions, it was determined that they too should be included in the final data set.

Table 7.5 Respondent Profile

Position of Respondent	Frequency	Percent
CEO /Managing Director / Owner	162	57.2
Manager	60	21.2
Other Senior Executive	57	20.1
Total	279	98.6
Missing	4	1.4
Total	283	100
Tenure of Respondents	**Mean**	**Range**
Range of Tenure: 1-35 Years	10.32 years	1-35 years

Respondents were also asked about their length of tenure at the organization in order to assess the extent that respondents' perceptions were based on intimate knowledge of the whole of the organization's processes. Since the mean tenure is 10.32 years, the sample is deemed to have this knowledge.

7.2.3 Sample Firms by Industry and Employee Numbers

Tables 7.6 and 7.7 show the sample distribution by type of industry and number of employees. All industries listed by the ABS (http://www.abs.gov.au/) business data (8155.0 - Australian Industry, 2003-04) are represented. The sample frequencies are similar to the general Australian profile by industry with the exception of retailing which is under-represented in the sample (6.4% sample versus 14.8% as outlined in ABS 8161.0.55.001 - Australian Bureau of Statistics Business Register, Counts of Businesses - Summary Tables, June 2004,

http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyTopic/B34A6C8A585479F0CA25709200750356?OpenDocument.).[9]

Table 7.6 Industry of Sample Firms

Variable	Category	Frequency	Percentage (%)
Type of Industry	*Agriculture*	2	.7
	Manufacturing	61	21.6
	Construction	11	3.9
	Retail	18	6.4
	Transport & Storage	6	2.1
	Finance & Insurance	19	6.7
	Govt. Admin. & Defense	7	2.5
	Health & Community Services	29	10.2
	Personal Services	11	3.9
	Mining	10	3.5
	Electricity, Gas & Water Supply	4	1.4
	Wholesale Trade	15	5.3
	Accommodation Cafes and Rests	4	1.4
	Communication Services	8	2.8
	Property & Bus Services	62	21.9
	Education	7	2.5
	Cultural & Recreation Services	9	3.2
	Total	283	100.0

Table 7.7 shows that the size of firms represented in the sample ranges from micro to large as indicated by full time equivalent (FTE) employees. This profile also reflects a representative sample of Australian businesses by size as indicated by the ABS (6203.0 - Labour Force, Australia, Feb 2003). These two characteristics of the sample - industry distribution and number of employees –

[9] One possible explanation for this may be that retailers appear to be under represented in the Australian Business Limited database at .06% across the total membership (ABL, http://www.australianbusiness.com.au/). This could be a consequence of a disproportionate representation of regional businesses versus metropolitan businesses over the total Australian membership and / or respondents could have incorrectly classified themselves in the survey.

taken together, means that subject to other generalization requirements, results of this research may be generalized to the population of interest.

Table 7.7 Size of Sample Firms by Number of FTE Employees

FTE Employees - Category	Frequency	Percentage (%)
<20	158	55.8
21-30	41	14.5
31-40	9	3.2
41-50	9	3.2
51-60	7	2.5
61-70	4	1.4
71-80	2	.7
81-90	4	1.4
91-100	9	3.2
>100	40	14.1
Total	283	100.0

7.3 DATA PREPARATION

Data preparation procedures translated the data collected in this research into a form suitable for analysis (Luck and Rubin 1987). This process ensured that the basic data array was complete and accurate by coding, transcribing or entering the data into a computer database, cleaning the data for accuracy and accounting for missing responses (Malhotra 1999).

7.3.1 Coding the Data

Coding the data meant assigning a code to each possible response for each question in the survey (Hair *et al* 2000). The questionnaire for this research consisted of mostly pre-coded questions. The exception to this was a section at the end of the survey for respondents' comments to open ended questions (See Appendix B p. 260).

All returned questionnaires were numbered and dated as they were returned (Sekaran, 2000).

7.3.2 Data Cleaning and Screening

Data entry errors were checked through data cleaning and screening. The purpose of this process was to ensure that data had been transcribed accurately by identifying outliers, inconsistent responses and missing data (Aaker, Kumar

and Day 2001). Two broad categories of potential data problems were considered: case related issues such as the accuracy of data input, missing values and outliers; and distribution issues such as normality, linearity and homoscedasticity (Tabachnick and Fidell 2001; Hair *et al* 1998).

7.3.2.1 Data Input Issues, Missing Values and Outliers

The first step in data examination was checking for missing values because most multivariate analysis requires complete data on all variables, otherwise cases with missing values will not be analyzed (Hair *et al* 1998). Data was initially entered using Excel application rather than SPSS, as Excel allows for the creation of data locks and inadmissible entries within cells, thus alarming data entry personnel to data entry errors as they occur. The final data sheet was then exported to SPSS for further screening procedures. This practice minimized the possibility of human data entry error. Data was also checked for entry accuracy through on screen editing of distributions by both the researcher and an assistant acting independently.

Respondents' missing data was then dealt with by examining frequencies of each variable. Generally, missing values that exceed 10 percent of the data set can pose problems for treatment (Malhotra, Agarwal and Peterson 1996) and non-random missing data will affect the generalizabilty of the research results (Tabachnick and Fidell 2001). In the responses, only rarely did missing data occur. For example, on two variables, there were 279 responses instead of 283 (N= 283). On eight more variables, cases numbers were in the range 280-282.

Initially, the cases were analyzed for patterns in the missing data as suggested by Hair *et al.* (1998). The analysis suggested that there were no clear patterns in the missing data, therefore an imputation method that is used in survey research, where the values that are missing, are estimated and derived from the value of other variables, was chosen for dealing with this missing data. Specifically, the missing values were replaced by employing linear interpolation through SPSS Version 12.0.

7.3.2.2 Checks for Data Normality, Linearity and Homoscedasticity

After dealing with missing data, each of the items was analyzed for skewness, kurtosis, the presence of outliers and normality. Box plots and histograms were used for examining the holistic picture of each of the variables across the small range of scores (1-7). Apart from the visual inspections of box plots and histograms, the variables were tested for skewness and kurtosis. The skewness values were less than +/-2.00, which suggest that distributions were within the normal range (Hair *et al* 1998). Kurtosis values also supported this assumption. Box's M test was applied to test for homoscedasticity (Hair *et al* 1998) across the variance/ covariance matrix with no unequal variances found. Additionally, each of the variables was inspected for outliers. No scores fell outside three standard deviations, hence it was concluded that there were no clear outliers (Hair *et al.* 1998). See Appendix C (p. 263) for means, standard deviations and intercorrelations of main variables.

7.4 STRUCTURAL EQUATION MODELING AND HYPOTHESIS TESTING

This section reports how SEM was used to test hypotheses. Based on the literature, the research followed four steps of SEM shown in Table 7.8 below

Table 7.8 SEM Steps Applied in this Research

Steps	Sections where applied in this research
1. Model Specification ➢ Measurement Models ➢ Structural Model	*Section 7.4.1*
2. Preparing for Model Evaluation ➢ Nature of the data ➢ Sample Size ➢ Input data ➢ Two stage approach ➢ Model identification	*Section 7.4.2*
3. Measurement Model Evaluation and Specification ➢ Testing measurement models ➢ Deciding Goodness of Fit Criteria	*Section 7.4.3*
4. Structural Model Evaluation and Post Hoc Analysis	*Section 7.4.4*

Synthesized for this research from Bollen and Lennox (1991); Byrne (2001); Hair *et al* (1998); Homburg (1991); Schumaker and Lomax (2004).

7.4.1 Model Specification

Model specification or model development as it is sometimes known (Hair *et al* 1998), involves using all available relevant theory, research and information to develop a theoretical model (Schumacker and Lomax 2004; Byrne 2001; Kline 1998). Prior to any data collection or analysis, the researcher specifies *a priori*, a specific model that should be confirmed with variance – covariance data (Schumacker and Lomax 2004). In other words, all available information is used to determine which variables are to be included in the theoretical model and how these variables are related one to another.

A given model is properly specified when the true population model (Σ) is deemed to be consistent with the implied theoretical model being tested, that is the sample *covariance matrix* (*S*) is sufficiently reproduced by the theorized model (Schumacker and Lomax 2004). Therefore, the aim of the research is to determine the best possible model that generates the sample covariance matrix, since this sample covariance matrix implies some underlying and unknown structure.

In this research, the variables specified (the measurement models) for inclusion in the theoretical model and their relationships to one another (the structural model), were derived from the literature. Given that all the variables were latent constructs that were unable to be measured directly, measurement models for each of these variables were derived *a priori.* This derivation process has been discussed in chapters three and four.

7.4.2 Preparing for Model Evaluation

The next step in the SEM process is preparation for model evaluation. Issues to be addressed include the nature of the data and the sample size, input data, the adoption of a one or two stage modelling approach and model identification.

7.4.2.1 The Nature of the Data and Sample Size

The nature of the data and the sample size are two major concerns for the estimation function selected (Arbuckle 2003). The first concern, the nature of

the data, involves issues related to missing data, outliers, normality and linearity as discussed in Sections 7.3.2.1 and 7.3.2.2. It can also mean the type of data obtained and its suitability for the analysis stated. For SEM models, continuous data is required (Chou and Bentler 1995). Since *"continuous methods can be used when a variable has four or more categories"* Bentler and Chou (1987 p. 88), a seven-point Likert scale was used for all items of the measurement models to more closely resemble data of a continuous nature.

The second concern surrounds sample size which determines a basis for sampling error estimation. The issue of sample size for adequate estimation has been a focus of debate in the SEM literature (Chou and Bentler 1995; Tabachnick and Fidell 2001; Hoyle 1995). The simple rule of thumb applied to multivariate analytical techniques such as MANOVA or multiple regression of 10 cases for each measured or latent construct, is not necessarily applicable in SEM (Kline 1998). In SEM, it may be more appropriate to consider the ratio of the number of cases to the number of parameters being estimated (Holmes-Smith 2001). As well, the statistical theory underlying parameter estimation in SEM is asymptotic in nature (Schumacker and Lomax 2004), so that the statistics such as standard errors for parameter estimates increase in precision, as the total number of cases approaches infinity. Put more succinctly, a SEM sample must be big enough to obtain stable or meaningful parameter estimates.

Some broad guidelines about absolute sample sizes are available: 'small' sample size is less than 100; 'medium' size is between 100 and 200; and 'large' sample size is more than 200 (Hair *et al* 1998; Hulland, Chow and Lam 1996; Kline 1998). Models with more parameters require a larger sample than do more parsimonious models (Byrne 2001; Kline 1998). One rule of thumb is that the ratio of sample size to number of free parameters should be at least 5:1 to obtain appropriate significance tests (Baumgartner and Homburg 1996). In this research, the full measurement model of the SMS does not violate this rule. The

sample size used in this research is deemed appropriate for the complexity of the model to be tested.

7.4.2.2 Estimation Procedures

Either a variance/covariance matrix or correlation matrix can be used as input data in SEM (Hair *et al* 1998). A covariance matrix was applied in this study because covariance structure is appropriate for use with the maximum likelihood method (ML) of estimation (Byrne 2001). The ML method was chosen as it was more defensive than other estimation procedures when the number of categories in the Likert scales is 4 or greater, where there is no skew or high kurtosis and sample size is sufficiently large relative to the number of items being estimated (West, Finch and Curran 1995). Moreover, an historical review of SEM over 15 years revealed that most SEM applications had used the ML method (Breckler 1990; Byrne 2001).

7.4.2.3 Two Stage Approach

The next issue to consider when preparing for model evaluation is to decide on a one or two-stage approach. Some authors argue for a one-stage approach (Diamantopoulos 1996) that involves evaluating both the measurement model and the structural models together. This approach is advanced in the literature due to its lack of estimating bias and thought to be more consistent with the spirit of causal modeling (Hulland, Chow and Lam 1996). However, other analysts caution against this approach.

James, Mulaaik and Brett (1982) proposed a two-step modeling approach that emphasized the analysis of the two conceptually distinct latent variable models: measurement models and structural models. Anderson and Gerbing (1988) described their approach by stating that the measurement model provides an assessment of convergent and discriminant validity and the structural model provides an assessment of predictive validity. Jöreskog and Sörbom (1993) state,

> *The testing of the structural model, i.e. the testing of the initially specified theory, may be meaningless unless it is first established that the measurement model holds. If the chosen indicators for a construct do not measure that construct, the specified theory must be modified before it can be tested. Therefore, the measurement model should be tested before the structural relationships are tested* (p. 113).

In support of this, Schumacker and Lomax (2004) state,

> *We think a researcher with adequately measured latent variables is in a better position to establish a substantive, meaningful structural equation model, thus supporting theory* (p. 210).

Therefore, this research takes a two-step approach in order that (1) the yet untested construct, SMS, be tested as a measurement model before it is included in a structural model and (2), so that each of the other latent constructs be tested as measurement models prior to their inclusion into the structural model.

7.4.2.4 Model Identification

The final issue to be considered for model evaluation, is model identification. This bears directly on whether the variance-covariance matrix of observed variables – the data – can be transposed onto the structural parameters of the model to be tested. Fundamentally, model identification focuses on the extent to which a unique set of values can be inferred for the unknown parameters from a given covariance matrix that is reproduced by the model.

Models may be *just-identified*, *over-identified* or *under-identified* (Byrne 2001). A just identified model is one in which there is a one-to-one correspondence between the data and the structural parameters. In this case, the number of data variances and covariances equals the number of parameters to be estimated. However, despite the capability of the model to yield a unique solution for all parameters, the *just-identified* model is not scientifically interesting as it has no

degrees of freedom and therefore can never be rejected. An *over-identified model* is one in which the number of estimable parameters is less than the number of data points (i.e. variances/ covariances of the observed variables). This situation results in positive degrees of freedom that allow for rejection of the model thereby rendering it suitable for scientific use. The aim in SEM then, is to specify a model such that it meets the criterions of *overidentification.* Finally, an *under-identified* model is one in which the number of parameters to be estimated exceeds the number of variances and covariances (i.e. data points). As such, the model contains insufficient information (from the input data) to obtain a determinant solution of parameter estimation. As illustrated by Byrne (2001) *"If a model is not identified; the process would be conceptually akin to trying to determine unique examples for X and Y, when the only information you have is that X + Y = 15"* (p. 35).

7.4.2.5 Deciding Goodness of Fit Criteria

The two-staged approach to the data analyses discussed in Section 7.4.2.3, allows for the evaluation of model fit from different perspectives and is based on multiple criteria that takes into account substantive, statistical and practical fit as well as parsimony. Specifically, these criteria include: (a) the substantive meaningfulness of the model (Mumford *et al* 1996) and (b), a variety of goodness of fit statistics (Bentler 1990; Byrne 2001; Carlson and Mulaik 1993; Mulaik *et al* 1989; Schumacker and Lomax 2004). Assessment of goodness of fit of the measurement and structural models was based on multiple criteria summarized in Table 7.9. and expanded upon in the sub sections that follow.

Table 7.9 Summary of Model Evaluative Criteria

Name	Abbreviation	Type	Acceptable Level in this Research
Co-efficient Alpha	α	Uni - dimensionality	$\alpha > 0.70$
Standardized Regression Weights	β		Beta > 0.50

Table 7.9 Summary of Model Evaluative Criteria (contd.)

Chi-square (with Associated degrees of freedom and probability of significant difference)	χ^2 (df, *p*)	Model Fit	$p > 0.05$
Normed chi-square	χ^2 / df	Model Parsimony	$1.0 < \chi 2 / df < 3.0$
Root mean square residual	RMR	Absolute Fit	RMR < 0.05
Root means square error of approximation	RMSEA		RMSEA < 0.08
Goodness of Fit Index	GFI & AGFI	Absolute Fit	Values close to and above 0.90 indicate satisfactory fit
Parsimony Goodness of Fit	PGFI	Model Parsimony	PGFI >0.50
Normed Fit Index	NFI	Incremental Fit	Values above 0.90 indicate acceptable fit.
Tucker Lewis index	TLI		As above
Comparative Fit index	CFI		As above

7.4.2.5.1 Model Uni-dimensionality

A measurement model is described as uni-dimensional if an indictor is specified to load on only one factor and the measurement error terms are independent (Anderson and Gerbing 1988). Measures of uni-dimensionality should indicate construct validity. In this case there would be no cross loadings indicated on error terms. In addition, internal validity of uni-dimensional factors is supported by a common approach to measurement called Cronbach co-efficient alpha. Some guidelines exist in the literature about measurement levels: values around 0.8 are 'very good' (Kline 1998) and values around 0.7 are 'adequate' (Nunally and Berstein 1994) depending on the questions (Kline 1998).

However, using *only* coefficient alpha is not appropriate for measuring uni-dimensionalty (Nunnally and Bernstein 1994) because coefficients alpha weights all items equally. Thus, item loads or weights are also used to increase measurement efficiency (Hulland, Chow and Lam 1996). There are different

acceptable levels, usually according to differing practice across different disciplines. For instance, Churchill (1979) suggests minimum values of 0.5 to 0.7 are acceptable, while Kline (1998) recommends values of 0.3 to 0.5 A minimum value of 0.5 to 0.7 was used in this research as it is the first study of operationalized SMS factors.

7.4.2.5.2 Chi-square test ($\chi 2$) and $\chi 2$ / df

One of the measures of absolute fit is the chi-square in association with its degrees of freedom (df) and probability (p) of significant difference (Hair *et al* 1998). A large value of chi-square relative to the degrees of freedom signifies that the observed and estimate matrices differ considerably. In contrast an insignificant ($p>0.05$) chi-square suggests a satisfactory fit of the model (Holmes-Smith 2001) and the higher the probability, the closer the model is to perfect fit (Byrne 2001). Chi-square measures are sensitive to sample size (Hu and Bentler 1995) and are not very useful for large sample sizes, however the changes in chi-square are useful for interpretation of improving model fit. The measurement model may sometimes be judged to provide acceptable fit even though the chi-square value is still statistically significant. This judgement is supported by the values of the Normed Fit Index (NFI) (Anderson and Gerbing 1988).

7.4.2.5.3 RMR, RMSEA

Another measure of fit used in the research is the Root mean Square Residual (RMR) which is the average residual value derived from the fitting of the covariance matrix for the hypothesized model to the covariance matrix of the sample data. It ranges from zero to 1.00; in an acceptable model this would be small, say, 0.05.

The root mean square error of approximation (RMSEA) is considered one of the most informative criteria in covariance structure modelling (Byrne 2001). It takes into account the error of approximation in the population and asks the question, *"How well would the model, with unknown but optimally chosen*

parameter values, fit the population covariance matrix if it were available?" (Browne and Cudeck, 1993 p. 137-138). This difference is measured by the RMSEA and is expressed per degree of freedom, making it sensitive to the number of parameters in the model (i.e. model complexity); values less than 0.05 represent good fit and values up to 0.08 are reasonable (Browne and Cudeck 1993).

7.4.2.5.4 GFI, AGFI and PGFI

The goodness-of-fit index (GFI) is a measure of the relative amount of variance and covariance in S (sample) that is jointly explained by Σ (the population). This ratio is between zero (poorest fit) and 1.00 (perfect fit) (Bollen 1989). Various threshold levels have been established (Hair *et al* 1998; Hulland, Chow and Lam 1996) and values close to 0.9 appear to indicate good fit. A related index is the adjusted goodness-of-fit index (AGFI) which adjusts the goodness of fit according to the degrees of freedom. Jöreskog and Sörbom (1993) note that it is possible for these values to be negative and Fan, Thomson and Wang (1999) further caution that these values can be influenced by sample size.

The parsimony goodness-of-fit index (PGFI) was introduced by James, Mulaik and Brett (1982) to address the issue of parsimony in SEM. It takes into account the complexity (i.e. the number of estimated parameters) of the hypothesized model in the assessment of overall model fit. As such, two interdependent pieces of information, the goodness-of-fit of the model (as measured by the GFI) and the parsimony of the model, are represented by a single index (the PGFI), thereby providing a more realistic evaluation of the hypothesized model (Byrne 2001). Typically parsimonious-fit measures in the .50's are expected when other goodness-of-fit indices are in the .90's (Mulaik *et al* 1989).

7.4.2.5.5 NFI, CFI and TLI

Bentler and Bonnet's (1980) normed fit index (NFI) has been the practical criterion of choice as reflected in the classic 'status' of their original paper (Byrne 2001). In addressing evidence that NFI has shown a tendency to

underestimate fit in small samples, Bentler (1990) revised the NFI to take small samples into account and proposed the comparative fit index (CFI). Values for both the NFI and CFI range between zero and 1.00 and are derived from a comparison of a hypothesized model to the independence model as before. A value of >0.90 was originally considered representative of a well fitting model (Bentler 1992); a revised cut off of 0.95 has recently been advised (Hu and Bentler 1999). Finally, the Tucker-Lewis index (TLI) (Tucker and Lewis 1973) consistent with other indexes outlined here, yields values ranging from zero to 1.00 with values close to 0.95 (for large samples) being indicative of good fit (Byrne 2001).

7.5 MEASUREMENT MODELS

Consistent with structural equation modeling conventions (Bentler and Chou 1987), each of the latent constructs was specified in terms of measured or manifest variables. Jőreskog and Sőrbom (1993) noted that model fit is difficult to attain when models contain many factors and many indicators. Therefore, limited numbers of items strongly associated with each factor were sought. Bollen (1989) suggested that two items are sufficient to define a construct and meet the requirements for multidimensional CFA measurement models. Bentler and Chou (1987) and Kline (1998) recommend using three item scales. Most of the scales developed to test the models for this research began with 6 items per scale. This was the number of items recommended by Holmes-Smith (2001) as being sufficiently large to capture all aspects of a construct, yet not so many items that multicollinearity becomes a problem. Multicollinearity is the condition where two indicators are so highly correlated (>.95) that they effectively measure the same thing (Aaker, Kumar and Day 2001). Were this to occur, then indicators could be deleted from the model, if their presence adds little to the explanation of the construct.

Items for inclusion in measurement model scales, were articulated as statements and anchored on a seven-point Likert scale ranging from strongly disagree (1), disagree (2), somewhat disagree (3), neither disagree nor agree (4), to somewhat agree (5), agree (6) to strongly agree (7).

Each construct to be used in the final structural model is evaluated in this section using confirmatory factor analysis (CFA) to assess for construct reliability, validity and model fit.

7.5.1 SMS – Measurement Model Evaluation

The SMS was proposed to be represented by three main dimensional factors - Organizational Identity, Organizational Memory and Social Interaction. Sub-dimensions of each of these factors were hypothesized. Figure 7.4 revisits the hypothesized third-order hierarchical SMS model. This was the theoretical and conceptual model confirmed by qualitative research in phase one of the study.

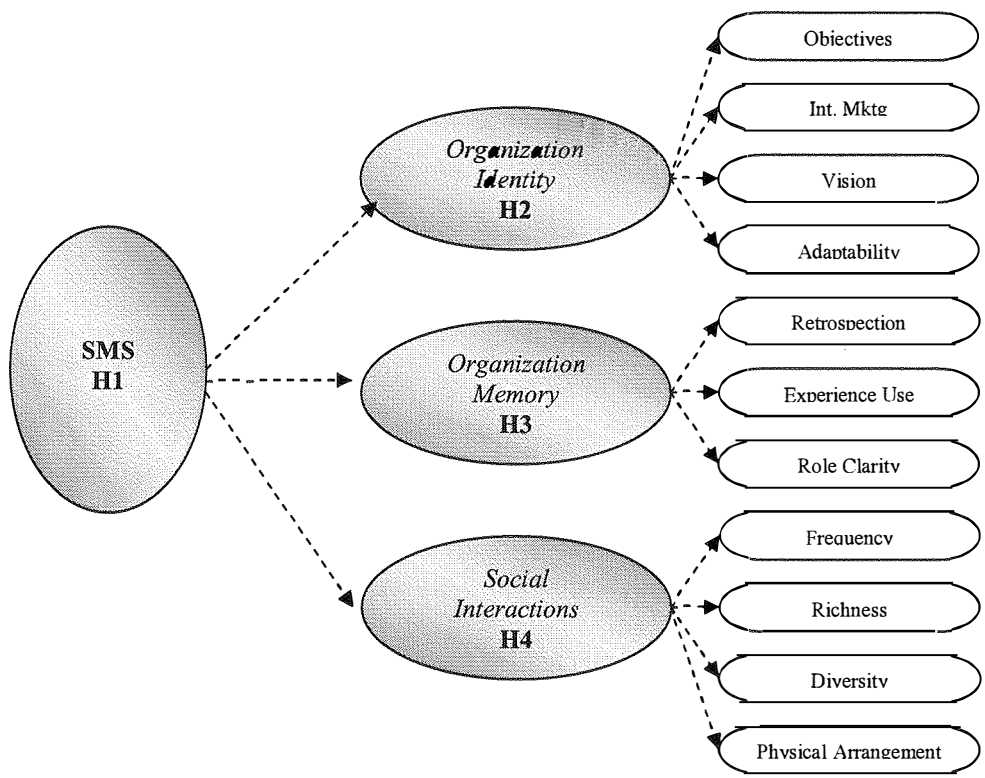

Figure 7.4 Hypthesized Model of SMS in Organizations

The hypotheses concerned with the measurement model of the SMS were presented previously in Table 7.1. The evaluation of the hypothesized hierarchical third-order model of the SMS (H1) is presented at the *end* of the analysis of each dimension, as it is the highest order of representation. Hence, model assessment begins with the lower order factors Organizational Identity, Organizational Memory and Social Interactions, which will each be subjected to processes of confirmation prior to inclusion in the higher order model.

The following sections now outline the procedures and results of measurement model and hypotheses testing, working from the lower order factors to the highest order factor of the SMS in organizations.

7.5.1.1 Organizational Identity – Measurement Model Evaluation

Organizational Identity was hypothesized to consist of a 4-factor structure – OBJECTIVES, INTERNAL MARKETING, VISION and ADAPTABILITY, with co-variations between each factor. Each factor was initially measured using 6 to 7 items per scale; each item was measured using a seven-point Likert scale. Table 7.10 lists the item wording. The scale co-efficient alpha measures are also shown at the end of the table. This is followed by Figure 7.5 that depicts the hypothesized model (called Model 1) inputted to AMOS 5.

Table 7.10 Initial CFA – Organizational Identity

Items	Item Wording
OB1	*This organization has clearly articulated objectives.*
OB2	*Clearly stated objectives are important to the organization.*
OB3	*Everyone in the organization knows what its objectives are.*
OB4	*Our employees share a common understanding about the organization's objectives.*
OB5r	*This organization is unclear about its objectives.*
OB6	*It is important that all employees understand what the organization's objectives are.*

Table 7.10 Initial CFA – Organizational Identity (contd.)

IM1	*Management ensures that everyone in the organization knows what the organizational objectives are.*
IM2	*This organization has clear systems of internal communication that let all members of the organization know what its objectives are.*
IM3	*Management makes an effort through various means to 'sell' the organizational objectives to organizational members.*
IM4	*Management ensure that each division / department/ individual knows what they have to achieve as part of the overall organization objectives.*
IM5r	*Management do not like to communicate organizational objectives freely throughout the organization*
IM6	*Communicating objectives to members of the organization is important.*
V1	*We know the type of organization we want to become.*
V2	*We are very clear about the vision for the organization.*
V3	*We know what we want to achieve in the long run.*
V4	*We have a clear picture of an anticipated future.*
V5	*People within the company share an image of where we will be in the future.*
V6r	*This company has no organizational vision.*
AD1	*We have no problem re-evaluating our objectives in the light of changing circumstances.*
AD2	*We can change our direction quickly if needed.*
AD3	*We have flexible internal systems that allow us to adapt our strategy where necessary.*
AD4	*We ensure that we change with the times.*
AD5	*We listen to all viewpoints.*
AD6	*We value performance feedback.*
AD7r	*We are slow to adapt to changing conditions.*
	r = reverse coded

	SCALE ALPHA CO-EFFICIENTS
OBJECTIVES	.8504
INTERNAL MARKETING	.8696
VISION	.9162
ADAPABILITY	.8723

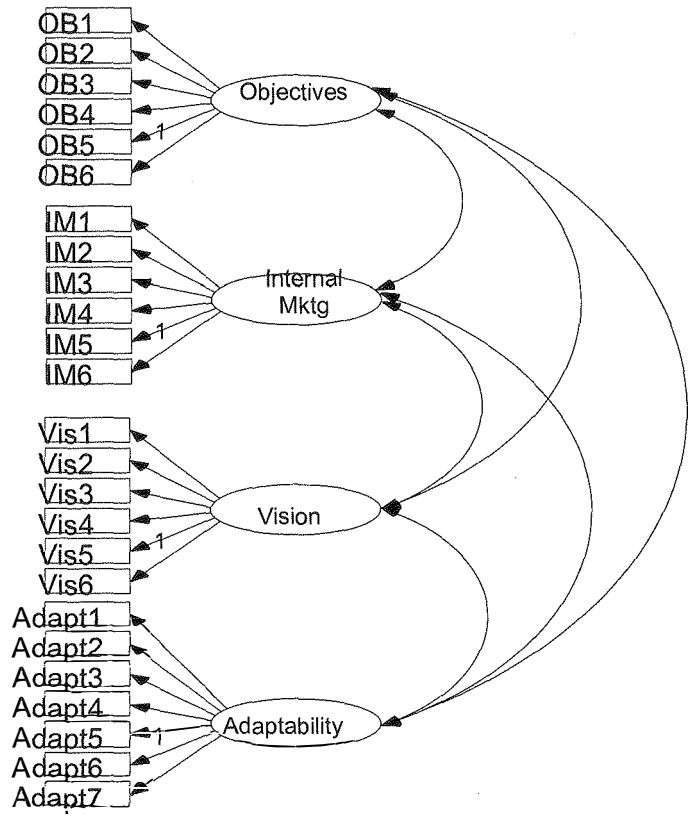

Figure 7.5 Organizational Identity – Hypothesized 4 Factor Model

Careful inspection of parameter estimates indicated unacceptably low factor loadings (<0.70) of some items onto their respective factors and some evidence of factor cross loadings. In keeping with Byrne's (2001) and Jöreskog and Sörbom's (1993) advice, all items were inspected for their substantive importance to the factor they were reflecting. Where low factor loadings **and** substantive redundancy were indicated, these items were dropped from the scales and the model re-run as Model 2

Model 2 was a 4-factor model comprised of: OBJECTIVES (Items OB1, OB3 & OB4); INTERNAL MARKETING (Items IM1, IM2, IM3, & IM4); VISION (Items Vis1-6) and ADAPTABILITY (Items Adapt2, Adapt3 & Adapt4). All items loaded onto their respective factors satisfactorily (>0.70), however there

was a problem with cross loadings between items reflected by the OBJECTIVES factor and the INTERNAL MARKETING factor and additionally, the covariance between OBJECTIVES and INTERNAL MARKETING (Estimate 1.152) indicated that these two factors could be better represented by one factor (Byrne 2001). These adjustments were made to the model and the model re-run as Model 3.

Model 3, therefore consisted of a 3-factor model comprised of a combined factor re-named COMMUNICATION OF OBJECTIVES (Items OB1, OB4, IM1, IM2), VISION (Items Vis1, Vis2, & Vis3) and ADAPTABILITY (Items Adapt2, Adapt3 & Adapt4). The decision to re-name the first factor of the Organizational Identity construct, was based on the substantive meaningfulness of the items that reflected it (Gerbing and Anderson 1984). That is, the content of the items reflected substance that had commonalities around the notion of 'communication of objectives'.

Results of the modeling for Model 3 indicated that there was a problem with the factor of ADAPTABILITY. The presence of large Modification Indices (MI's; 17.870 – 13.715) indicated for all the ADAPTABILITY items (suggesting that ADAPTABILITY items load onto items of the other factors), indicates factor cross loadings (Byrne 2001). In situations such as these, the substantive meaningfulness of the factors in the model and their links to theory must be taken into account if re-specification is indicated (Byrne 2001). Clearly re-specification of the model of Organizational Identity was required and this process is explained next.

The factor ADAPTABILITY was not identified during exploratory research. However it was included in the hypothesized model of Organizational Identity on theoretical grounds, in that the literature had dealt with the possibility that Organizational Identity might be adaptable over time rather than enduring and

stable (Albert and Whetten 1985). Gioia *et al* (2000) found that organizational identity changed over time due to its relationship with organization image,

> *we believe that we should encourage the study of identity as something other than an enduring reified concept. We need to study how organization members adapt to frequent information that suggests reconsideration of their organizations identity* (p. 76).

Based on a re-examination of the literature in this field, it is plausible that adaptability is not *intrinsically* a dimension of Organizational Identity, but rather is a separate factor that could in certain circumstances, act *upon* Organizationalal Identity. This possibility has been alluded to in the literature, as image is said to affect identity (Gioia and Thomas 1996). Given that a study of these circumstances is outside the scope of the current research, and that the main objective here is to operationalize Organizational Identity and to determine its importance to a SMS, it was determined on balance, to re-specify the model of Organizational Identity that excluded the ADAPTABILITY dimension. This proposed two-factor model was inputted as Model 4.

Model 4, the final model of Organizational Identity, therefore comprised 2 factors, COMMUNICATION of OBJECTIVES (Items OB4, IM1 & IM2) and VISION (Items Vis 1, Vis2 & Vis3). No MI's were suggested, items loaded well onto their respective factors (>0.70) and the co-variance between factors was high (.75) and significant (p<.001). Goodness-of-fit indices also indicated a well-fitted model. The final model of Organizational Identity (Model 4) (Figure 7.6) is presented below with the covariance measure included. This covariance indicates the effect that change in one variable, has on the other and measures the strength of their interdependence.

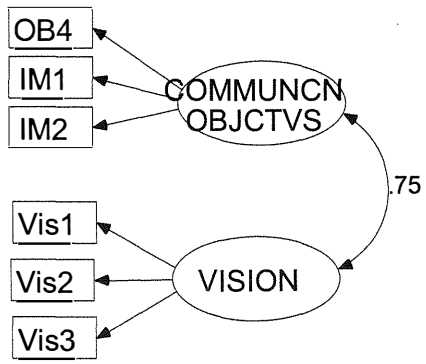

Figure 7.6 Organizational Identity - Two-Factor Model

Table 7.11 presents a summary of fit statistics for the 4 models of Organizational Identity including factor loadings of the final items and the final scale co-efficient alphas.

Table 7.11 ORGANIZATIONAL IDENTITY – Summary of Goodness of Fit Criteria, All 4 Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 1	1022.662	269	3.802	.111	.766	.634	.100	.834	.851
Model 2	370.649	98	3.782	.099	.851	.613	.099	.925	.908
Model 3	116.770	24	4.865	.094	.916	.489	.117	.947	.920
Model 4	8.440	8	1.055	.031	.990	.377	.014	1.00	.999

Standardized Regression Weights (Factor Loadings) Final Model			
IM2	<---	COMMUNCN_OBJCTVS	.840***
IM1	<---	COMMUNCN_OBJCTVS	.919***
OB4	<---	COMMUNCN_OBJCTVS	.820***
VIS3	<---	VISION	.786***
VIS2	<---	VISION	.945***
VIS1	<---	VISION	.885***
Final Scale Alpha		COMMUNICATION of OBJECTIVES	.8984
Final Scale Alpha		VISION	.9029

***p<.001

In light of the hypothesis forwarded –

> *H2: Organizational Identity is a multidimensional construct consisting of 4 factors that co-vary: Organization Objectives, Internal Marketing, Vision and Adaptability*

only partial support is found. However, Model 4 represents a good fit of the sample data (S) to the population (Σ). The model is also meaningful in terms of

the substance of the items and factors to the extant theory of Organizational Identity. That is, the items collectively provide a measurement model of Organizational Identity that is consistent with theory. Therefore, it is concluded that the measurement model (Model 4) is a sound operationalization of Organizational Identity in organizations

In any situation where two or more factors are highly correlated (>0.5), as is the case here (COMMUNCN_OBJCTVS<--> VISION .746), it is often the case that a higher order factor exists, that explains the lower order factors more parsimoniously (Flora, Finkel and Foshee 2003). Therefore, the first-order model (Model 4) was re-specified to include a higher order factor – ORGID – in place of first order factor co-variances and is presented in Figure 7.7.

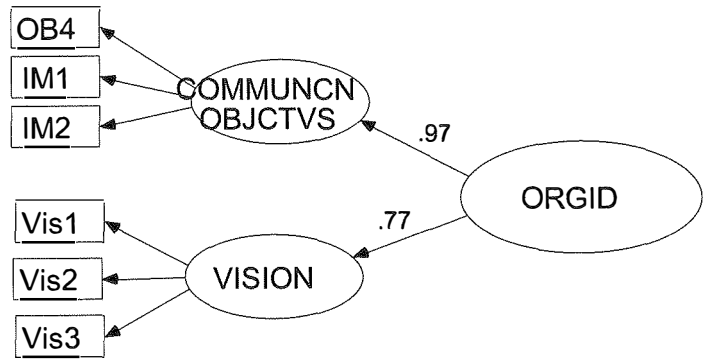

Figure 7.7 Second-Order Model of Organizational Identity

In the case of second-order factors, the first-order factors function as indicators of the second-order factor. The higher-order factor is hypothesized as accounting for or explaining, all variance and co-variance related to the first-order factors (Byrne 2001). Because the higher-order model explains the data more parsimoniously than the first-order 2-factor model, its goodness of fit cannot be better than that of the first-order factor (Flora *et al* 2003). Indeed fit statistics can be equivalent for both the first-order or second-order factor (Byrne 2001), as is the case here (χ^2 8.440; df 8; CMIN/DF 1.055; RMR .031; GFI .990; PGFI .377; RMSEA 0.14; CFI 1.00; TLI .999). To assess the fit of the

higher order model relative to the lower order model, the target co-efficient described by Marsh and Hocevar (1985) is calculated. This is the ratio of the full first order χ^2 value to that of the higher order model. In this case the ratio is exactly 1 as both models have equal χ^2.

At this point the importance or usefulness of testing for higher order factor structures could be questioned. However, one of the more important differences between the 2-factor first-order model and the one-factor second-order model is that the second-order model has a structure imposed upon the covariance pattern of the lower-order factors (Rindskopf and Rose 1988). This structure translates to β co-efficients (COMMUNCN OBJCTVS <--- ORGID .97, p<.001 and VISION <--- ORGID .77, p<.001) which indicate the regression paths from the higher-order factor to the lower-order and therefore the relative weight that each lower-order factor contributes to the higher-order factor. This implies that in this instance, 'Communication of Objectives' contributes more to the construct of Organizational Identity than does 'Vision'. Hence, in terms of managerial practice, this information is particularly useful to know and may guide further research for future theoretical development. Provided the higher-order model is an equivalent fit to the lower-order model, and provided there is substantive meaningfulness to a higher-order structure, the higher-order is preferred. In light of the findings that a higher-order factor, ORGANIZATIONAL IDENTITY explains the lower factors, partial support is found for hypothesis H2a.

> *H2a: Organizational Identity is a higher order construct consisting of 4 lower order factors: Organization Objectives, Internal Marketing, Vision and Adaptabilty,*

in that the higher order model of OI is a sound operationalization of the concept of Organizational Identity and will be used in further analysis and hypothesis testing of the SMS. The measurement model of Organizational Memory is presented next.

7.5.1.2 Organizational Memory – Measurement Model Evaluation

Organizational Memory was hypothesized to consist of a 3-factor structure – RETROSPECTION, ROLE CLARITY and EXPERIENCE USE with co-variances between each factor. Each factor was initially measured using 6 to 7 items per scale; each item was measured using a seven-point Likert scale as discussed earlier. Table 7.12 lists the item wording. The scale co-efficient alpha measures are shown at the end of the table.

Table7.12 Initial CFA – Organizational Memory

Items	Item Wording
RETRO1	*We try to connect current situations with experiences from the past.*
RETRO2	*We talk about past situations in order to understand today's.*
RETRO3	*When confronting a problem, we look for similar problems from the past.*
RETRO4	*We ask people in the organization if they have any past experience that may help us to understand a current situation.*
RETRO5	*When problem solving, we ask 'old hands' in the business to relate past similar situations.*
RETRO6	*We have good knowledge of past events in this organization.*
ROLE1	*We have clearly articulated job expectations here.*
ROLE2	*Most of the people here have clearly defined organizational roles.*
ROLE3	*People here know what is expected of them.*
ROLE4	*People here have a clear understanding of what is required to do their job.*
ROLE5r	*There is confusion over role expectations here.*
ROLE6r	*People here are unsure about the part they play in the organization.*
TENR1	*We have lots of 'old hands' in this organization.*
TENR2	*We utilize the experience of people in the organization with long tenure.*
TENR3	*We value our people with long tenure in the organization.*
TENR4	*People with long tenure in this organization can be obstructive to progress*
TENR5	*Our 'old timers' are really useful for informing us about the past history of the organization.*
TENR6	*We make good use of our historical records in this organization.*
	r = reverse coded

SCALE ALPHA CO-EFFICIENTS	
RETROSPECT	.8832
ROLE CLARITY	.5124
EXPERIENCE USE	.6763

Figure 7.8 depicts the hypothesized model of Organizational Memory (called Model 1) inputted to AMOS 5.

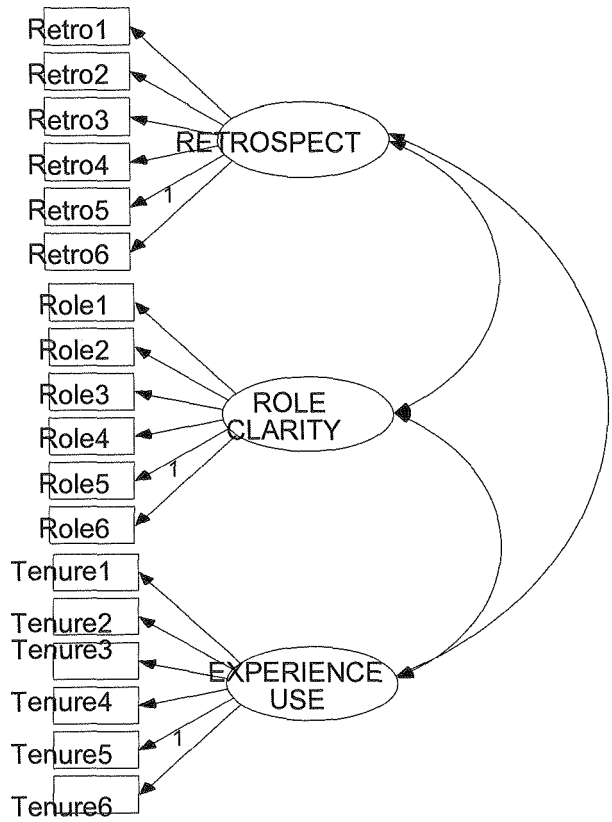

Figure 7.8 Organizational Memory – Hypothesized 3 Factor model

The same procedures were adopted as outlined for the model of Organizational Identity in section 7.5.1.1 The hypothesized model of Organizational Memory was evaluated as Model 1. Then working in a step-wise manner, subsequent models were evaluated making only one adjustment for fit at a time, taking into account the substantive importance of items to the hypothesized construct and its theoretical base, parameter estimates, modification indices recommended and goodness-of-fit statistics. Four model iterations were required to arrive at a well-fitted model that was substantively meaningful and met acceptable levels of goodness of fit criteria.

Table 7.13 is a summary table of all 4 models evaluated, including factor loadings of items included in the final model and final scale alpha coefficients. Figure 7.9, which follows, represents the final model of Organizational Memory.

Table 7.13 Organizational Memory – Summary of Goodness of Fit Criteria, All 4 Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 1	615.064	132	4.660	.159	.810	.626	.114	.824	.796
Model 2	127.796	41	3.117	.070	.918	.570	.087	.953	.936
Model 3	40.877	24	1.703	.049	.968	.516	.050	.988	.981
Model 4	12.816	11	1.165	.027	.987	.505	.024	.998	.997

Standardized Regression Weights (Factor Loadings) Final Model			
RETRO2	<---	RETROSPECT	.899***
RETRO1	<---	RETROSPECT	.845***
ROLE4	<---	ROLE CLARITY	.857***
ROLE3	<---	ROLE CLARITY	.936***
ROLE2	<---	ROLE CLARITY	.667***
TENURE3	<---	EXPERIENCE_USE	.882***
TENURE2	<---	EXPERIENCE_USE	.791***
Final Scale Alpha		RETROSPECT	.8627
Final Scale Alpha		ROLE CLARITY	.8487
Final Scale Alpha		EXPERIENCE USE	.8202

***p<.001

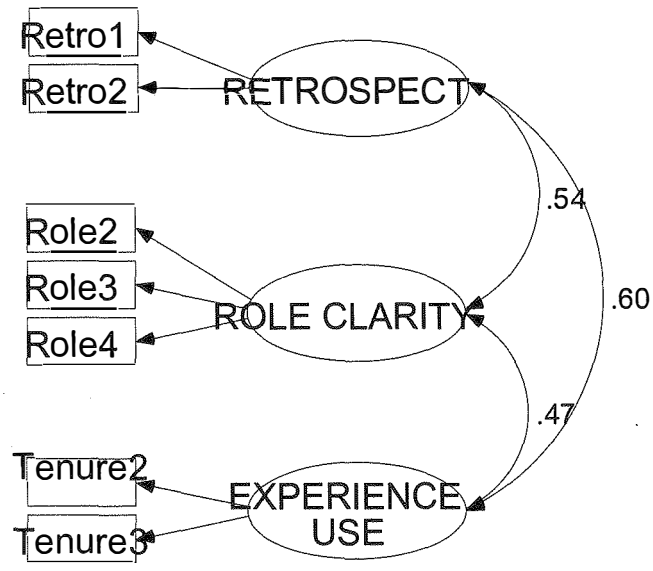

Figure 7.9 Organizational Memory – Final Model

The statistics listed for Model 3, based on goodness of fit criteria, show that it appeared to be an adequately fitted model. However, the p value of Model 3 (p = .017) indicated a non-significant chi-square statistic. Mulaik, James, Van Altine, Bennett, Lind and Stilwell (1989) suggested that non-significant χ^2 plus goodness-of-fit indices in the .90's accompanied by parsimonious-fit indices between .50 and .80 are not unexpected. Therefore, Model 3 at first glance appeared to be a well-fitted model. But, the decision to proceed to investigate Model 4 was based on the lower than expected co-variances between the factors in Model 3, which were all below the 0.50 threshold. Low co-variances have implications for higher order modeling in that, if this occurs, a higher order factor may not be accounting for the lower order factors, which forms the basis of hypotheses testing in this research. This could also indicate that the model is mis-specified if it still appears to meet the criterion of substantive meaningfulness (Gerbing and Anderson 1984).

Model 4 then, was a re-specification of Model 3 with the deletion of one item for RESTROSPECTION (Retro 4) and one item for ROLE CLARITY (Role 6). It then became the preferred model, as depicted in Figure 7.9 with increased alpha reliability measures for the scales when these items were deleted. This model also had increased values in covariances between the factors (RETROSPECT<--> ROLE CLARITY .540, p<.001; ROLE CLARITY<-->EXPERIENCE_USE .468, p<.001; RETROSPECT<--> EXPERIENCE_USE .598, p<.001), which were strong and significant and overall goodness-of-fit improvement as indicated by the fit indices. These measures of covariance indicate the relative strengths of interdependencies of each of the factors with the others and demonstrate the effect that change on one, could have on the other factors.

In addition to the increased covariance measures, the Aikake (AIC) and consistent Aikake (CAIC) (Aikake 1987) values have dropped from Model 3 (82.877 AIC; 180.432 CAIC), to Model 4 (46.816 AIC; 125.789 CAIC). AIC

and CAIC values represent parsimony measures in assessment of model fit, taking into account sample size and relative complexity of the model (Bozdogan 1987). These are used in the comparison of two or more nested models, with reduced values representing an improved fit of the hypothesized model (Hu and Bentler 1995), therefore lending further support to Model 4. All items load only on their respective factors, scale reliability is well above acceptable levels (>0.70) and factor loadings are high (>0.50). There were no modification indices indicated, therefore the hypothesis forwarded,

H3: Organizational Memory is a multidimensional construct consisting of factors that include Retrospection, Role Clarity and Experience Use,

is supported. Model 4 (Figure 7.9) represents a good fit of the sample data (S) to the population (Σ). The model is meaningful in terms of the substance of the items and factors to theory of Organizational Memory. That is, the items collectively provide a measurement model of Organizational Memory that is conceptually consistent with theory. Therefore, it is concluded that the measurement model (Model 4) is a sound operationalization of Organizational Memory.

As with Organizational Identity modeled previously, the decision to proceed to higher order modeling was based on both hypothesis-testing requirements and because the lower order model indicated a higher order factor due to the high co-variance structure. Therefore, the first-order model (Model 4) was re-specified to include a second-order factor – ORGMEM – in place of first-order factor co-variances and is presented in Figure 7.10.

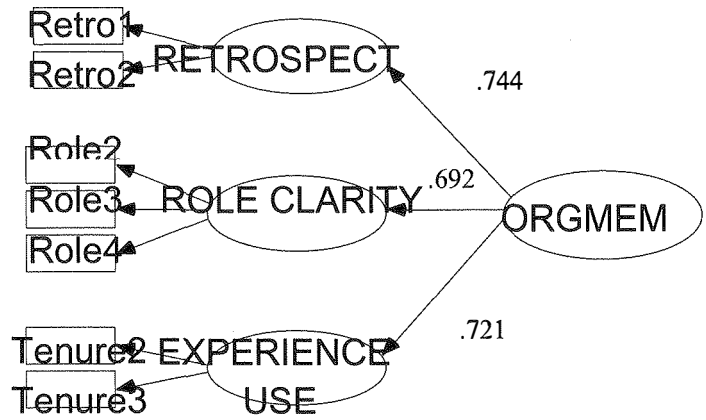

Figure 7.10 - Second Order Model of Organizational Memory

Comparison of fit statistics of the 3-factor first-order model, to the second-order factor model are presented in Table 7.14. The factor loadings of the three lower-order factors onto the higher-order ORGMEM factor should be noted, as these weights represent the contribution that each factor makes to the Organizational Memory construct. In this instance, each sub-dimension makes a similarly weighted contribution to Organizational Memory.

Table 7.14 Comparison of Fit Statistics First and Second Order Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Ist Order Model	12.816	11	1.165	.027	.987	.305	.024	.998	.997
2na Order Model	14.008	12	1.167	.032	.986	.422	.024	.998	.997

Standardized Regression Weights (Factor Loadings) 2na Order Factor Model			
RETROSPECT	<---	ORGMEM	.744 ***
ROLE CLARITY	<---	ORGMEM	.692 ***
EXPERIENCE_USE	<---	ORGMEM	.721 ***

***p<.001

As in the previous section on Organizational Identity, the first-order factors function as indicators of the second-order factor. The higher-order factor is hypothesized as accounting for, or explaining all variance and co-variance related to the first-order factors (Byrne 2001). Because the higher-order model explains the data more parsimoniously than the first-order 3-factor model, its

goodness of fit cannot be better than that of the first-order factor (Flora *et al* 2003). To assess the fit of the higher-order model relative to the lower-order model, the target co-efficient described by Marsh and Hocevar (1985) is calculated. This is the ratio of the full first order χ^2 value to that of the higher order model ($\chi^2_{(11)}$ 12.816 / $\chi^2_{(12)}$ 14.008). In this case the ratio is 0.915 which means that the second order factor explains 91.5% (a very high proportion) of the co-variation of the first-order factors. In light of the findings that a higher-order factor, ORGANIZATIONAL MEMORY explains the lower factors, support is found for hypothesis H3a.

H3a: Organizational Memory is a higher order construct consisting of 3 lower order factors: Retrospection, Role Clarity and Experience Use.

The higher order model of Organizational Memory will be used in further analysis and hypothesis testing of the SMS. The measurement model of Social Interaction follows.

7.5.1.3 Social Interaction – Measurement Model Evaluation

Social Interaction was hypothesized to consist of a 4-factor structure – FREQUENCY, RICHNESS, DIVERSITY and PHYSICAL ARRANGEMENT with co-variations between each factor. Each factor was initially measured using 6 to 7 items per scale; each item was measured using a seven-point Likert scale. Table 7.15 lists the item wording.

Table 7.15 Initial CFA – Social Interaction

Items	Item Wording
PHYSFAC1	*In this business, meeting rooms and offices are built in a style that supports interaction.*
PHYSFAC2	*When we need to seek information from one another, we can get in touch easily.*
PHYSFAC3	*Meetings spaces have been well provided for in this organization.*
PHYSFAC4	*Accessing one another in this business is quite convenient.*
PHYSFAC5	*We are able to meet with one another easily when required.*
PHYSFAC6	*Provision has been made for opportunities to get together in this organization.*
FREQ1	*There are lots of opportunities for conversations in this business.*
FREQ2	*We have plenty of informal meetings in this business.*

Table 7.15 Initial CFA – Social Interaction (contd.)

FREQ3	*We have regular formal meetings in this organization.*
FREQ4	*We talk to one another frequently about organizational issues / problems.*
FREQ5r	*It's hard to get together in this organization.*
FREQ6r	*We don't meet often enough.*
RICH1	*We have plenty of opportunities for face to face interactions here.*
RICH2	*We value personalized interactions with one another.*
RICH3	*We bump into one another frequently and talk informally.*
RICH4r	*For whatever reason, it is difficult to have personalized interactions here.*
RICH5	*We share a common language in this organization.*
RICH6	*We value face to face interaction.*
DIV1	*There are lots of opportunities for different levels of people in this business to talk to one another.*
DIV2	*We value the expression of alternative viewpoints.*
DIV3	*We listen to the ideas of people from all levels in the organization.*
DIV4	*We acquire varied and diverse information in our organization.*
DIV5	*We interact with others who provide a variety of viewpoints.*
DIV6	*There are opportunities for the expression of diverse opinions in this firm.*
DIV7r	*People from different levels in the organization never interact.*
	r = reverse coded
	SCALE ALPHA CO-EFFICIENTS
PHYSICAL ENVIRONMENT	.8474
FREQUENCY	.4375
RICHNESS	.8536
DIVERSITY	.9115

Figure 7.11 depicts the hypothesized model of Social Interaction (Model 1) inputted to AMOS 5.

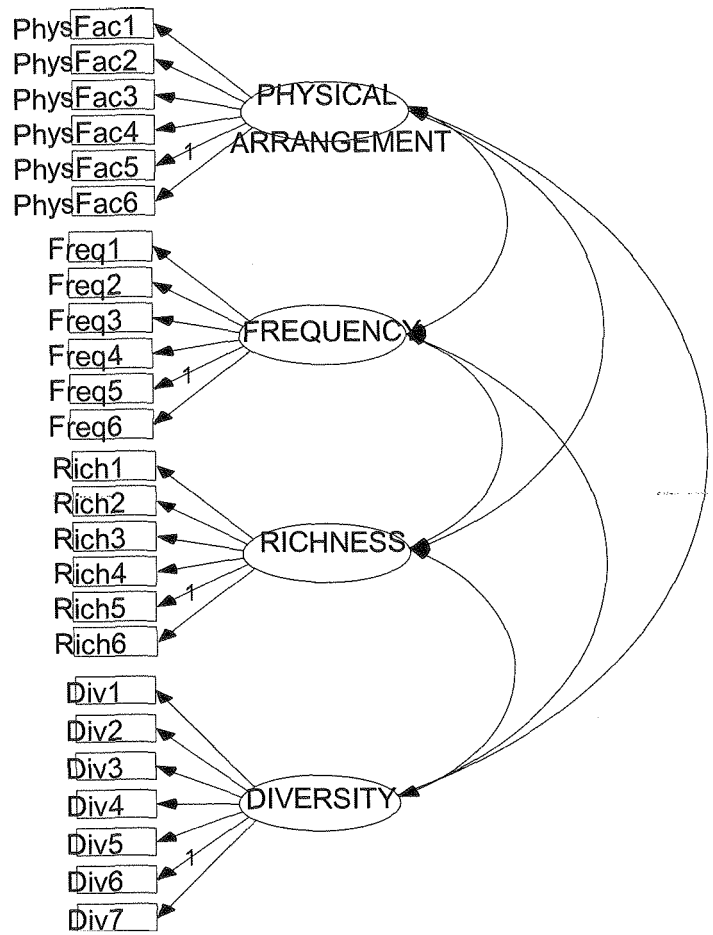

Figure 7.11 Social Interaction – Hypothesized 4 Factor Model

The same procedures, as outlined for the model of Organizational Identity and Organizational Memory in previous sections, were adopted. The hypothesized model was evaluated as Model 1. Then working in a step-wise manner, subsequent models were evaluated making only one adjustment at a time, paying particular attention to the substantive importance of items to the hypothesized construct and its theoretical base, and to parameter estimates, recommended modification indices and goodness-of-fit statistics.

Five model iterations were required to arrive at a well-fitted model that was substantively meaningful and met or exceeded acceptable goodness-of-fit criteria. Aikake (AIC) and consistent Aikake (CAIC) (Aikake 1987) values have dropped from Model 1 (1157.620 AIC; 1417.765 CAIC), to Model 5

(115.082 AIC; 245.155 CAIC). These values, as stated before, represent *comparative parsimony* measures in assessing model fit (Bozdogan 1987) accounting for sample size and complexity of the model, with reduced values representing a better fit of the hypothesized model (Hu and Bentler 1995), thereby lending further support to Model 5. Table 7.16 is a summary table of all 5 models evaluated, including factor loadings of the items included in the final model onto their respective factors, final scale reliability alpha coefficients and goodness-of-fit statistics.

Table 7.16 Social Interaction – Summary of Goodness of Fit Criteria, All 5 Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 1	1045.620	269	3.887	.124	.755	.625	.101	.821	.840
Model 2	451.175	98	4.604	.085	.829	.598	.113	.900	.878
Model 3	210.886	59	3.574	.063	.898	.582	.096	.947	.930
Model 4	133.672	48	2.785	.041	.927	.571	.080	.967	.954
Model 5	59.082	38	1.555	.036	.964	.555	.044	.990	.986

Standardized Regression Weights (Factor Loadings) Final Model				
PHYSFAC5	<---	PHYSL_ARRNGMT		.840***
PHYSFAC4	<---	PHYSL_ARRNGMT		.930***
PHYSFAC2	<---	PHYSL_ARRNGMT		.733***
FREQ2	<---	FREQUENCY		.793***
FREQ1	<---	FREQUENCY		.840***
RICH6	<---	RICHNESS		.846***
RICH2	<---	RICHNESS		.838***
DIV5	<---	DIVERSITY		.897***
DIV4	<---	DIVERSITY		.853***
DIV3	<---	DIVERSITY		.869***
DIV6	<---	DIVERSITY		.803***
Co-variance	PHYSL_ENVRMT	<-->	FREQUENCY	.868 ***
Co-variance	FREQUENCY	<-->	RICHNESS	.731 ***
Co-variance	RICHNESS	<-->	DIVERSITY	.706 ***
Co-variance	PHYSL_ENVRMT	<-->	RICHNESS	.637 ***
Co-variance	PHYSL_ENVRMT	<-->	DIVERSITY	.649 ***
Co-variance	FREQUENCY	<-->	DIVERSITY	.608 ***
Final Scale Alpha		PHYS ARRANGEMENT		.8600
Final Scale Alpha		FREQUENCY		.7930
Final Scale Alpha		RICHNESS		.8295
Final Scale Alpha		DIVERSITY		.9149

***p<.001

Figure 7.12 represents the final 4-factor model of Social Interaction.

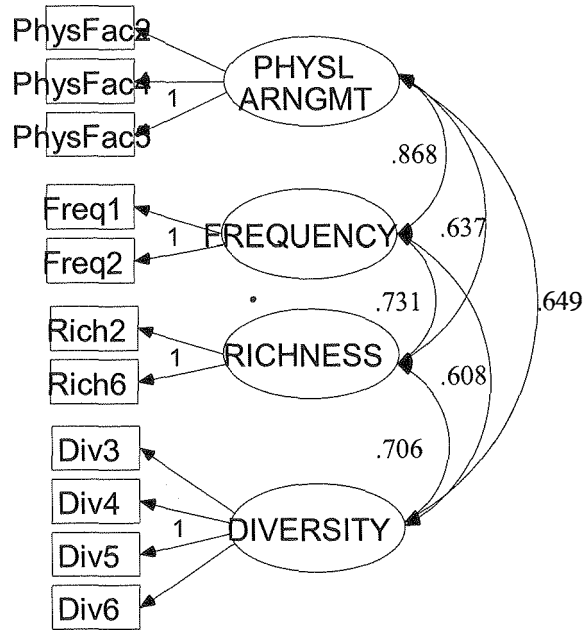

Figure 7.12 Social Interaction – Final 4 Factor Model

Note the covariance values between each of the four sub-dimensions of Social Interaction. These indicate the relative strength of the interdependencies between each sub-dimension and indicate the extent that change of one sub-dimension would have on the other. Based on the findings of data analysis presented, hypothesis H4 is supported:

> *H4: Social Interaction is a multidimensional construct consisting of 4 factors that co-vary, Frequency, Richness, Diversity and Physical Environment,*

Model 5 represents a good fit of the data (S) to the population (Σ). The model is meaningful in terms of the substance of the items and factors to available theory of social interactions in organizations. The items measure the factors well, as indicated by no cross loadings; all factor loadings and scale reliability coefficients exceed acceptable measures. The items and factors collectively provide a measurement model of Social Interaction in organizations that is consistent with theory. Therefore, it is concluded that the measurement model (Model 5) is a sound operationalization of Social Interactions in organizations and will be used in the structural model of the SMS.

As with Organizational Identity and Organizational Memory previously, the decision to proceed to higher order factor modeling was based on hypothesis-testing requirements and on the fact that the lower-order model indicated a higher-order factor could be explaining the lower-order factors, because of the high values indicated by the co-variance structure. The first-order model (Model 5) was re-specified to include a second-order factor – SOCIAL INTERACT – in place of first-order factor co-variances and the final solution of the second-order model is presented in Figure 7.13.

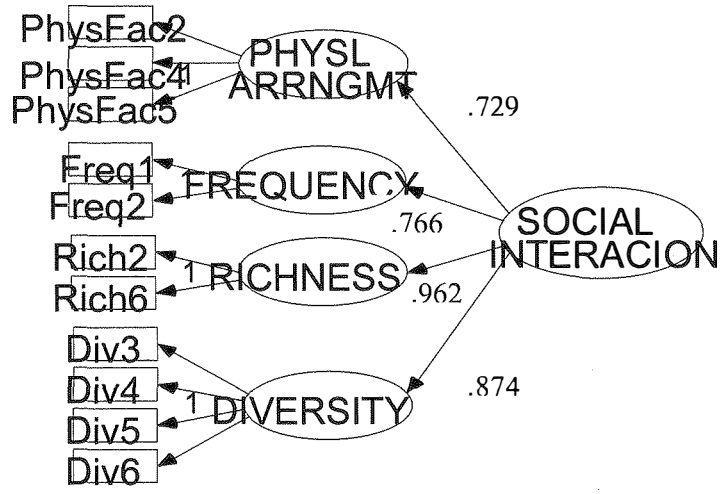

Figure 7.13 Second Order Model of Social Interaction

Note the factor weights of each factor. This indicates the relative contribution that each makes to the construct of Social Interaction. Richness and Diversity in this instance make a higher contribution than do Frequency and Physical Arrangements. Table 7.17 provides a comparison of the fit indices between the 4-factor first-order model and the second-order model and the factor loadings (β paths) from the second-order factor to the first-order factors.

Table 7.17 Comparison of Fit Statistics First and Second Order Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Ist Order Model	59.082	38	1.555	.036	.964	.555	.044	.990	.986
2nd Order Model	66.345	39	1.701	.055	.960	.567	.050	.987	.982

Table 7.17 Comparison of Fit Statistics First and Second Order Models (Contd.)

Standardized Regression Weights (Factor Loadings) 2nd Order Factor Model			
PHYSL_ARRANGEMNT	<---	SOCIAL_INTERACT	.729 ***
FREQUENCY	<---	SOCIAL_INTERACT	.766 ***
RICHNESS	<---	SOCIAL_INTERACT	.962 ***
DIVERSITY	<---	SOCIAL_INTERACT	.874 ***

***p<.001

As in the previous section on Organizational Identity, the first-order factors function as indicators of the second-order factor. The higher-order factor is hypothesized to account for, or explain all variance and co-variance related to the first-order factors (Byrne 2001). Because the higher order model explains the data more parsimoniously than the first-order 4-factor model, its goodness of fit cannot be better than that of the first-order model (Flora *et al* 2003). To assess the fit of the higher-order model relative to the lower-order model, the target co-efficient described by Marsh and Hocevar (1985) is calculated. This is the ratio of the full first-order χ^2 value to that of the higher-order model ($\chi^2_{(38)}$ 59.082 / $\chi^2_{(39)}$ 66.345). In this instance, the ratio is 0.891, which means that the second-order factor explains 89% of the co-variation of the first-order factors.

In light of the findings that a higher order factor, SOCIAL INTERACT explains the lower factors, support is found for hypothesis H4a.

> *H4a: Social Interaction is a higher order construct consisting of 4 lower order factors: Frequency, Richness, Diversity and Physical Environment.*

The higher order model of Social Interactions will be used for further analysis in the SMS.

7.5.1.4 SMS – Hierarchical Measurement Model Evaluation

The conceptualization depicted in Figure 7.4 (p. 186) suggests that the SMS is a multidimensional, hierarchical construct. It can be described as a third-order factor model. Despite the lack of hierarchical modeling in the marketing literature (for one exception see Brady and Cronin 2001) it was determined that this was the best representation of the operation of SM in organizations.

The SMS was hypothesized to consist of three second-order factors; Organizational Identity, Organizational Memory and Social Interactions, with co-variations between each factor (H1). The 3 second-order factors were hypothesized to consist of a combined 10 first-order factors with final analysis confirming 9 first-order factors.

The purpose of higher-order model conceptualization, is that the higher-order model is a special case of the lower-order model; a structure being imposed on the lower-order model (regression paths) (Byrne 2001). In managerial and theoretical terms, this would represent a more elegant conceptualization of a construct. This type of higher order modeling is most important in that it also indicates the relative contribution (β paths) that the lower-order factors make to the higher-order factors through regression weights. For management, this can signal which aspects of a construct are more or less important than others. In theoretical terms, this means that researchers are made aware of the foundational structure of the construct.

Given that the lower-order measurement models for Organizational Identity, Organizational Memory and Social Interactions have been assessed in the previous sections, they can be inputted as resolved into a higher-order model of a SMS in organizations. This is the hypothesized measurement model of the SMS (called here Model 1) and is represented by Figure 7.14.

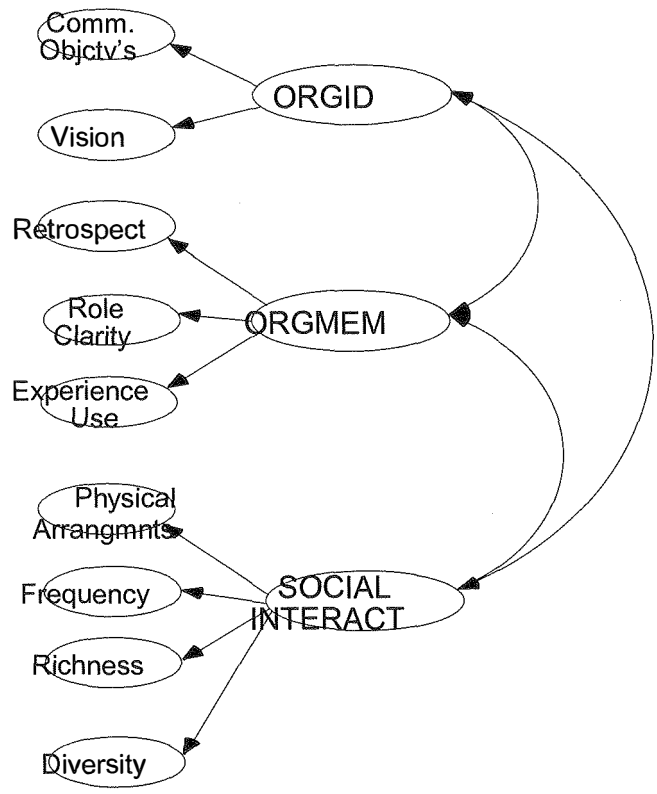

Figure 7.14 SMS – Hypothesized Second Order Model

Procedures were followed as per previous measurement models. Scale alpha co-efficients have been reported for each sub-model and remain the same in the higher-order model so are not reported here. Three model iterations were required to arrive at a well-fitted model that was substantively meaningful and met or exceeded acceptable goodness-of-fit criteria. Aikake (AIC) and consistent Aikake (CAIC) (Aikake 1987) values have reduced from Model 1 (569.946 AIC; 848.673 CAIC), to Model 3 (490.097 AIC; 787.406 CAIC). These values, as stated earlier, represent comparisons between models (Bozdogan 1987) when accounting for sample size and relative complexity of the model. Smaller or reducing values representing a better fit of the hypothesized model (Hu and Bentler 1995) and lend further support to Model 3 as being the preferred model.

Table 7.18 is a summary table of the three iterations of the SMS model and include goodness-of-fit statistics, β path values from the second-order factors to the first-order factors, and from the first-order factors to the items reflecting them. Estimates of the co-variances between the three higher-order factors are also shown. The high factor loadings for all items onto the first-order factors and high loadings of the first-order factors onto the second-order factors should be noted. The second-order factor loadings represent the relative weight that these lower-order constructs contribute to the higher-order factors and are regression paths. Also to be noted are the high correlations among the second-order factors, indicating the presence of a higher-order factor.

Table 7.18 SMS – Summary of Goodness of Fit Criteria, All 3 Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 1	449.946	240	1.875	.083	.885	.708	.056	.957	.950
Model 2	436.996	239	1.828	.082	.859	.707	.054	.959	.953
Model 3	362.097	236	1.534	.071	.905	.712	.044	.974	.970
Standardized Regression Weights of Second-Order Factors to First-Order Factors									
Comm_Objctvs			<---		ORGID			.734***	
Vision			<---		ORGID			.931***	
Retrospect			<---		ORGMEM			.722***	
Role_Clarity			<---		ORGMEM			.755***	
Experience_Use			<---		ORGMEM			.666***	
Frequency			<---		SOCIAL_INTERACT			.747***	
Richness			<---		SOCIAL_INTERACT			.945***	
Diversity			<---		SOCIAL_INTERACT			.902***	
Physical_Envrmt			<---		SOCIAL_INTERACT			.684***	
Standardized Regression Weights of First-Order Factors to Indicators									
RETRO2			<---		Retrospect			.925***	
RETRO1			<---		Retrospect			.821***	
ROLE4			<---		Role_Clarity			.861***	
ROLE3			<---		Role_Clarity			.930***	
ROLE2			<---		Role_Clarity			.669***	
TENURE3			<---		Experience_Use			.877***	
TENURE2			<---		Experience_Use			.794***	
VIS3			<---		Vision			.805***	
VIS2			<---		Vision			.928***	
VIS1			<---		Vision			.891***	
IM2			<---		Comm_Objctvs			.845***	
IM1			<---		Comm_Objctvs			.905***	
OB4			<---		Comm_Objctvs			.823***	
PHYSFAC5			<---		Physical_Envrmt			.840***	
PHYSFAC4			<---		Physical_Envrmt			.931***	
PHYSFAC2			<---		Physical_Envrmt			.732***	
FREQ2			<---		Frequency			.788***	

Table 7.18 SMS – Summary of Goodness of Fit Criteria, All 3 Models (Contd.)

FREQ1	<---	Frequency	.845***
RICH6	<---	Richness	.857***
RICH2	<---	Richness	.827***
DIV5	<---	Diversity	.896***
DIV4	<---	Diversity	.856***
DIV3	<---	Diversity	.866***
DIV6	<---	Diversity	.802***
Correlations between Second Order factors			
ORGID	<-->	ORGMEM	.706***
ORGMEM	<-->	SOCIAL_INTERACT	.837***
ORGID	<-->	SOCIAL_INTERACT	.655***

***p<.001

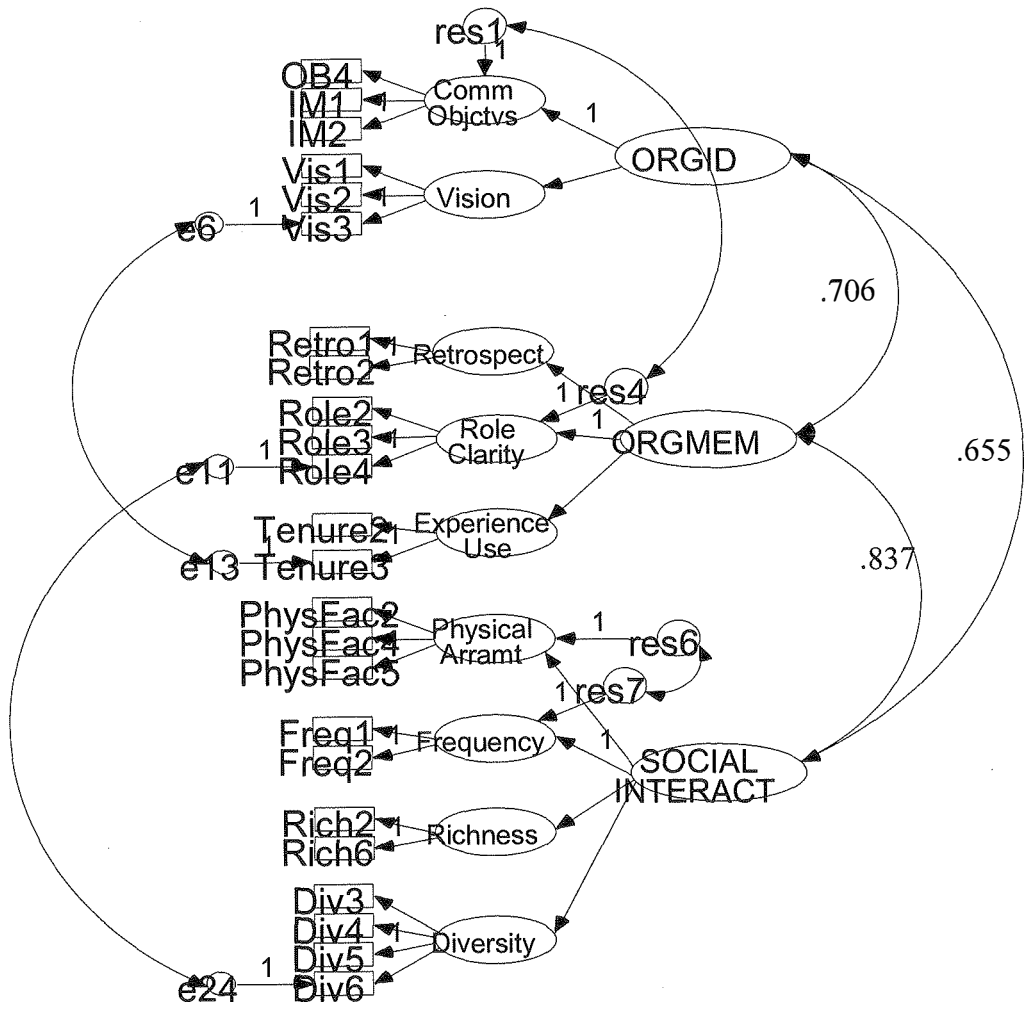

Figure 7.15 SMS – Confirmed Second-Order Factor Model

Figure 7.15 represents the final 3-factor model of SMS with covariance structure. Note the relative strengths of each covariance between the three dimensions of the SMS. These represent the measures of interdependence between the factors.

Also note the inclusion of correlated error terms between e6 <--> e13, e11 <--> e24, res1 <--> res4 and res6 <--> res7. These correlations indicate that the error terms associated with these particular variables are correlated in some way. Jöreskog and Sörbom (1993) state that there are many situations in social psychological research where these parameters can make strong substantive sense. For substantiation, we need to revisit the items from which these errors derive.

The suggested co-variance between e6 <--> e13 (estimate .361) represents a correlated error between two indicators of the lower order factors, Vision and Experience Use. On inspection of these items (Vis 3 – *'We know what we want to achieve in the long run'*; Tenure 3 – *'We value employees with long tenure in this organization'*), it is reasonable to consider that respondents may have had correlated responses to the items as they both suggest organization history over time. Similarly, the co-variance between e11 <--> e24 (estimate .320) (Role 4 – *'People here have a clear understanding of what is required to do their job aptly'*; and Div 6 – '*There are opportunities for the expression of diverse opinions in this organization'*), could indicate correlation among respondent notions of communication paths in the organization.

The residual error terms correlated in the model, indicate correlations among error parameters attached to higher-order factors in the model. The residuals (error terms) attached to the factors of 'Communication of Objectives' and 'Role Clarity' (res1 <--> res4 = 0.465) have been correlated based on their substantive sense and MI's suggested (8.463). It is plausible to consider that respondents could have strong correlated responses to these two factors as they

both represent communication aspects within the organization. Similarly with the correlated residuals attached to 'Physical Arrangements' and 'Frequency' (res6 <--> res7 = 0.436) as these errors are both related to two aspects of 'Social Interaction', the higher-order factor. Items from each of these factors share elements of the notion of meeting and sharing with others in the organization. In light of the findings of the analysis, support is found for the measurement model of the SMS as hypothesized;

> *H1: SMS is a multidimensional construct consisting of 3 factors that co-vary: Organizational Identity, Organizational Memory and Social Interaction,*

This model will now be tested as a higher-order model.

As with the previous measurement models, the decision to proceed to higher-order modeling was based on both hypothesis testing requirements and because the lower-order model indicated that a higher-order factor could be explaining the lower-order factors. This is evidenced in the second-order model of the SMS (Figure 7.15) by the high correlations between the second-order factors (OI <-->OM - 0.706; OM <--> SI - 0.837; OI <--> SI - 0.655). Therefore, the second-order model (Figure 7.15) was re-specified to include a third-order factor – SMS – in place of the second order co-variances and is presented in Figure 7.16.

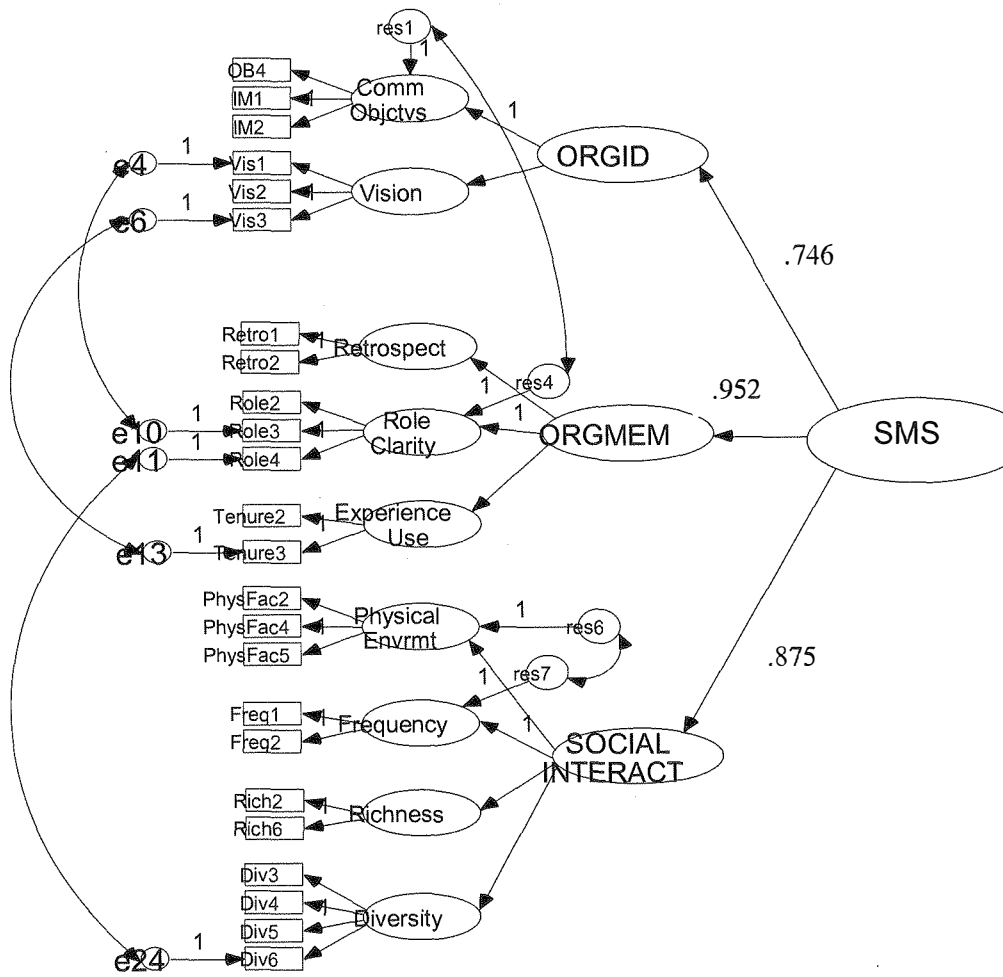

Figure 7.16 Third Order Model of SMS

As in previous measurement models, the 9 first-order factors serve as indicators of the 3 second-order factors and these serve as indicators of the third order factor – SMS. The higher-order factor is hypothesized as accounting for, or explaining all variance and co-variance related to the lower order factors (Byrne 2001). Note the factor weights of each of the three dimensions indicating their relative contribution to the operation of the SMS.

To assess the fit of the higher-order model relative to the lower-order model, the target co-efficient described by Marsh and Hocevar (1985) is again

calculated. This is the ratio of the full second-order χ^2 value to that of the third-order model ($\chi^2_{(236)}$ 362.097 / $\chi^2_{(235)}$ 363.929). In this instance, the ratio is 0.995, which means that the third order factor explains over 99% of the co-variation of the second-order factors. Comparison of fit statistics of the final 3-factor second-order model to the third-order model are presented in Table 7.19.

Table 7.19 SMS - Comparison of Fit Statistics Second and Third Order Models

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
2nd Order Model	362.097	236	1.534	.068	.905	.712	.044	.974	.970
3rd Order Model	363.929	235	1.549	.072	.907	.710	.044	.973	.969

Standardized Regression Weights (Factor Loadings) 3rd Order Factor Model			
SOCIAL_INTERACT	<---	SMS	.875***
ORGID	<---	SMS	.746***
ORGMEM	<---	SMS	.952***

***p<.001

In light of the findings that a higher order factor, SMS, explains the lower factors, support is found for hypothesis H1a.

> *H1a: SMS is a third-order hierarchical construct consisting of three second-order factors, Organizational Identity, Organizational Memory and Social Interaction and nine first-order factors.*

The SMS, as modeled, appears to operate as an interpretation and memory mechanism in organizations through processes of social interactions that have many forms. The importance of activities of retrospect, the use of experience within the organization and the relative clarity of roles for organizational actors, appears to be the most important aspect of the SMS. These activities are co-dependent upon the processes of social interaction within the organization that both drive and are driven by them. Marginally less important to the SMS in this instance, are the activities associated with communication of objectives and vision for the future of the organization. Having said that, there still exists a strong co-dependent relationship between activities associated with

communicating objectives and vision, and the recall practices, experiences used and roles that organizational actors play. Moreover, there is also a moderately strong co-dependent relationship between communicated objectives and vision, and the social interactions in which organizational actors engage.

Now that the main measurement model of the SMS is resolved, it will be used in the structural modeling procedures that follow. However, the other constructs in the structural model, Sensing (S), Response (R) and Performance (P) also require measurement model evaluation and confirmation as they too are latent constructs set for inclusion in the full structural latent model. These remaining variables will now be assessed for measurement model validity and fit.

7.5.2 Sensing – Measurement Model Evaluation

Sensing was measured using an adaptation of Daft, Sormunen and Parks (1988) scale used to investigate the scanning activities of chief executives. It was determined that this was a superior measurement of managers' information gathering practices. Daft, Sormunen and Parks' scale (1988) measured information gathering about a broad variety of environmental sectors rather than the commonly used intelligence gathering scales derived from Kohli *et al* (1993) and Narver and Slater (1990), which tend to place an emphasis on intelligence gathered about customers and competitors, with scant attention given to technology or broad industry or social effects.

Daft *et al* (1988) found that executives in higher performing firms scanned not only more frequently, but also more widely than other executives. The more successful executives not only gathered information about their immediate task sectors such as customers and competitors, but they also gathered information about the marketplace and the social and general environment. Daft *et al* (1988) concluded that they used this information to form a more general impression about the organizational context for strategic adjustments.

The scale used for this research, comprised a single question asked across 7 environmental sectors, *"How frequently, do you receive useful information about the following environmental sectors?"*. The measures of frequency ranged from less than once a year (1); about once a year (2); a few times per year (3); monthly (4); more than once per month (5); weekly (6) to daily (7). The definitions of environmental sectors were derived from those used by Daft *et al* (1988) and follow in Table 7.20.

Table 7.20 Initial CFA – Sensing "How frequently, do you receive useful information about the following environmental sectors?"

Items	Sector Description
COMP	*Includes the organizations and products that compete with yours. Includes organizations that make substitute products/services. Refers to competitive actions and tactics between your organization and competing organizations.*
CUST	*Refers to organizations and individuals that purchase your products/services. Includes organizations that purchase for re-sale as well as final consumers.*
SUPP	*Suppliers, both current and potential.*
TECH	*Includes development of new production methods and techniques Innovation in materials and products. General trends in research and science relevant to your organization.*
REG	*Includes federal and state regulations, local council and community policies, Includes developments at all levels of government.*
ECON	*Includes factors such as stock markets, rate of inflation, trade balance, federal and state budgets, interest rates, unemployment and economic growth rates.*
SOCA	*Comprises social values in the general population, work ethic, demographic and lifestyle trends.*
Scale Alpha Co-efficient 0.7026	

Figure 7.17 is the model that was initially inputted to Amos 5 for analysis.

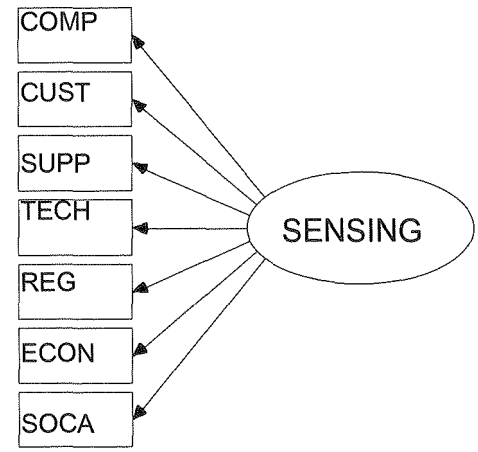

Figure 7.17 Sensing – Initial One Factor Model

The same procedures were adopted as outlined for all measurement models previously. Goodness-of-fit indices and MI's suggested the deletion of two items (economic and regulatory sector) that could potentially change the substance of the factor. Using SPSS (V12) to perform CFA with Varimax rotation, a two-factor solution was suggested. Given that the broad market sector conceptualization of Sensing was selected over other intelligence gathering conceptualizations, it was determined that a two-factor model would be a superior construct, rather than deleting the two environmental sectors from the conceptualization, as suggested by AMOS 5. Further discussion about the Sensing construct and its basis in earlier literature is warranted at this point to explain and justify this decision.

Bourgeois (1980) and Hambrick (1982) decomposed the environment into sectors that exist in two layers: task and general. Economic, regulatory and socio-cultural sectors fall into the general category, while customer, competitor, supplier and technology sectors fall into the task category. On the basis of prior theory (Bourgois 1980; Hambrick 1982) and empirical findings (Huber and Daft 1987; Daft *et al* 1988), 'Sensing' was modeled as a two factor model. Table 7.21 shows the summary goodness-of-fit criteria and Figure 7.18 represents the final two-factor model of Sensing.

Table 7.21 Sensing – Summary of Goodness of Fit Criteria,

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
One-Factor Model	146.846	14	10.489	.119	.861	.430	.183	.875	.813
Final Two-Factor Model	24.159	11	2.196	.057	.977	.384	.065	.988	.976

Standardized Regression Weights (Factor Loadings) Final Two-Factor Model			
FREQSOCA	<---	GENERAL	.781 ***
FREQECON	<---	GENERAL	.813 ***
FREQREG	<---	GENERAL	.692 ***
FREQSUPP	<---	TASK	.798 ***
FREQCUST	<---	TASK	.882 ***
FREQCOMP	<---	TASK	.723 ***
FREQTECH	<---	TASK	.853 ***
Final Scale Alpha		GENERAL	.8095
Final Scale Alpha		TASK	.8691

***p<.001

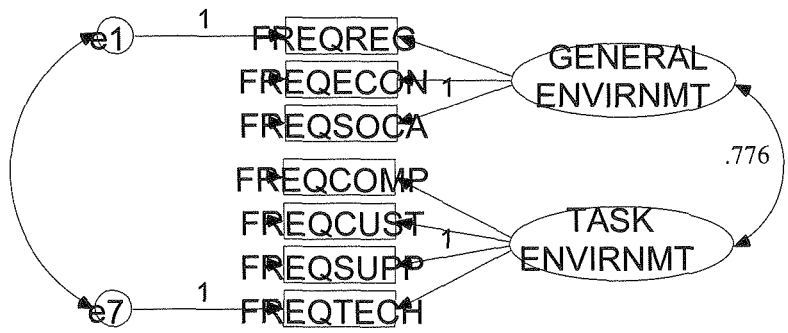

Figure 7.18 – Sensing -Two Factor Model

There are two noteworthy issues with this final two-factor model. First a correlated error term has been included between REGULATORY sector and TECHNOLOGY sector (e1<--> e7 .209, p<.001)). These correlated error terms have been included here (rather than deleting one of the items from the scale) given that correlating these terms is argued to make substantive sense. It is likely that responses to TECHNOLOGY would be highly correlated to responses to REGULATORY sectors, as there could plausibly be commonalities between activities related to information gathering about them,

looking at the definitions provided to respondents. Second the covariance between GENERAL and TASK is strong (GENERAL<--> TASK .776; p<.001), indicating the possibility of modeling the construct as a higher-order factor. Given that the presence of a higher order factor is indicated here, Sensing was re-specified as a second-order factor. Figure 7.19 presents the second-order solution.

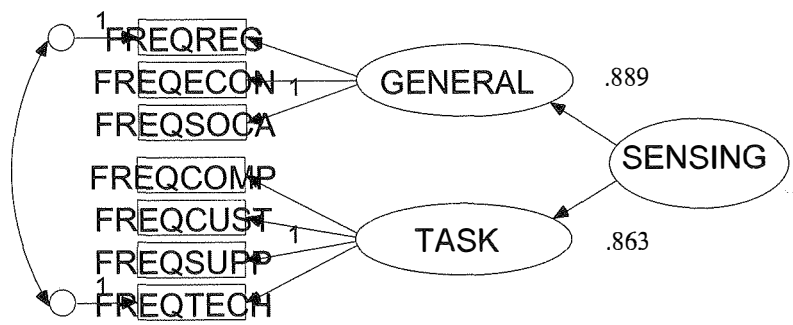

Figure 7.19 Sensing – Final 2 Factor Second Order Model

The second order model is equivalent to the first order two-factor model as the goodness-of-fit indices are the same as the two-factor model and the ratio of the full first order χ^2 value to that of the higher order model (Marsh and Hocevar, 1985) is 1. This is the same as was found earlier with ORGID in section 7.5.1.1. The regression paths are TASK<-- SENSE .863, p<.001; GENERAL<--- SENSE .889, p<.001. The factor weights indicate the contribution that each factor makes to the higher-order factor. In this instance these are relatively equally weighted. The second order two-factor model will be used for subsequent analysis of the full structural model. The RESPONSE variable is evaluated next.

7.5.3 Response – Measurement Model Evaluation

Response was measured using an adaptation of Kohli, Jaworski and Kumar's (1993) MARKOR scale included as part of their model of market orientation. It comprised nine items taking into account decision, review and implementation dimensions of response. Table 7.22 shows item wording including scale alpha.

Table 7.22 Initial CFA - Response

Items	Item Wording
Resp1	*In this organization we are able to detect and respond to marketplace changes promptly*
Resp2 r	*It takes us a long time to decide how to respond to competitors' strategic changes.*
Resp3 r	*We are slow to respond to marketplace changes.*
Resp4	*We are capable of making quick changes to our strategies if required.*
Resp5	*We are good at anticipating change in the market.*
Resp6 r	*For one reason or another we tend to ignore our competitors' strategic changes.*
Resp7	*We periodically review our strategic efforts to ensure they are in line with market needs.*
Resp8	*We can implement changes to strategy with a minimum of fuss.*
Resp9	*This organization has organized mechanisms for monitoring change in the environment*
	r = reverse coded
Scale Alpha Co-efficient 0.7026	

Figure 7.20 shows the model inputted into AMOS 5 for evaluation, called the initial model.

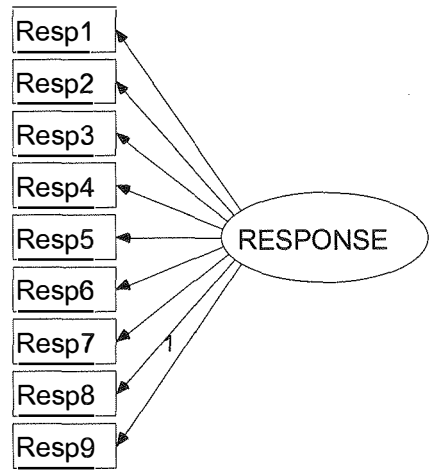

Figure 7.20 – Response – Initial One Factor Model

Taking the stepwise approach recommended by Byrne (2001), as for all previous measurement models, factor loadings were examined in line with the

substantive importance of the items to the construct. Suggested MI's and goodness-of-fit indices were taken into account. Modification of the model was performed in line with evaluation of factor loads (regression coefficients), modification indices and the substance of the construct itself.

It should be noted that the 'substance' of the items that remain in the final model (Resp1, Resp4, Reps5 & Resp8) reflects commonalities around the notion of 'change'; either responses to it or capacity to implement it. The final measurement model of 'Response' is presented in Figure 7.21. As this was a relatively simple model to evaluate, only one iteration was necessary to resolve model fit.

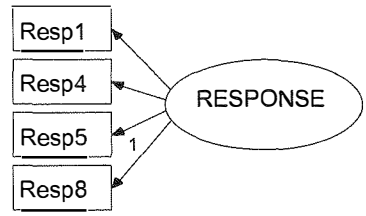

Figure 7.21 – Response Final Model

Fit statistics of initial and final models and factor loadings of the final model are presented in Table 7.23. It should be noted that all goodness-of-fit indices exceed acceptable levels and that scale reliability (alpha) has increased from .70 to .83 as a result of the deletion of items.

Table 7.23 – RESPONSE: Summary of Goodness of Fit Criteria –Initial and Final Model, Factor Loadings and Scale Reliability

Model	CMIN	df	CMIN/DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Initial Model	136.522	27	5.056	.129	.898	.539	.120	.879	.839
Final Model	4.740	2	2.370	.031	.992	.198	.070	.993	.980

Standardized Regression Weights (Factor Loadings) Final Model			
RESP8	<---	RESP	.682 ***
RESP5	<---	RESP	.696 ***
RESP4	<---	RESP	.832 ***
RESP1	<---	RESP	.754 ***
Final Scale Alpha			.828 ***

***p<.001

The final measurement model to be evaluated, PERFORMANCE, is discussed next.

7.5.4 Performance – Measurement Model Evaluation

Performance was measured using an adaptation of Kohli, Jaworski and Kumar's (1993) MARKOR scale. It comprised six items related to a single question, *"How successful has your organization been in achieving the following outcomes in the last three years?"* The items accounted for achievements related to financial and strategic objectives, customer satisfaction, mission, overall performance and performance relative to competitors. Respondents were asked to rate their success based on a seven-point Likert scale delineated as (1) Very unsuccessful, (2) Unsuccessful, (3) Somewhat unsuccessful, (4) Neither successful nor unsuccessful, (5) Somewhat successful, (6) Successful and (7) Very successful. The items are listed in Table 7.24.

Table 7.24 Initial CFA – Performance *"How successful has your organization been in achieving the following outcomes in the last three years?"*

Items	Item Wording
Perf1	*Achievement of financial objectives*
Perf2	*Achievement of strategic objectives*
Perf3	*Achievement of overall target customer satisfaction*
Perf4	*Achievement of overall mission*
Perf5	*Overall performance*
Perf6	*Achievement of performance relative to competitors*
Scale Alpha Co-efficient	.8872

The model inputted to AMOS 5, called the 'initial model', is shown in Figure 7.22.

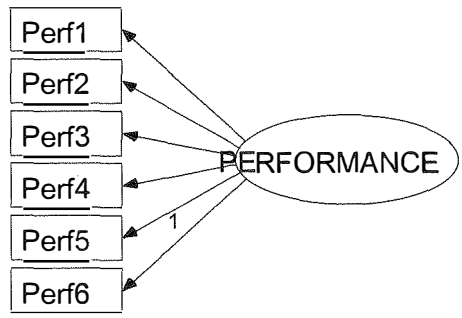

Figure 7.22 – Performance Initial Model

Following the stepwise approach as in all previous measurement model evaluations, a final solution emerged. Table 7.25 outlines the fit indices and scale alphas of initial and final model solution.

Table7.25 – PERFORMANCE: Summary of Goodness of Fit Criteria –Initial and Final Model, Factor Loadings and Scale Reliability

Model	CMIN	df	CMIN/DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Initial	57.596	9	6.400	.052	.941	.403	.138	.949	.915
Final	1.349	1	1.349	.013	.976	.100	.035	.999	.997
Standardized Regression Weights (Factor Loadings) Final Model									
								Estimate	
PERF5	<---	PERFORMANCE						.858 ***	
PERF4	<---	PERFORMANCE						.867 ***	
PERF2	<---	PERFORMANCE						.774 ***	
PERF1	<---	PERFORMANCE						.820 ***	
Final Scale Alpha								.8376	

***p<.001

The final measurement model of Performance follows as Figure 7.23.

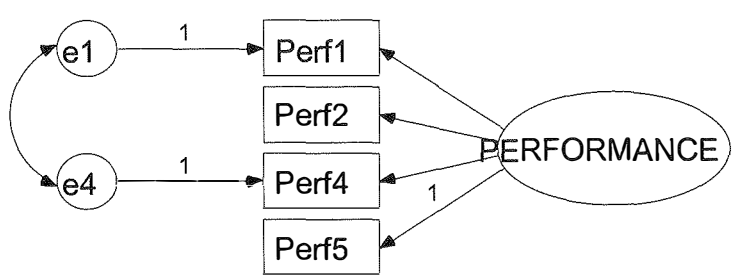

Figure 7.23 Performance - Final Measurement Model

As in previous models, the presence of one correlated error term (e1↔ e4 .240; p<.001)) needs to be noted. Error terms typically represent a non-random or systematic measurement error, the presence of which could mean that the items themselves are correlated, indicating that they might be perceived by respondents as similar to one another, or the correlated error term could indicate the presence of an underlying factor (Byrne 1994). Inspecting the respective items (Perf 1 and Perf 4) reveals that they relate to achievement of financial objectives and overall mission. It would seem unlikely that a separate and unique underlying factor could account for this based on both substantive and statistical reasons. The low value of the correlation (0.240) indicates a weak relationship. It appears more plausible that these items could have meant much the same thing to respondents, that is, that achieving financial objectives may be aligned with achievement of mission for these respondents. Given the relatively high proportion of smaller firms in the sample (55.8%) this appears plausible, which would account for the correlated error terms here. All fit indices are greatly improved because of deletion of items 3 and 6, with a small non-significant fall in scale reliability (alpha). However, that scale alpha is well above (.8376) acceptable levels (>.70) (Nunnally and Berstein 1994).

Consistent with SEM conventions (Bentler 1988), each of the latent constructs that was specified in terms of measured or manifest variables have been resolved and confirmed. That is, measurement models for each variable in the full latent structural model have been specified and solved according to a variety of criteria that includes theoretical substance, statistical validity and reliability measures, as well as a variety of goodness-of-fit criteria. It is now possible to proceed to the full latent structural model, whereby the measurement models as resolved, are incorporated into a structural model that tests for causality among the variables.

7.6 STRUCTURAL MODEL EVALUATION

Because the structural portion of a full latent structural equation model involves relationships among latent variables, and the primary concern in working with a full model is to assess the extent to which those relations are valid, it is critical that the measurement of each latent variable is psychometrically sound (Byrne 2001). This criterion has been satisfied in terms of each measurement model evaluated in earlier sections.

Figure 7.24 represents the hypothesized structural model including the hypothesized paths between constructs (note that indicator items and lower order factors are not included in this figure).

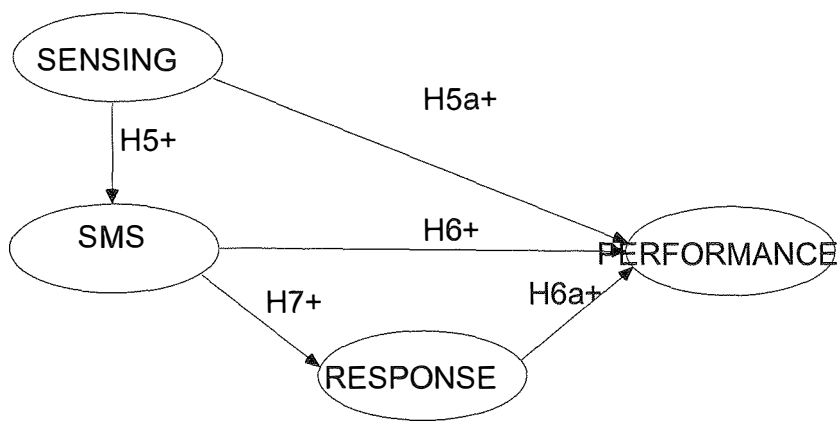

Figure 7.24 Hypothesized Full Latent Structural Model

However, before the analysis continues, the number of parameters to be estimated requires evaluation in terms of the issue of model identification. Recall in section 7.4.2.4 'Model Identification', the number of parameters to be estimated must not exceed the number of variances and covariances of the observed variables (i.e. data points). In SEM, the model must contain sufficient information (from the input data) to obtain determinant solutions of parameter estimation. If all measurement models are inputted as resolved thus far, given

the potential complexity of the model, it is possible that the model may be *under-identified.*

Reviewing each measurement model resolved thus far at their respective highest-order models, it can be seen that SENSING (Section 7.5.2) has 30 parameters to estimate, SMS (Section 7.5.1) has 115 parameters to estimate, RESPONSE (Section 7.5.3) has 13 parameters to estimate and PERFORMANCE (Section 7.5.4) has 14 parameters to estimate. Constraining some of these parameters (error terms and residuals that are nearly equal) by the inclusion of fixed parameters where advised by the critical ratios for differences function in AMOS 5 (Byrne 2001), and then drawing these models into the structural model brings the total number of parameters to 166. Clearly there is a problem with model identification (Schumaker and Lomax 2004), in that there is insufficient data (cases) for such a model to be tested, according to Baumgartner and Homburg's (1996) rule of thumb of the ratio of 5:1 parameters to cases (n = 283). Therefore, it will not be possible to run a structural model that is under-identified unless some alternative strategy is employed.

In this instance a remedy can be provided, according to the partial aggregation model forwarded by Bagozzi and Edwards (1998) and used by Berthon, Hulbert and Pitt (2004) when measuring customer orientation and innovation. It is possible to test the structural model with fewer parameters to estimate, by aggregating some of the existing parameters. This increases the ratio of cases to parameters and has the effect of smoothing out measurement error to some extent (Cudeck 1989). In this case, the SMS and SENSING constructs are suitable candidates for aggregation of parameters as they have the largest number of parameters and are the most complex of the measurement models.

The procedure of partial aggregation involved the formation of new indices by summing items on a stepwise basis within each construct to form higher

clusters of composite indices (Berthon *et al* 2004). The partially aggregated model is depicted in Figure 7.25 (error terms have been left out of figure).

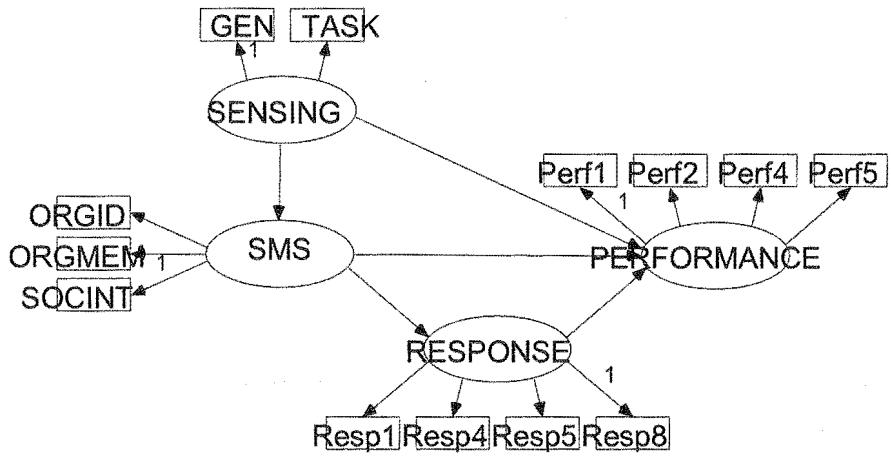

Figure 7.25 – Hypothesized Structural Model - Partially Aggregated SENSE and SMS constructs (Model 1)

Figure 7.25 shows that both the SMS and SENSING constructs have been aggregated to the main second order factor scores and inserted as indicator variables for the structural model. Note that RESPONSE and PERFORMANCE variables were inputted as previously resolved in final measurement models (Figures 7.23 PERFORMANCE and Figure 7.21 RESPONSE). Table 7.26 presents Model 1 statistics.

Table 7.26 Structural Model Partially Aggregated SENSE and SMS constructs – Summary of Goodness of Fit Criteria (Model 1)

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 1	155.849	60	2.597	.081	.921	.607	.075	.946	.930
Regression Weights of Structural Paths									
SENSEMAKING		<---	SENSING					.255 ***	
RESPONSE		<---	SENSEMAKING					.841 ***	
PERFORMANCE		<---	RESPONSE					-.010 (p>.05)	
PERFORMANCE		<---	SENSING					-.033 (p>.05)	
PERFORMANCE		<---	SENSEMAKING					.789 ***	

*** p<.001

All paths from indicators to factors exceed the recommended levels (>.70) and are significant (p<.001). Inspecting the goodness-of-fit statistics tells us that the

model appears to be an adequate fit, however the Hoelter values are low (.05 Hoelter 144 and .01 Hoelter 160).

Hoelter's critical N statistics (at the .05 and .01 level) focus directly on the adequacy of sample size rather than on model fit (Byrne 2001). Development of Hoelters index arose from an attempt to find a fit index that is independent of sample size. Specifically, its purpose is to estimate a sample size sufficient to yield an adequate model fit for the χ^2 test[10] (Hu and Bentler 1995). Hoelter (1983) proposed that a value in excess of 200 is indicative of a model that adequately represents the sample data. Model 1 in this instance requires modification because Hoelter's (1983) benchmark of 200 is not satisfied which indicates that the model (Figure 7.25 p. 228) does not represent a good fit to the sample data.

Modification indices (13.686) also indicated that a co-variance specified between ORGMEM and SOCINT would improve model fit. This is entirely plausible given the earlier high correlation (.837) found between these factors (see Figure 7.15 p. 211). In addition, looking at the substance of items aggregated into the scales of these two indicators, we can see that it would be plausible that there would be a relationship between these constructs. There are strong substantive commonalities around 'exchange of information' and 'shared experiences'. Therefore, the co-variance was specified between ORGMEM and SOCINT and the model re-run as Model 2 – the final model. Table 7.27 presents the final statistics.

Table 7.27 Structural Model Partially Aggregated SENSE & SMS constructs – Summary of Goodness of Fit Criteria (Model 2)

Model	CMIN	df	CMIN/ DF	RMR	GFI	PGFI	RMSEA	CFI	TLI
Model 2	82.651	48	1.7222	.061	.954	.587	.051	.979	.971
Standardized Regression Weights of Structural Paths									
SMS				<---	SENSING			.361 ***	
RESPONSE				<---	SMS			.684 ***	
PERFORMANCE				<---	RESPONSE			-.140 (p>.05)	

[10] The Chi-square statistic χ^2 is itself sensitive to sample size.

PERFORMANCE	<---	SENSING	-.068 (p>.05)
PERFORMANCE	<---	SMS	.711 ***
Standardized Regression Weights of Factors to Indicators			
RESP8	<---	RESPONSE	.716
RESP5	<---	RESPONSE	.683
RESP4	<---	RESPONSE	.801
RESP1	<---	RESPONSE	.769
SOCINT	<---	SMS	.704
ORGMEM	<---	SMS	.679
ORGID	<---	SMS	.810
GENFREQ	<---	SENSING	.822
TASKFREQ	<---	SENSING	.823
PERF2	<---	PERFORMANCE	.783
PERF1	<---	PERFORMANCE	.823
PERF4	<---	PERFORMANCE	.867
PERF5	<---	PERFORMANCE	.866
		e2 ↔ e3	.145 ***

*** p<.001

This model is the preferred model for the following reasons:

1. Comparatively speaking, Aikake (AIC) and consistent Aikake (CAIC) (Aikake 1987) values have reduced from Model 1 (217.849 AIC; 361.858 CAIC), to Model 2 (142.960 AIC; 282.014 CAIC) indicating comparative fit improvement.
2. The Hoelter values have increased from .05, 144; .01, 160 in Model 1, to .05, 223; .01, 252 in Model 2. These now exceed Hoelter's benchmark of >200 implying that the sample size (n = 283) is adequate to test this particular model.
3. All other goodness-of-fit statistics indicate that the model is an adequate fit of the sample data to the hypothesized model.

The study is now in a position to revisit the hypotheses developed for testing with the full latent structural model.

There were three main research questions to be answered through a structural model. The first question was, 'What is the SMS's relationship to Sensing?'. The hypothesis related to this question stated that, *H5: Sensing is positively and directly related to the SMS.* In light of the finding that SENSING'S β path to SMS is .361 and significant, support is therefore, found.

The second question was concerned with the SMS's relationship with Performance. The hypothesis related to this question stated that, *H6: SMS is positively and directly related to performance.* Given that it has been found that the β path from SMS to Performance is .711 and significant, support is found.

The third question is concerned with the SMS's relationship to Response and the hypotheses stated that, *H7: Sensemaking is positively and directly related to Response* and *H6a: Sensemaking's relationship to performance is mediated by response.* A strong positive β path has been indicated from SMS to Response (.684) lending support to H7. However, given that a non-significant and slightly negative path has been found from Response to Performance, support is not found for H6a.

7.6.1 Summary of Results

Table 7.29 presents the results of hypothesis testing. Overall the hypotheses were supported, with the exception of H5a: Sensing's relationship to Performance, which was found to be negative and not significant and H6a: Response mediating the relationship between SMS and Performance, which was also found to be negative and not significant.

Table 7.28 Summary of Hypothesis Testing and Results

	Hypotheses	Supported
H1	*SMS is a multidimensional construct consisting of 3 factors that co-vary: Organizational Identity, Organizational Memory and Social Interactions.*	YES
H1a	*SMS is a third-order hierarchical construct consisting of three lower order factors, Organizational Identity, Organizational Memory and Social Interaction and nine first-order factors.*	YES
H2	*Organizational Identity is a multidimensional construct consisting of 4 factors that co-vary: Organizational Objectives, Internal Marketing, Vision and Adaptability*	Partial Support
H2a	*Organizational Identity is a higher order construct consisting of 4 lower order factors: Organization Objectives, Internal Marketing, Vision and Adaptabilty.*	Partial Support
H3	*Organizational Memory is a multidimensional construct consisting of 3 factors that co-vary: Retrospection, Role Clarity and Utilization of Experience.*	YES
H3a	*Organizational Memory is a higher order construct consisting of 3*	YES

	lower order factors: Retrospection, Role Clarity and Utilization of Experience.	
H4	*Social Interaction is a multidimensional construct consisting of 4 factors that co-vary: Frequency, Richness, Diversity and Physical Environment.*	YES
H4a	*Social Interaction is a higher order construct consisting of 4 lower order factors: Frequency, Richness, Diversity and Physical Environment*	YES
H5	*Sensing is positively and directly related to the SMS..*	YES
H5a	*Sensing is positively and directly related to firm performance.*	NO
H6	*SMS is positively and directly related to performance*	YES
H6a	*SMS's relationship to performance is mediated by response*	NO
H7	*SMS is positively and directly related to Response*	YES

Figure 7.26 presents the final full latent structural model with β paths between variables indicated.

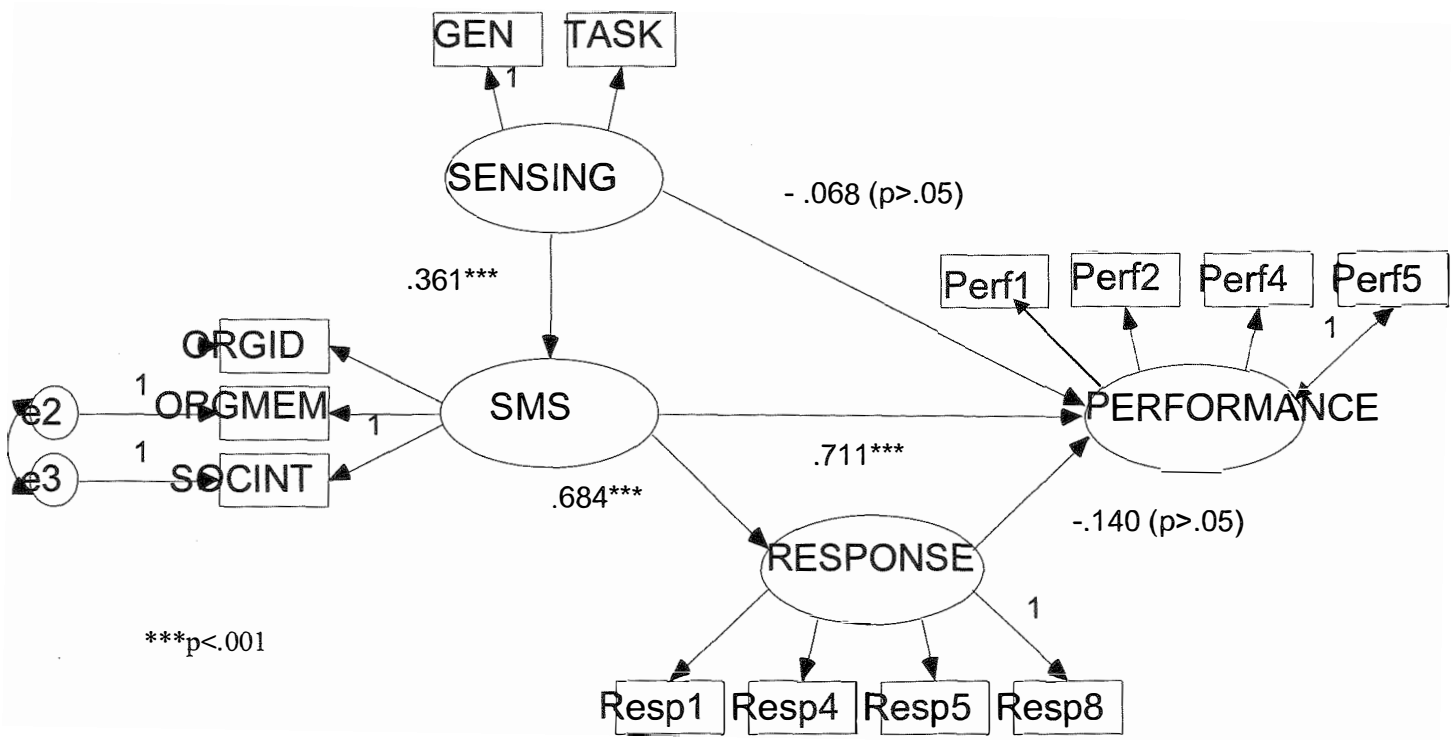

Figure 7.26 Final Full Latent Structural Model

7.7 CONCLUSION

This chapter reported the results of the data analysis for phase two of this research. First, the data were coded and cleaned. This data preparation stage found minimal missing data that did not impose a serious problem to analysis. Non-response bias was not statistically an issue, however the response rate (10.5%) will be considered carefully when drawing inferences from the research results.

After the data was prepared, preliminary analysis was conducted and a profile of respondents and their organizations was developed in terms of its representativeness of the sample to the population. SEM techniques using AMOS 5 were used to test the measurement and structural models developed during the literature review and exploratory research. The results of this analysis confirmed that the SMS acts as an interpretation and memory mechanism operating through social interaction processes in organizations, representing the organizational 'black box' of MIP. Finally, the research hypotheses were partially confirmed, confirmed and disconfirmed through the results of SEM. The implications of these results are discussed in the next and final chapter.

CHAPTER EIGHT: IMPLICATIONS AND CONCLUSIONS

8.1 INTRODUCTION

The purpose of this thesis is to contribute to marketing theory, by filling a gap in the literature that deals with organizational processes for interpreting and retaining market information, and the impact of these processes on the quality of information gathered, disseminated, coordinated for strategic response and ultimately, their impact on organizational performance.

To this end, the thesis set out to develop and test an holistic model of a SMS in organizations, using SM theory to link the SMS to information acquisition (Sensing) and Response behaviours and to evaluate the consequent relationships to organization performance. Congruent to this purpose, this research was designed to achieve the research objective, *"to determine how market information is processed for interpretation through SM behaviours in organizations and how this is related to organizational performance"*.

This final chapter reports the outcomes generated in response to the research objective and research questions. First, the research findings are compared and contrasted with the literature, highlighting similarities and departures and showing where the research advances the extant literature. Particular reference is made to the contributions of this thesis to a better understanding of the research problem. The implications of the findings for theory and practice are presented, followed by a discussion of the limitations of the study and recommendations for further research.

8.2 CONCLUSIONS ABOUT THE RESEARCH OBJECTIVE, RESEARCH QUESTIONS AND THE RESEARCH PROBLEM

It is important to note that the findings of this research are based on responses of interview and survey participants. Hence, the findings are

clearly grounded on the perceptions of these same participants, that is, the sense they made of questions asked, rather than objective measures.

This section outlines the contributions of the thesis by comparing the results of this research reported in chapters five and seven with the literature reviewed in chapters two, three and four. Each research question is addressed in turn, followed by conclusions about the research objective and problem.

8.2.1 Research Question One - How is SM operationalized in organizations?

Four main conclusions were derived from the findings about research question one.

The first conclusion relates to the construct of a SMS in organizations, its dimensions and their relationships to one another. The literature suggested that SM has seven properties (Weick 1995) and is comprised of a process whereby information is cycled through behaviours of acting, selecting and retaining (Weick *et al* 2005). SM is about the placement of stimuli into frameworks for understanding (Bettis, Mills, Williams and Nolan 2005; Thomas, Clark and Gioia 1993), using retrospective accounts and retained meanings (Weick 1979) to understand current events (Weick *et al* 2005). SM is also profoundly social and is an interactive process (Czarniawska-Joerges 1992; Hutchins 1991; Resnick, Levine and Teasley 1991; Weick and Roberts 1993) whereby organizations operate as systems of interdependent parts rather than independent elements (Slater and Narver 1998).

The findings of this research confirm the literature and suggest that SM, as it operates through the SMS, consists of interlinked cycles, as evidenced by high co-variation among all dimensions and sub-dimensions of variables in the model. The co-variation effects found in the model, also confirm the interdependent nature of organizational systems. The qualitative findings confirm the seven properties of SM and the overall findings suggest that the SMS reflects a single underlaying concept.

The findings also suggest that shared understanding about the organization's direction, acts as a framework for SM and that the past, when used to inform the present, contributes to organizational SM. Clarity of purpose (through roles and job expectations), also contributes to organizational SM and finally, evidence is found for the importance of social interaction processes, particularly as they impact upon roles, job expectations and utilizing experiences of tenured employees.

In summary, the findings support the hypothesis that SM in organizations operates through a SMS consisting of three dimensions and nine sub-dimensions and that these dimensions and sub-dimensions operate as interdependent parts. The findings confirm that all dimensions and sub-dimensions reflect a single underlying concept and that the Organizational Memory and Social Interaction dimensions, as constructed in this study, make a greater contribution to the SMS than does the Organizational Identity dimension. This finding implies that Organizational Memory and Social Interaction processes that support and are an outcome of each another, exert a stronger influence on the SM capacity of the organization than does Organizational Identity, helping to reduce ambiguity for organizational actors,.

The second conclusion relates to the construct of Organizational Identity, its sub-dimensions and their relationships to one another. The literature portrays Organizational Identity as those aspects of organizations that are core, distinctive and enduring (Albert and Whetten 1985). However, more recent studies suggest that Organizational Identity may be adaptable and open to change (Gioia *et al* 2000); that it may simultaneously display elements of stability and flexibility and that it is re-defined over time, both as the organization encounters new events (Gioia 1998) and through changes in its vision for the future (Gioia and Chittipeddi 1991).

This research found that Organizational Identity, as constructed in this study, operates through the organization's objectives communicated to

employees and that clear internal systems of communications about what is required of employees, engender overlapping understandings about the direction of the organization and its envisaged future.

These findings confirmed the literature, in that Organizational Identity was found to consist of aspects of the organization that were distinctive (objectives) with vision also being a part of Organizational Identity. However, some of the findings disconfirmed the literature as adaptability was not found to be a part of the Organizational Identity construct. One explanation for this finding is that management could choose to communicate changing objectives or changing vision as appropriate to changing circumstances. In this way, 'vision' and 'communicated objectives' potentially subsume both properties of stability and adaptability.

The findings also confirm the relationship between the two sub-dimensions of Organizational Identity, with communicated objectives and vision reflecting a single underlying concept. Communicated objectives was found to contribute slightly more to the Organizational Identity construct than did vision. This implies that in this study, 'communicated objectives' is seen as more important to established and establishing Organizational Identity than 'vision'.

The third conclusion relates to the construct of Organizational Memory, its sub-dimensions and their relationships to one another. The literature states that Organizational Memory is stored information from an organization's history brought to bear on current decisions (Walsh and Ungson 1991) and that the use of memory facilitates problem definition (Neustadt and May 1986), being retained in procedures, norms, people, culture and structures (Deshpande and Webster 1989; Homburg and Pflesser 2000; Katz and Khan 1976; Walsh and Ungson 1991).

The findings of this research confirm the literature. Organizational Memory was found to operate through elements that reflected the use of past experiences to inform current events (retrospect), clear roles and

expectations regarding those roles (role clarity) and the use and value of people with long tenure in the organization (tenure). The relationships between the three sub-dimensions of Organizational Memory suggest that they reflect a single underlying concept with all sub-dimensions contributing relatively equally to the construct.

The fourth conclusion relates to the construct of Social Interaction, its sub-dimensions and their relationships to one another. The literature states that SM is about social processes and activities (Weick 1995), that interaction forms the basis of all action in organizations (Turner (1988) and that meanings are made and sustained through social interaction (Walsh and Ungson 1991). Social interactions relay information in a variety of forms; richness (Eisenhardt 1990; Maltz, Souder, Kumar 2001), frequency (Daft and Lengel 1986; Maltz 2000) and diversity (Daft, Sormunen and Parks 1988) and are facilitated or constrained by the physical environment (Sommers 1969; Walsh and Ungson 1991) in which they occur.

The Social Interaction dimension was found to be comprised of four sub-dimensions reflecting frequent and informal interactions (frequency), personalized and face-to-face interactions (richness), interaction through a variety of sources and levels in the organization including the opportunity for expressions of varied perspectives (diversity) and finally, that convenience and ease of access to other organization members facilitated interactions (physical arrangements). The findings also confirm the relationship between the sub-dimensions of Social Interaction, reflecting a single underlying concept, with the richness and diversity sub-dimensions contributing slightly more to the construct than frequency and physical arrangements. This implies that rich and diverse social interactions make a greater contribution to SM – the reduction of ambiguity – in organizations than simple frequency and the physical context of those interactions.

8.2.2 Research Question Two – How is the SMS related to Sensing?

In the literature, Sensing is variously described, as information acquisition (Moorman 1995) intelligence gathering (Kohli and Jaworski 1990) and

scanning (Chun, 1999). The literature states that information acquisition activities are related to interpretive capabilities (Daft and Weick 1984) and that the more frequent (Hambrick 1982 Eisenhardt (1990) and more widely (Eisenhardt 1990) information is gathered, the more likely it will be that the organization will enjoy higher performance (Slater and Narver 1995).

It was found that there was a direct, positive and moderate relationship between Sensing, as constructed in this study (frequent and broad information gathering), and interpretive capabilities as measured by the SMS, but that there was no direct relationship between Sensing and Performance. One possible explanation for the moderate relationship to the SMS, as opposed to a strong relationship, is that the processes subsumed within the SMS construct, allow for the possibility that it does not rely on a constant flow of new information gathered from the marketplace. Rather, that existing information within the organization may be being used as raw material for re-interpretation through SM cycles. This was evidenced in the qualitative findings when managers talked about elaboration and embellishment of core information through further interpretation activities within the organization.

Contrary to the literature (Kohli and Jaworski 1993; Eisenhardt 1990; Daft *et al* 1988) which found positive links with performance, Sensing and Performance were not found to be directly related in the current study. One explanation for this may be that the literature measured acquisition and attention to information and linked this to Performance (Daft *et al* 1988), whereas in the current study, this notion of attention is being captured within the SMS construct. Additionally, interpretation was implied in alternative variables such as importance of particular information to the organization (Daft *et al* 1988), accessing rich information modes (Eisenhardt 1990) and intelligence dissemination (Kohli *et al* 1993), when linked to Performance.

8.2.3 Research Question Three – How is the SMS Related to Organizational Performance?

Research question three concerns the relationship between interpretation, as measured by the SMS and Performance in organizations. It also concerns investigating whether the relationship between the SMS and Performance is mediated by Response.

The literature states that SM reduces ambiguity and progressively clarifies situations by the fitting of information into some structure for understanding and action (Gioia et al 1991, 1996; Thomas *et al* 1993). When ambiguity is sufficiently reduced, action becomes possible through clearer comprehension of what to do or not to do (Weick *et al* 2005), this then shapes performance outcomes. MIP approaches in the literature (Day 1994b, 2002; Hult, Ketchen and Slater 2005; Kohli and Jaworski 1990; Moorman 1995) also state that higher levels of MIP act as a learning system enabling the organization to take better actions, thus resulting in better performance. The SMS operates as an MIP system in that it undertakes dissemination and interpretation activities (Baker and Sinkula 2002) providing the organization with higher quality processing which should lead to superior performance outcomes.

The SMS, as constructed in this research, was positively and directly related to Performance, however, its path to Performance was not found to be through Response. The direct relationship of the SMS to Performance was found to be strong, indicating that the SMS appears to be capturing much of the interdependent parts of a learning system that contributes to Performance in organizations. The non-significant findings associated with the indirect path of the SMS to Performance through Response, was not expected. One explanation is that past response may be bearing fruit in current performance; being captured in the SMS through earlier adaptations to objectives or role expectations for example. Another explanation is that, as the SMS is viewed as a learning system, 'action' may be occurring at micro levels in the organization and not being captured through the Response variable in the current study. For example, employees could be

learning through interaction with one another, and perhaps feedback directly from customers, that a particular sales approach is not effective and take corrective 'action' as the next transaction occurs. This is a form of 'Response' in that action occurs, but not at the strategic or senior management level, yet these micro 'actions' could have a positive impact on performance.

8.2.4 Research Question Four – How is the SMS Related to Organizational Response?

Research question four was concerned with the relationship of the SMS to Response.

The literature asserts a positive relationship between SM and Response through interpretation–action links (Hult *et al* 2005; Thomas *et al* 1993). SM aides in implementation, in that strategic decisions to respond are more likely to be implemented if founded upon some existing aspect of identity or memory (Kantrow 1986; Walsh and Ungson 1991).

The findings confirm the positive direct relationship between the SMS and Response in organizations. The qualitative findings showed that organization objectives dictated response. Rapid response, by managers sampled in the qualitative phase of the research, was deemed to be an implementation issue rather than a strategic issue. Respondents stated that, at times it was difficult to make adjustments to strategy when necessary. Immediate feedback was sought after response actions, with adjustments more frequently being made to objectives, rather than to the response once implemented. The findings of the quantitative research confirmed the literature with a strong positive relationship demonstrated between the SMS and Response in organizations.

The next section briefly summarizes how the findings have contributed to understanding the research problem.

8.2.5 Conclusion about the research problem – How is market information processed for interpretation in organizations?

Essentially this research found that the SMS acts as an interpretation – memory - learning system in organizations, being composed of dimensions that reflect Organizational Identity, Organizational Memory and Social Interaction. The high interaction effects demonstrated by the relationships between the three SMS dimensions indicate its interdependent nature and reflect a single underlying concept. The relative weights of the three dimensions in order of importance to the SMS were Organizational Memory and Social Interaction, followed by Organizational Identity. This implies that the SMS acts as an interpretation mechanism of market information through recall behaviours, clearly defined roles and utilization of tenured employees, which act as memory repositories for past organizational objectives and vision. Social Interactions cycle information and reduce ambiguity about roles, recall activities, including using history and experience, and facilitate the communication of objectives and organizational vision, creating interpretation and feedback mechanisms. These can be used by both employees and management, for example by management's adjustment of objectives and vision to fit in with current roles or experience or in reverse, as employees feedback to management that roles, recall behaviours and experience need adaptation for the organization to implement 'better actions'.

The SMS accounted for over 71% of Performance and over 68% of Response as measured in this study, while Sensing accounted for over 36% of the SMS's activities. In terms of the research problem, this means that market and marketplace information acquired by the organization contribute to performance, but only when interpreted through the SMS. Marketplace information acquisition by itself, is not linked to Performance in this research. Nor is Response linked to Performance directly, but rather strategic Response behaviours are an outcome of the operation of the SMS.

In summary, the SMS acts as an interpretation and memory system in organizations that leads to improved organization Performance. This occurs

by reducing ambiguities for organizational actors and enabling 'better actions'.

8.3 IMPLICATIONS OF THE STUDY

8.3.1 For Marketing Theory

The SMS constructed from an analysis of OL, MO, MIP and SM theories constitutes a representation of organizational SM processes that can account for the quality of interpretation and memory of marketplace information either externally acquired or internally generated. Because the SMS was not linked to Performance through measured strategic Response behaviours in this study, the nature of the SMS is such that it appears to be 'capturing' other micro actions that occur within the organization. Revealing the organization behaviours within the organizational 'black box', may allow an organisation to refine its SMS, such that market information is processed faster than its rivals and also allow the organization to continually improve its learning processes. These behaviours represent some of the key capabilities revealed by market-oriented organizations and may be important facilitators of competitive advantage through their proprietary nature.

The study revealed that the SMS was linked to strategic Response, therefore the nature of the SMS may be an important factor for implementation of marketing strategy. Implementing, supporting and fostering the SMS within organizations may imbue an organization with superior response capabilities in the face of market turbulence and reinforce a competitive advantage through faster and more effective marketplace response.

8.3.2 For SM Theory

SM theory has often been criticised for its unknowable and invisible operation. This research contributes to SM theory by making SM processes in organizations more visible through the articulation of a model of a SMS in organizations comprised of its constituent operands; Organizational Identity, Organizational Memory and Social Interaction. The SMS model also demonstrates the strengths and interdependent nature of these operands. Understanding these aspects of SM advances SM theory, in that it allows

SM processes to become more visible for theory development and offers a prescription for their effective implementation.

Related to SM theories are theories concerned with Organizational Identity, Organizational Memory and Social Interaction in organizations. First, as Organizational Identity is an emerging theoretical stream, this study advances understanding about its constituent parts and its interdependence on other aspects of SM in organizations. Having demonstrated that adaptability is not a part of Organizational Identity, but rather a concept that potentially operates upon Organizational Identity, also has implications for future Organizational Identity research. Second, this study contributes to Organizational Memory research by delineating its sub-dimensions and their interrelationships. Third, as the nature of Social Interaction in organizations has received scant attention in the literature, this study advances understanding about its sub-dimensions and their interrelationships. As interactions form the basis for all 'action' in organizations, this should prove to be a promising area for further research.

8.3.3 For Methodology

In addition to theoretical implications and contributions, the study also makes methodological contributions to the marketing management and SM literatures.

The present research represents one of few studies in the marketing literature where hierarchical modelling is used to test a complex phenomenon. This type of higher order modelling is more common in psychology and education research. Higher order modelling has some advantages over multidimensional covariance models as a structure is imposed on the model and tested, which results in regression weights being obtained for the lower order variables. These weights alert the researcher and practitioner to the relative contribution that each factor makes to a construct. This is particularly useful to managers for implementation purposes and to future researchers who may wish to investigate the underlying structures.

The second methodological contribution of the research is that the model is tested with a diverse sample (n = 283) that includes a representation of all business types that operate in a developed economy. This includes manufacturing and service businesses, consumer and industrial businesses, small, medium and large businesses, and regional and metropolitan contexts. The findings from such a sample may therefore be more generalizable, given the characteristics of the sample across business type, than a single industry sample.

8.3.4 For Management

In addition to the theoretical and methodological contributions, the research has important managerial implications.

The SMS construct was resolved as a multi-dimensional higher order construct in order to inform management of the behaviours indicated within a SMS in organizations. These behaviours reflect organizational activities undertaken when organizations and their members interpret market information. Many of these behaviours are able to be manipulated by management through careful arrangement of structures and procedures within organizations. For example, as Organizational Identity operates through 'Communication of Objectives' and 'Vision', with 'Communication of Objectives' being more important to Organizational Identity, management need to ensure that not only should objectives be formulated, but that they need to be communicated throughout the organization to support interpretation systems.

For Organizational Memory, reflecting on the past to inform the present and clarity of organizational roles as defined by managerial expectations may aide in strategic response and implementation. Additionally, the use of tenured employees to inform problem solving is equally important to Organizational Memory. Organizational Memory provides a relatively cheap informational resource that may be underutilized in many organizations; it contributes to the sense of 'what's going on here?' and, as it makes the greatest contribution to the SMS, it is the most important variable, therefore management should be aware of this when allocating

resources, communicating role expectations and creating procedures for operating.

As Organizational Memory is closely interdependent with Social Interaction in organizations, management must facilitate Social Interaction behaviours if Organizational Memory is to be fully utilized as a means of organizational SM. These two factors together make a greater contribution to the SMS than does Organizational Identity. This understanding has implications for resource allocation and managerial attention to these areas. By management attending to the organizational activities associated with Organizational Memory and the Social Interaction that supports it, Organizational Identity can be both reinforced and adapted to changing market conditions. And it is Organizational Identity that filters information and helps organizational members to ground their sense of 'what's going on here?'.

In addition to the managerial implications derived from the findings of the SMS construct, the structural relationships between the SMS and Sensing and between the SMS and Performance also contribute to management practice.

The first contribution to management practice is the finding that externally acquired information, may not be the only source of useful information to the organization. Some SM activities within the SMS are concerned with processing information that is not acquired externally, that is, alternative sources of information may be being generated internally. Past information exists within the SMS, embedded in Organizational Identity, Organizational Memory and in Social Interactions. It may be that this information is being used for interpreting current events, and that these dimensions of the SMS are acting as frameworks for re-interpretation and alignment and comparison of the past with the present. Existing knowledge embedded within the SMS is potentially an under utilized resource that can be managerially manipulated through more optimal social processes and attention to activities reflected by Organizational Identity and Organizational Memory. Making better *use* of existing informational resources may be a cost effective way to remain competitive. Additionally,

new information may be *under-utilized* without effective interpretation mechanisms operating through the SMS. Moreover, costly technology based knowledge management systems, may be better utilized through greater emphasis on the SMS, in particular as the SMS acts as an effective interpretation mechanism within the organization.

The second contribution to management is the finding that the SMS contributes to Response in organizations. Increasing the strength of the SMS may contribute to more effective response through increased implementation capabilities. When organization members are provided with a vision for the future, provided with clear objectives and procedures for achieving them, and when this message is communicated throughout the organization, with opportunities for sufficient interaction between members so that interpretation is possible, coordinated action can take place.

The third contribution to management is that the hierarchical SMS construct provides managers with a clear map of behaviours and activities that describes the system in detail. Interventions may be targeted to certain areas of the SMS as reflected by the relative weights and contributions that individual factors make to the system. These interventions could be about particular scale items of individual factors, or they could relate to the interrelationships between factors. This knowledge allows an understanding of how one dimension potentially influences another, thereby alerting management to early intervention. For example, if management knows that Organizational Memory is going to be lost through retrenchments and / or restructure, it can take remedial action to reinforce and perhaps increase Social Interaction, so that history is re-interpreted and Organizational Identity is both re-interpreted and reinforced through adaptations to communicated objectives and envisaged future.

8.4 LIMITATIONS OF THIS RESEARCH AND SUGGESTIONS FOR FUTURE RESEARCH

This research provides new insights into the operation of interpretation and memory mechanisms in organizations through a SMS. However, these

findings should be viewed in light of some limitations that warrant attention. This section addresses these limitations and forwards suggestions for future research.

The first limitation relates to the sample size of the qualitative research conducted. In-depth interviews were conducted with senior management of twelve Australian organizations selected for their heterogeneity and access to the phenomena being explored. It must also be emphasised that this sample size should be carefully considered when interpreting the results of the research. Clearly, in other contexts, with greater numbers of interviews, the findings may be different.

The second limitation relates to the context of the quantitative research, which was a diverse array of organizations operating in Australia with the key informants being senior management. Therefore, responses may not express the perceptions of other organization members and may not reflect the operation of the SMS throughout the organization. The use of multi-informant samples to increase reliability and validity has been addressed earlier, therefore, future research should consider data gathered from multiple informants within each organization and comparisons made between the expressed opinions of both management and employees. This would help to determine if there are differences in the construct of the SMS itself, and whether these differences between groups, have differential flow-on relationships to performance consequences.

The third limitation is related to the size of the sample used for the quantitative research (n=283). The sample size was considered 'large' by published standards as a sample of >200 satisfies the SEM data analysis technique. However, the complexity of the model/s meant that for the structural model in particular, a sample size of 830[11] cases would be required, were all parameters inputted as resolved for all measurement models. A remedy of partial aggregation applied to analysis overcame this issue to enable model fit. While sample size did not prove to be an

[11] This number is 166 (the number of measurement model parameters) multiplied by 5, which would satisfy Baumgartner and Homburg's (1996) rule of 5 cases per parameter.

impediment to model resolution and findings, future research using a much larger sample is suggested.

The fourth limitation, directly related to sample size, is the issue of non-response. In this research, an adjusted response rate of 10.5% was achieved. While there were no statistical differences determined between early and late respondents, nevertheless, almost 90% of those surveyed failed to respond. The responses received could be indicative of respondents who have a strong opinion on the research topic, or could indicate the presence of qualitative differences between respondents and non-respondents. Future research is required where a larger response rate is achieved.

The lack of relationship found between Response and Performance could be due to the cross sectional nature of the study. Response, as measured in this research, may not reflect current interpretations, as a time lag can plausibly exist between interpretations made within the SMS and Response implemented. One fruitful direction for future research would be to use data that measures interpretation processes in the SMS in year one, then Response and Performance in subsequent years.

Finally, another consideration regarding the use of Response in this research is that Response was used, as derived from MO studies that subsumed it as a factor in MO constructs. Given previous problems with Response as a sub-factor of MO, it may be advantageous in the future to test 'change' in products, services or strategy, rather than Response as has been tested here. An additional consideration is that Response, as measured in this research, may not be capturing the 'micro actions' occurring in the interpretation-action-learning sequence operating within the SMS. Exploration of the 'micro actions' through which SM is occurring, is also a fruitful area for further research.

8.5 CONCLUSION

This research provided a framework for understanding the complex array of interdependent organizational behaviours that reflect SM in organizations, a

SMS. The research also contributed by providing a structure for understanding how these MIP behaviours are related to Sensing, Response and Performance in organizations. The framework makes a contribution to knowledge, in that it is the first researched step toward articulating the 'gritty details of practice' and of opening the 'organizational black box'. The framework and structure were built from theory and empirical research, and provide a foundation for further research.

Table A.1 Forms of Image

Label	Definition in Literature	Representative Examples
Construed external image	*Organization members perception of how outsiders perceive the organization*	*Dutton and Dukerich (1991)* *Dutton, Dukerich & Harquail (1994)*
Projected image	*Image created by an organization to be communicated to constituents might or might not represent ostensible reality; singular image of the organization*	*Alvesson (1990)* *Bernstein (1984)*
Desired future image	*Visionary perception the organization would like external others and internal members to have of the organization sometime in the future*	*Gioia & Chittipeddi (1991)* *Gioia & Thomas (1996)*
Corporate identity	*Consistent and targeted representations of the organization emphasized through the management of corporate symbols and logos; strategically planned and operationally applied internal and external self representation*	*Olins (1989)* *Van Riel & Balmer (1997)*
Transient impression	*Short term impression constructed by a receiver either through direct observation or interpretation of symbols provided by an organization*	*Berg (1985)* *Grunig (1993)*
Reputation	*Relatively stable long term collective judgments by outsiders of an organizations actions and achievements*	*Fombrun (1996)* *Fombrun & Shanley (1990)*

Source: Adapted from Gioia *et al* (2000, 67).

Table A. 2 Memory Indicators

Memory Carriers	Memory Elements
Culture	*World Views, ideologies, norms/values, symbols, habits, myths/saga, rituals, work surroundings, expectations of customers*
Structure	*Communication channels, methods/techniques, task and steering groups, project/cross functional groups/task forces, discussion groups*
Systems	*Information systems, measuring systems, performance indicators, selection systems, education, training and instruction systems, intervention techniques, complaint settlement, appraisal and payment systems, financial systems, budget systems, control systems, data/graphs, forms/work prescriptions, documents/reports.*
Procedures	*Standard operation procedures, rules, sources for investigations, routines, product creation process*

Source: Adapted from van der Bent, Paauwe and Williams (1999, 379).

Figure A.1 Relationship Between Interpretation Modes and Organization Processes

Unanalyzable	Undirected Viewing	Enacting
ASSUMPTIONS ABOUT ENVIRONMENT	**Scanning Characteristics** 1. Data sources: external, personal 2. Acquisition: no scanning department; irregular contacts and reports; casual information **Interpretation Process** 1. Much equivocality reduction 2. Few rules, many cycles **Strategy and Decision Making** 1. Strategy: Reactor 2. Decision processes: coalition building	**Scanning Characteristics** 1. Data sources: external, personal 2. Acquisition: no department, irregular report and feedback from env'm't, selective information **Interpretation Process** 1. Some equivocality reduction 2. Moderate rules and cycles **Strategy and Decision Making** 1. Strategy: prospector 2. Decision processes: incremental and trial and error
	Conditioned Viewing	**Discovering**
	Scanning Characteristics 1. Data sources: internal, personal 2. Acquisition: no department although regular record keeping and information systems; routine information **Interpretation Process** 1. Little equivocality reduction 2. Many rules, many cycles **Strategy and Decision Making** 1. Strategy: Reactor 2. Decision processes: programmed, problematic search	**Scanning Characteristics** 1. Data sources: internal, impersonal 2. Acquisition: separate department, special studies and reports, extensive information **Interpretation Process** 1. Little equivocality reduction 2. Many rules, moderate cycles **Strategy and Decision Making** 1. Strategy: analyzer 2. Decision processes: systems analysis, computation
Analyzable	Passive	Active
	ORGANIZATIONAL INTRUSIVENESS	

Source: Daft and Weick (1984, 291).

Knowledge Generation in Australian Firms

A Survey of Managerial Knowledge Generation Practices.

Managerial Knowledge Generation Practices in Australian Business

A Project Investigating the Relationship between Managerial Knowledge Generation Practices and Performance in Australian Businesses.

A Doctoral Research Project conducted within The University of Newcastle

All Information will be strictly confidential – Your anonymity is assured

Please return the completed questionnaire by April 18th, 2003
In the reply paid envelope provided, or to the following address:

Kym Cowley
Newcastle Business School
University of Newcastle
University Drive, Callaghan NSW 2308

OR by FAX to
Attention: Kym Cowley
Facsimile Number: 02 4921 6911

Instructions

Please note the following before you begin:

1. Please be assured that your information is STRICTLY CONFIDENTIAL and YOUR ANONYMITY IS ASSURED.

2. Who should fill in the questionnaire?
   - We are inviting you the manager (or Chief Executive Officer) of the company to complete the questionnaire. If it is not possible for you to complete the survey, then another manager should complete it on your behalf. Completing the survey and returning it in the reply paid envelope provided, implies consent to use the supplied information in this study.

General Instructions:

3. It is important that you PLEASE ANSWER ALL QUESTIONS, even if some appear similar. The survey should take about 30 minutes to complete.

4. Answer the questions for the whole enterprise if your business is spread over several locations.

5. Most questions can be answered by circling the appropriate number – please read the questions and instructions for each question carefully.

6. If precise details are not possible, then your best estimate will suffice.

7. If you wish to make additional comments, please use the space provided at the end of the survey.

8. If you have any questions related to the questionnaire or any of the questions contained herein, please don't hesitate to contact Kym Cowley on:

   Phone +612 4921 7471
   Facsimile +612 4921 6911
   Email Kym.Cowley@newcastle.edu.au

9. If you have any questions or would like to know the outcome of this project please contact the supervisor, Dr. G. Pires at

   Newcastle Business School,
   University of Newcastle,
   Callaghan NSW 2308.
   Phone +612 4921 8698
   Email: Guilherme.Pires@newcastle.edu.au

10. If you have any concerns about the manner in which this research was conducted (Ethics Approval No: H-918-0600) please do not hesitate to contact the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308. Telephone +612 4921 6333.

SECTION 1: BUSINESS INFORMATION – INTERNAL ENVIRONMENT

The purpose of the following questions is to determine the internal strategies and structures that organizations use to process business information and to generate knowledge.

PLEASE CIRCLE THE NUMBER THAT BEST DESCRIBES YOUR EXTENT OF AGREEMENT WITH THE STATEMENTS.

PLEASE NOTE - IN THE FOLLOWING SECTIONS THE SCALES ARE TO BE INTERPRETED AS:

(1) Stongly Disagree (2) Disagree (3) Somewhat Disagree (4) Neither Disagree nor Agree
(5) Somewhat Agree (6) Agree (7) Strongly Agree

A-1	This organization has very clearly articulated objectives.	1	2	3	4	5	6	7
A-2	This organization has a strong identity.	1	2	3	4	5	6	7
A-3	Everyone in the organization knows what its objectives are.	1	2	3	4	5	6	7
A-4	Organizational members share a common understanding about the organization's identity.	1	2	3	4	5	6	7
A-5	This organization is unclear about its identity.	1	2	3	4	5	6	7
A-6	It is important that all organizational members understand what the company stands for.	1	2	3	4	5	6	7

B-1	Management ensures that everyone in the organization knows what the organizational objectives are.	1	2	3	4	5	6	7
B-2	This company has clear systems of internal communication that let all members of the organization know what its objectives are.	1	2	3	4	5	6	7
B-3	Management makes an effort through various means to 'sell' the organizational objectives to organizational members.	1	2	3	4	5	6	7
B-4	Management ensure that each division / department/ individual knows what they have to achieve as part of the overall organization objectives.	1	2	3	4	5	6	7
B-5	Management do not like to communicate organizational objectives freely throughout the organization	1	2	3	4	5	6	7
B-6	Communicating objectives to members of the organization is important.	1	2	3	4	5	6	7

C-1	We know the type of organization we want to become.	1	2	3	4	5	6	7
C-2	We are very clear about the future vision for the organization.	1	2	3	4	5	6	7
C-3	We know what we want to achieve in the long run.	1	2	3	4	5	6	7
C-4	We have a clear picture of an anticipated future.	1	2	3	4	5	6	7
C-5	People within the company share an image of where we will be in the future.	1	2	3	4	5	6	7
C-6	This company has no organizational vision.	1	2	3	4	5	6	7

D-1	We have no problem re-evaluating our objectives in the light of changing circumstances.	1	2	3	4	5	6	7
D-2	We can change our direction quickly if needed.	1	2	3	4	5	6	7
D-3	We have flexible internal systems that allow us to adapt our strategy where necessary.	1	2	3	4	5	6	7
D-4	We ensure that we change with the times.	1	2	3	4	5	6	7
D-5	We listen to all viewpoints.	1	2	3	4	5	6	7
D-6	We value performance feedback.	1	2	3	4	5	6	7
D-7	We are slow to adapt to changing conditions.	1	2	3	4	5	6	7

The next section makes statements about different problem solving processes and structures within firms.

PLEASE NOTE - IN THE FOLLOWING SECTIONS THE SCALES ARE TO BE INTERPRETED AS:

(1) Stongly Disagree (2) Disagree (3) Somewhat Disagree (4) Neither Disagree nor Agree
(5) Somewhat Agree (6) Agree (7) Strongly Agree

E-1	We try to connect current situations with experiences from the past.	1	2	3	4	5	6	7
E-2	We talk about past situations in order to understand today's.	1	2	3	4	5	6	7
E-3	When confronting a problem, we look for similar problems from the past.	1	2	3	4	5	6	7
E-4	We ask people in the organization if they have any past experience that may help us to understand a current situation.	1	2	3	4	5	6	7
E-5	When problem solving, we ask 'old hands' in the business to relate past similar situations.	1	2	3	4	5	6	7
E-6	We have good knowledge of past events in this organization.	1	2	3	4	5	6	7

F-1	We have clearly articulated job expectations here.	1	2	3	4	5	6	7
F-2	Most of the people here have clearly defined organizational roles.	1	2	3	4	5	6	7
F-3	People here know what is expected of them.	1	2	3	4	5	6	7
F-4	People here have a clear understanding of what is required to do their job.	1	2	3	4	5	6	7
F-5	There is confusion over role expectations here.	1	2	3	4	5	6	7
F-6	People here are unsure about the part they play in the organization.	1	2	3	4	5	6	7

G-1	We have lots of 'old hands' in this organization.	1	2	3	4	5	6	7
G-2	We utilise the experience of people in the organization with long tenure.	1	2	3	4	5	6	7
G-3	We value our people with long tenure in the organization.	1	2	3	4	5	6	7
G-4	People with long tenure in this organization can be obstructive to progress	1	2	3	4	5	6	7
G-5	Our 'old timers' are really useful for informing us about the past history of the organization.	1	2	3	4	5	6	7

G-6	We make good use of our historical records in this organization.	1	2	3	4	5	6	7

This section makes statements about social interactions within businesses.

PLEASE NOTE - IN THE FOLLOWING SECTIONS THE SCALES ARE TO BE INTERPRETED AS:

(1) Strongly Disagree (2) Disagree (3) Somewhat Disagree (4) Neither Disagree nor Agree
(5) Somewhat Agree (6) Agree (7) Strongly Agree

H-1	In this business, meeting rooms and offices are built in a style that supports interaction.	1	2	3	4	5	6	7
H-2	When we need to seek information from one another, we can get in touch easily.	1	2	3	4	5	6	7
H-3	Meetings spaces have been well provided for in this organization.	1	2	3	4	5	6	7
H-4	Accessing one another in this business is quite convenient.	1	2	3	4	5	6	7
H-5	We are able to meet with one another easily when required.	1	2	3	4	5	6	7
H-6	Provision has been made for opportunities to get together in this organization.	1	2	3	4	5	6	7

I-1	There are lots of opportunities for conversations in this business.	1	2	3	4	5	6	7
I-2	We have plenty of informal meetings in this business.	1	2	3	4	5	6	7
I-3	We have regular formal meetings in this organization.	1	2	3	4	5	6	7
I-4	We talk to one another frequently about organizational issues / problems.	1	2	3	4	5	6	7
I-5	It's hard to get together in this organization.	1	2	3	4	5	6	7
I-6	We don't meet often enough.	1	2	3	4	5	6	7

J-1	We have plenty of opportunities for face to face interactions here.	1	2	3	4	5	6	7
J-2	We value personalized interactions with one another.	1	2	3	4	5	6	7
J-3	We bump into one another frequently and talk informally.	1	2	3	4	5	6	7
J-4	For whatever reason, it is difficult to have personalized interactions here.	1	2	3	4	5	6	7
J-5	We share a common language in this organization.	1	2	3	4	5	6	7
J-6	We value face to face interaction.	1	2	3	4	5	6	7

K-1	There are lots of opportunities for different levels of people in this business to talk to one another.	1	2	3	4	5	6	7
K-2	We value the expression of alternative viewpoints.	1	2	3	4	5	6	7
K-3	We listen to the ideas of people from all levels in the organization.	1	2	3	4	5	6	7
K-4	We acquire varied and diverse information in our organization.	1	2	3	4	5	6	7
K-5	We interact with others who provide a variety of viewpoints.	1	2	3	4	5	6	7

K-6	There are opportunities for the expression of diverse opinions in this firm.	1	2	3	4	5	6	7
K-7	People from different levels in the organization never interact.	1	2	3	4	5	6	7

SECTION 2: BUSINESS INFORMATION – EXTERNAL ENVIRONMENT

The purpose of the following questions is to determine the profile of the environmental sectors that your business faces. Obviously your answers will be from your own and your firm's perspective. This is exactly what we are trying to capture so please use your own judgments here. The following broad definitions of each environmental sector are supplied for your convenience.

The competition sector –
Includes the firms and products that compete with yours,
Includes companies that make substitute products / services,
Refers to competitive tactics and actions between your firm and competing firms.

The supply sector –
Suppliers, both current and potential

The technological sector
Includes development of new production techniques and methods,
Innovation in materials and products
General trends in research and science relevant to your firm.

The economic sector –
Includes factors such as stock markets,
Rate of inflation,
Trade balance, federal and state budgets,
Interest rates, unemployment and economic growth rates.

The customer sector –
Refers to firms or individuals that purchase your products / services,
Includes firms that purchase for resale as well as final consumers.

The regulatory sector –
Includes federal and state legislation and regulations,
Includes local council and community policies,
Includes developments at all levels of government.

The sociocultural sector –
Comprises social values in the general population,
Work ethic,
Demographic and lifestyle trends.

PLEASE NOTE - THE SCALE IS TO BE INTERPRETED AS:

(1) No change from year to year (2) Only minimal changes (3) Slight change from year to year
(4) Some changes apparent (5) Moderate change from year to year (6) Rapid change from year to year
(7) Rapid and unpredictable change within a year

ıse rate the frequency with which you receive useful information from various rces. (Each are described below)

tress useful information to mean that it helps you to understand the environment and to plan firm actions. ;rial you receive and do not use should not be counted.

,ess than once a year	(2) About once a year	(3) Few times per year	(4) Monthly
Iore than once per month	(6) Weekly	(7) Daily	

ritten external sources – Journals, trade magazines, information services, reports, books newsletters, ;papers etc.

ITTEN EXTERNAL SOURCES – FREQUENCY RECEIVED							
Competition sector	1	2	3	4	5	6	7
Customer sector	1	2	3	4	5	6	7
Supply sector	1	2	3	4	5	6	7
Technological sector	1	2	3	4	5	6	7
Regulatory sector	1	2	3	4	5	6	7
Economic sector	1	2	3	4	5	6	7
Sociocultural sector	1	2	3	4	5	6	7

'ritten internal Sources – Special studies, reports, memos, intranet, MIS etc.

ıITTEN INTERNAL SOURCES							
Competition sector	1	2	3	4	5	6	7
Customer sector	1	2	3	4	5	6	7
Supply sector	1	2	3	4	5	6	7
Technological sector	1	2	3	4	5	6	7
Regulatory sector	1	2	3	4	5	6	7
Economic sector	1	2	3	4	5	6	7
Sociocultural sector	1	2	3	4	5	6	7

'ersonal external Contacts – business associates, officials, customers, trips etc.

RSONAL EXTERNAL CONTACTS							
1 Competition sector	1	2	3	4	5	6	7
2 Customer sector	1	2	3	4	5	6	7
3 Supply sector	1	2	3	4	5	6	7
4 Technological sector	1	2	3	4	5	6	7
5 Regulatory sector	1	2	3	4	5	6	7
6 Economic sector	1	2	3	4	5	6	7
7 Sociocultural sector	1	2	3	4	5	6	7

1) Less than once a year (2) About once a year (3) Few times per year (4) Monthly
5) More than once per month (6) Weekly (7) Daily

4. Personal Internal Contacts – salespeople, staff, subordinates etc

PERSONAL INTERNAL CONTACTS								
R-1	Competition sector	1	2	3	4	5	6	7
R-2	Customer sector	1	2	3	4	5	6	7
R-3	Supply sector	1	2	3	4	5	6	7
R-4	Technological sector	1	2	3	4	5	6	7
R-5	Regulatory sector	1	2	3	4	5	6	7
R-6	Economic sector	1	2	3	4	5	6	7
R-7	Sociocultural sector	1	2	3	4	5	6	7

SECTION 3: RESPONSE

This section examines the responsiveness of your firm to information about changing environmental conditions.

(1) Strongly Disagree (2) Disagree (3) Somewhat Disagree (4) Neither Disagree nor Agree
(5) Somewhat Agree (6) Agree (7) Strongly Agree

S-1	In this firm we are able to respond to marketplace changes promptly.	1	2	3	4	5	6	7
S-2	It takes us a long time to decide how to respond to competitors' strategic changes.	1	2	3	4	5	6	7
S-3	We are slow to respond to marketplace changes.	1	2	3	4	5	6	7
S-4	We are capable of making quick changes to our strategies if required.	1	2	3	4	5	6	7
S-5	We are good at anticipating change in the market.	1	2	3	4	5	6	7
S-6	For one reason or another we tend to ignore our competitors' strategic changes.	1	2	3	4	5	6	7
S-7	We periodically review our strategic efforts to ensure they are in line with market needs.	1	2	3	4	5	6	7
S-8	We can implement changes to strategy with a minimum of fuss.	1	2	3	4	5	6	7

SECTION 4: ASPECTS OF BUSINESS PERFORMANCE

The following items refer to aspects of your firm's performance.

Please indicate the degree to which your company has been successful in achieving the following outcomes in the last three years.

(1) Very Unsuccessful (2) Unsuccessful (3) Somewhat Unsuccessful
(4)Neither Successful nor Unsuccessful (5) Somewhat Successful (6) Successful
(7) Very Successful

S-1	Achievement of Financial Objectives	1	2	3	4	5	6	7
S-2	Achievement of strategic objectives	1	2	3	4	5	6	7
S-3	Achievement of overall target customer satisfaction	1	2	3	4	5	6	7
S-4	Achievement of overall mission	1	2	3	4	5	6	7
S-5	Overall performance	1	2	3	4	5	6	7

SECTION 5: GENERAL FIRM CHARACTERISTICS

In which industry do you operate? *(Please tick the most appropriate description).*

Agriculture Forestry, Fishing & Hunting	Mining
Manufacturing	Electricity, Gas & Water Supply
Construction	Wholesale Trade
Retail Trade	Accommodation, Cafes & Restaurants
Transport and Storage	Communication Services
Finance and Insurance	Property & Business Services
Government Administration & Defence	Education
Health & Community Services	Cultural & Recreational Services
Personal & other Services	Other (Please specify)

Number of Full time employees (or equivalent) in your firm?

1. Less than 20	2. 21 -30	3. 31 - 40	4. 41 – 50	5. 51 - 60
6. 61 – 70	7. 71 - 80	8. 81 - 90	9. 91 - 100	10.. More than 100

What is your current position within the company?

How long have you been working for this business?

List two or three distinctive things that your firm does in regard to the collection of information for strategic purposes.

List two or three distinctive things that your firm does in relation to processing information for knowledge generation.

there anything distinctive about decision making and strategy implementation in your business?

Are there any other issues you would like to comment about related to knowledge generation practices in your firm?

Thankyou very much for your valuable time and assistance.

Faculty of Business and Law
Newcastle Business School

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Monday, July 16, 2007

Information Statement for the Research Project:

Managerial Knowledge Generation Practices in Australian Firms

To the Manager / Chief Executive Officer
Dear Sir / Madam,

You are invited to take part in the research project identified above which is being conducted by Ms. Kym Cowley from Newcastle Business School, University of Newcastle, Australia as part of her PhD program under the supervision of Dr. Guilherme Pires.

The purpose of the research is to investigate some of the organizational processes through which marketplace information is transformed into knowledge and then used for decision-making and organizational action. Previous research has shown that organizations that collect lots of marketplace information, seem to enjoy higher performance. However, conflicting research also shows that some firms may simply make better use of the information they collect. In this case, information becomes transformed through organizational processes into useful knowledge. These are the processes being investigated.

Your participation in this study involves completing the survey enclosed and returning it in the reply paid envelope (to Newcastle Business School, University of Newcastle, University Drive, Callaghan NSW 2308) by 30th November 2003. The survey should take about 30 minutes to complete.

All information is strictly confidential and anonymity is assured. It is not possible to identify either you or your organisation from your responses.

Your organisation has been selected because of its membership of a business chamber in Australia. You have been approached because the combined business chambers represent multiple industries and various sized Australian firms. Your address has been sourced through the web site of Australian Business Limited, http://www.australianbusiness.com.au/

Participation in this research is entirely voluntary. Completion of the survey and returning it to the researchers implies consent to use the information in the study.

The data collected will be aggregated for analysis. The final analysis will be presented in Ms. Cowley's thesis, reported in marketing and management journals as well as presentations at international conferences. The completed surveys will be stored safely at the University of Newcastle and only the researchers identified above, will have access to the surveys.

Please read this information statement and familiarize yourself with its contents. If there is anything you do not understand, if you have questions, or if your require feedback concerning the outcomes of this project, please don't hesitate to directly contact the members of the research team. It is anticipated that results will be available by June 2004.

We hope that you will support this very important research project; your participation is highly valued.

Dr. Guilherme Pires Ms. Kym Cowley

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-918-0600.

Should you have any concerns about your rights as a participant in this research, or if you have any complaints about the manner in which the research is conducted, it may be given to the researcher or if an independent person is preferred, to the University's Human Research Ethics Officer, Research Branch, Chancellery, University of Newcastle, 2308. Telephone (02) 4921 6333, Email: Ethics@newcastle.edu.au

Descriptives of Main Variables – Means, Standard Deviations & Intercorrelations

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
SENSE	283	100.0%	0	.0%	283	100.0%
RESPONSE	283	100.0%	0	.0%	283	100.0%
PERFMEAN	283	100.0%	0	.0%	283	100.0%
IDMEAN	283	100.0%	0	.0%	283	100.0%
OMMEAN	283	100.0%	0	.0%	283	100.0%
SOCIALME	283	100.0%	0	.0%	283	100.0%

Descriptives

			Statistic	Std. Error
SENSE	Mean		4.3806	.04192
	95% Confidence Interval for Mean	Lower Bound	4.2981	
		Upper Bound	4.4631	
	5% Trimmed Mean		4.3880	
	Median		4.3800	
	Variance		.497	
	Std. Deviation		.70527	
	Minimum		2.04	
	Maximum		6.13	
	Range		4.09	
	Interquartile Range		.8482	
	Skewness		-.099	.145
	Kurtosis		.384	.289
RESPONSE	Mean		4.8155	.04434
	95% Confidence Interval for Mean	Lower Bound	4.7282	
		Upper Bound	4.9028	
	5% Trimmed Mean		4.8433	
	Median		4.8889	
	Variance		.556	
	Std. Deviation		.74599	
	Minimum		2.11	
	Maximum		6.33	
	Range		4.22	
	Interquartile Range		1.0000	
	Skewness		-.600	.145
	Kurtosis		.465	.289

PERFMEAN	Mean		5.4335	.05446
	95% Confidence Interval for Mean	Lower Bound	5.3263	
		Upper Bound	5.5406	
	5% Trimmed Mean		5.4959	
	Median		5.6667	
	Variance		.839	
	Std. Deviation		.91610	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.0000	
	Skewness		-1.293	.145
	Kurtosis		2.729	.289
IDMEAN	Mean		5.6009	.05125
	95% Confidence Interval for Mean	Lower Bound	5.5001	
		Upper Bound	5.7018	
	5% Trimmed Mean		5.6497	
	Median		5.7600	
	Variance		.743	
	Std. Deviation		.86212	
	Minimum		2.60	
	Maximum		7.00	
	Range		4.40	
	Interquartile Range		1.0800	
	Skewness		-.889	.145
	Kurtosis		.727	.289
OMMEAN	Mean		5.1158	.04093
	95% Confidence Interval for Mean	Lower Bound	5.0353	
		Upper Bound	5.1964	
	5% Trimmed Mean		5.1436	
	Median		5.2222	
	Variance		.474	
	Std. Deviation		.68858	
	Minimum		2.00	
	Maximum		6.67	
	Range		4.67	
	Interquartile Range		.8333	
	Skewness		-.763	.145
	Kurtosis		1.225	.289

Descriptives

SOCIALME	Mean		5.5071	.04697
	95% Confidence Interval for Mean	Lower Bound	5.4147	
		Upper Bound	5.5996	
	5% Trimmed Mean		5.5607	
	Median		5.6800	
	Variance		.624	
	Std. Deviation		.79017	
	Minimum		2.12	
	Maximum		6.88	
	Range		4.76	
	Interquartile Range		.9200	
	Skewness		-1.145	.145
	Kurtosis		2.059	.289

Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average(Definition 1)	SENSE	3.2482	3.5893	3.9286	4.3800	4.7768	5.3446	5.6750
	RESPONSE	3.4444	3.8889	4.3333	4.8889	5.3333	5.6667	5.8889
	PERFMEAN	3.6667	4.1667	5.0000	5.6667	6.0000	6.3333	6.5000
	IDMEAN	3.8880	4.3600	5.1600	5.7600	6.2400	6.6000	6.7600
	OMMEAN	3.8444	4.1667	4.7222	5.2222	5.5556	5.9222	6.1000
	SOCIALME	4.0960	4.5120	5.1200	5.6800	6.0400	6.3600	6.5920
Tukey's Hinges	SENSE			3.9375	4.3800	4.7723		
	RESPONSE			4.3333	4.8889	5.3333		
	PERFMEAN			5.0000	5.6667	6.0000		
	IDMEAN			5.1600	5.7600	6.2200		
	OMMEAN			4.7222	5.2222	5.5556		
	SOCIALME			5.1200	5.6800	6.0200		

Extreme Values

			Case Number	Value
SENSE	Highest	1	38	6.13
		2	133	6.07
		3	48	6.01
		4	49	5.89
		5	64	5.85
	Lowest	1	167	2.04
		2	243	2.37
		3	26	2.54
		4	282	2.63

Descriptives

		5	275	2.72
RESPONSE	Highest	1	31	6.33
		2	198	6.33
		3	47	6.22
		4	112	6.22
		5	158	6.22
	Lowest	1	119	2.11
		2	270	2.56
		3	114	2.67
		4	88	2.67
		5	278	2.78
PERFMEAN	Highest	1	91	7.00
		2	112	7.00
		3	130	7.00
		4	178	7.00
		5	182	7.00(a)
	Lowest	1	78	1.00
		2	88	1.83
		3	136	2.50
		4	158	2.67
		5	185	2.83
IDMEAN	Highest	1	11	7.00
		2	49	7.00
		3	112	7.00
		4	150	7.00
		5	167	7.00
	Lowest	1	151	2.60
		2	270	2.68
		3	88	2.92
		4	166	3.16
		5	281	3.32
OMMEAN	Highest	1	167	6.67
		2	6	6.50
		3	11	6.44
		4	150	6.39
		5	203	6.39
	Lowest	1	12	2.00
		2	151	3.06
		3	270	3.22
		4	194	3.28
		5	88	3.39
SOCIALME	Highest	1	71	6.88
		2	82	6.76
		3	112	6.76
		4	150	6.76
		5	167	6.76
	Lowest	1	12	2.12

Descriptives

2	151	2.44
3	270	3.04
4	95	3.12
5	191	3.16

Only a partial list of cases with the value 7.00 are shown in the table of upper extremes.

Tests of Normality

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SENSE	.052	283	.065	.990	283	.051
RESPONSE	.089	283	.000	.976	283	.000
PERFMEAN	.130	283	.000	.917	283	.000
IDMEAN	.113	283	.000	.948	283	.000
OMMEAN	.091	283	.000	.969	283	.000
SOCIALME	.102	283	.000	.933	283	.000

Lilliefors Significance Correction

SENSE

SENSE Stem-and-Leaf Plot

```
 Frequency    Stem &  Leaf

     4.00 Extremes    (=<2.6)
     6.00        2 .  778
    14.00        3 .  222334&
    57.00        3 .  55566666777788888999999999
    81.00        4 .  000000011111112222222233333333444444444
    72.00        4 .  555555555666666666777777777788888899
    25.00        5 .  00011122333&
    21.00        5 .  555667778
     1.00        6 .  &
     2.00 Extremes    (>=6.1)

 Stem width:      1.00
 Each leaf:       2 case(s)

 & denotes fractional leaves.
```

RESPONSE

RESPONSE Stem-and-Leaf Plot

```
 Frequency    Stem &  Leaf

     5.00 Extremes    (=<2.8)
     1.00        2 .  &
     9.00        3 .  2344&
    21.00        3 .  5677788888
    49.00        4 .  0000111112223333344444
    61.00        4 .  555555555666666677777777788888
    88.00        5 .  00000001111111111112222222223333333333344444
    36.00        5 .  55555666666777778
```

Descriptives

```
   13.00        6 .  00123

 Stem width:      1.00
 Each leaf:       2 case(s)

 & denotes fractional leaves.
```

PERFMEAN

PERFMEAN Stem-and-Leaf Plot

```
 Frequency    Stem &  Leaf

    12.00 Extremes    (=<3.5)
     9.00        3 .  6888
    13.00        4 .  000133
    29.00        4 .  55566688888888
    50.00        5 .  00000000111111333333333
    76.00        5 .  555555555556666666666666666888888888888
    70.00        6 .  0000000000000000011111113333333333
    18.00        6 .  55555668
     6.00        7 .  000

 Stem width:      1.00
 Each leaf:       2 case(s)
```

IDMEAN

IDMEAN Stem-and-Leaf Plot

```
 Frequency    Stem &  Leaf

     8.00 Extremes    (=<3.6)
    10.00        3 .  7899&
    13.00        4 .  012334
    30.00        4 .  56666777888899
    38.00        5 .  00011222223344444
    85.00        5 .  555555566666666677777778888888888888899999
    58.00        6 .  00000001111122222222333444444
    36.00        6 .  55555566667777889
     5.00        7 .  00

 Stem width:      1.00
 Each leaf:       2 case(s)

 & denotes fractional leaves.
```

OMMEAN

MMEAN Stem-and-Leaf Plot

```
Frequency    Stem &  Leaf

    5.00 Extremes    (=<3.4)
    3.00        3 .  555
    4.00        3 .  6777
    8.00        3 .  88889999
   11.00        4 .  00000111111
    8.00        4 .  22233333
   14.00        4 .  44455555555555
   31.00        4 .  6666666666666666777777777777777
   24.00        4 .  888888888888888889999999
   28.00        5 .  0000000001111111111111111111
   42.00        5 .  222222222222222222222233333333333333333333
   38.00        5 .  44444444444444555555555555555555555555
   30.00        5 .  666666666666666777777777777777
   16.00        5 .  8888888889999999
   11.00        6 .  00000001111
    7.00        6 .  2222333
    2.00        6 .  45
    1.00        6 .  6

Stem width:      1.00
Each leaf:       1 case(s)
```

SOCIALME

SOCIALME Stem-and-Leaf Plot

```
Frequency    Stem &  Leaf

   10.00 Extremes    (=<3.4)
    2.00        3 .  99
    4.00        4 .  0011
    7.00        4 .  2222223
    7.00        4 .  4444455
   17.00        4 .  66666666666677777
    8.00        4 .  88888899
   21.00        5 .  000000000000000111111
   22.00        5 .  2222222222222223333333
   28.00        5 .  4444444444444444444445555555
   48.00        5 .  666666666666666666666666677777777777777777777777777
   33.00        5 .  888888888888888888999999999999999999
   21.00        6 .  000000000000000111111
   28.00        6 .  2222222222222233333333333333
   13.00        6 .  4444444445555
   13.00        6 .  6666666777777
    1.00        6 .  8

Stem width:      1.00
Each leaf:       1 case(s)
```

Correlations Main Variables

Descriptive Statistics

	Mean	Std. Deviation	N
SENSE	4.3806	.70527	283
RESPONSE	4.8155	.74599	283
PERFMEAN	5.4335	.91610	283
IDMEAN	5.6009	.86212	283
OMMEAN	5.1158	.68858	283
SOCIALME	5.5071	.79017	283

Correlations

		SENSE	RESPONSE	PERFMEAN	IDMEAN	OMMEAN	SOCIALME
SENSE	Pearson Correlation	1	.265(**)	.052	.216(**)	.116	.139(*)
	Sig. (2-tailed)	.	.000	.382	.000	.051	.019
	Sum of Squares and Cross-products	140.270	39.315	9.496	37.030	15.882	21.850
	Covariance	.497	.139	.034	.131	.056	.077
	N	283	283	283	283	283	283
RESPONSE	Pearson Correlation	.265(**)	1	.383(**)	.627(**)	.454(**)	.521(**)
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000
	Sum of Squares and Cross-products	39.315	156.931	73.784	113.720	65.703	86.675
	Covariance	.139	.556	.262	.403	.233	.307
	N	283	283	283	283	283	283
PERFMEAN	Pearson Correlation	.052	.383(**)	1	.508(**)	.360(**)	.414(**)
	Sig. (2-tailed)	.382	.000	.	.000	.000	.000
	Sum of Squares and Cross-products	9.496	73.784	236.663	113.093	64.042	84.511
	Covariance	.034	.262	.839	.401	.227	.300
	N	283	283	283	283	283	283
IDMEAN	Pearson Correlation	.216(**)	.627(**)	.508(**)	1	.596(**)	.671(**)
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000
	Sum of Squares and Cross-products	37.030	113.720	113.093	209.598	99.795	128.877
	Covariance	.131	.403	.401	.743	.354	.457
	N	283	283	283	283	283	283
OMMEAN	Pearson Correlation	.116	.454(**)	.360(**)	.596(**)	1	.667(**)
	Sig. (2-tailed)	.051	.000	.000	.000	.	.000
	Sum of Squares and Cross-products	15.882	65.703	64.042	99.795	133.710	102.284
	Covariance	.056	.233	.227	.354	.474	.363
	N	283	283	283	283	283	283

Descriptives

SOCIALME	Pearson Correlation	.139(*)	.521(**)	.414(**)	.671(**)	.667(**)	1
	Sig. (2-tailed)	.019	.000	.000	.000	.000	.
	Sum of Squares and Cross-products	21.850	86.675	84.511	128.877	102.284	176.070
	Covariance	.077	.307	.300	.457	.363	.624
	N	283	283	283	283	283	283

:orrelation is significant at the 0.01 level (2-tailed).
ɔrrelation is significant at the 0.05 level (2-tailed).

Descriptives

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