FORESIGHT COMPETENCE AND THE STRATEGIC THINKING OF STRATEGY-LEVEL LEADERS

Submitted in fulfilment of the degree of Doctor of Philosophy

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CERTIFICATION OF DISSERTATION

I declare that the work presented in the thesis is, to the best of my knowledge and belief, original and my own work, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

Signature of Candidate Date

ENDORSEMENT

Signature of Supervisor/s Date

DEDICATION

To my parents

Jan van der Laan and

Catharina Sophia Maria van der Laan

For their life-long support, belief and love

To my wife

Shu-Fang van der Laan

For your steadfastness, belief and enduring love

To my children

Lucas and Sophia

For being so incredible and the source of so much love and joy

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My spiritual font of strength and blessings, God our Father and Jesus Christ my Lord.

My wife for her absolute dedication to this journey. Her profound love and enduring support.

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My friend Ramadan Kanan, who every step of the way provided the wisdom and inspiration to keep on taking one step at a time.

ABSTRACT

Leadership of organisations are currently faced by what are termed ‘post normal’ times. This is marked by complexity, flux and contradictions in all aspects of the operating environments within which the organisations function. Prior research notes that the lack of strategic thinking capabilities are regarded as the greatest challenge facing organisational leaders in the manufacturing sector of Australia. Further research regards this challenge to extend beyond the manufacturing sector in Australia but is likely a global challenge. Building organisational leadership capacity, especially in terms of strategy, requires new ways of thinking that have been identified in the literature as consisting of five elements of strategic thinking. In addition, the concept of foresight is a desirable organisational core-competence yet remains largely misunderstood and empirically under-studied. The concepts of foresight competence, foresight styles, decision styles, orientation to time and strategic thinking are further closely associated to competitive advantage and sustainability. Understanding how these concepts are related to each other and to effective organisational strategy-making, and what demographic characteristics of strategy-level leaders are positively associated with them, is regarded as critically important. Given these gaps in the literature the research problem investigated by this study is: *How and to what extent are foresight competence and the strategic thinking of strategy-level leaders associated within the context of organisational strategy-making?*

This research problem has not been empirically investigated in any depth and there has been a dearth of prior research related to the concepts of foresight competence and strategic thinking. This study has integrated influential related studies in a transdisciplinary approach and the conceptual framework of the study aligns the constructs and measures in order to address the following research issues:

> *RI 1: Is foresight competence positively associated with the strategic thinking of strategy-level leaders?*
> *RI2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?*
> *RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation’s strategy-making mode?*

In order to address the research issues a quantitative two-step methodology was adopted. Firstly, the pilot study included input from a panel of experts which together with a pilot survey helped to build on and refine the conceptual framework and data collection instruments respectively. Secondly a web-based survey methodology measuring foresight styles, orientation to time, decision styles and strategy making was used to collect primary data. The sample consisted of strategy level leaders from Australian and South African organisations. The data was analysed utilising multivariate data analysis techniques including exploratory factor analysis, confirmatory factor analysis, multiple regression analysis and structural equation modelling. Hypotheses at both the lower- and higher-order factorial level were tested including hypotheses related to the effect of interaction terms.

The results confirmed that foresight competence and strategic thinking in strategy-level leaders are distinctive constructs and these constructs are positively related. Foresight

competence was found to precede strategic thinking in the strategy process. The interaction terms of age, level of education, exposure to futures or foresight education and industry experience were found have an effect on the relationship between the constructs. The analytical aspects of the strategy-level leaders' strategic thinking in terms of strategy-making in the organisation were found to be positively related. However, it emerged from the results that the creative aspects of strategic thinking were negatively associated with the strategy-making processes of the organisations as represented by the sample.

The results confirmed that the classical, linear and deliberate approach to strategy is still predominant. It further confirmed that strategic thinking is still largely elusive in the practise of strategy and does represent a challenge to strategy-level leaders. Within the context of ambiguous and dynamic environmental change, and the imperative of sustainable organisational development, the study highlights the concern that strategy is generally practised at the expense of the generative and creative aspects of strategic thinking.

The main contribution of this research was to develop and refine a conceptual framework that illustrated and is the first rigorously tested model of the empirical relationships between the constructs of foresight competence and strategic thinking, and organisational strategy-making processes. The influence of leader demographic characteristics, in terms of the Strategic Leadership theory, contributed to the literature in this regard. It represents and important insight into the confluence between leaders' cognitions abilities and the rational strategy-making processes typically employed by organisations.

Publications arising from this Dissertation

- van der Laan, L 2009, 'Foresight and the strategic thinking of strategy level leaders: IFR pilot study report', Institute for Futures Research, University of Stellenbosch, Cape Town
- van der Laan, L 2009, 'Foresight competence and strategic thinking in ENGEN Petroleum Company strategy-level leadership', ENGEN Pty (Ltd), Cape Town
- van der Laan, L 2008, 'The imperative of strategic foresight to strategic thinking', *Journal of Futures Studies*, vol. 13, no. 1, pp. 21-42.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

We are currently in a time described as ‘post normal’, marked by complexity, chaos and contradictions (Sardar 2009). ‘Post normal times’ are sustained by these characteristics and lead to increased uncertainty for those responsible for an organisation’s future direction and leads to “different types of ignorance that make decision making problematic” (Sardar 2009, p. 1). Having foresight is regarded as a leadership competence that allows strategy-level leaders to overcome such challenges especially in terms of their strategic thinking and strategic decision making (Day, G. & Schoemaker 2008; Hamel 2009; Hamel & Prahalad 1994).

Leaders are increasingly called upon to creatively challenge change and exploit inconsistency, innovation, complexity and ethically sound directions for the long- and short-term strategic directions of their organisations in order to overcome these types of ignorance (de Geus 1997). Leadership is increasingly values and needs driven rather than typically short term profit-orientated only (Burke 2006; van der Laan 2008). Studies of leadership repeatedly refer to the need of leaders to creatively anticipate the future while encouraging participation in the creation of shared visions and the alignment of the whole organisation to such visions of the future (Kouzes & Posner 2002). It is suggested that leaders should be predominantly future-orientated in the everyday work they do (Kouzes & Posner 2002). In practise, the formulation of strategy is associated with a leader’s foresight and strategic thinking with both concepts featuring prominently in the academic consideration of what constitutes ‘creatively anticipating the future’ and driving organisational strategy.

Leaders are required to be future-driven with developed hybrid competencies which include futures foci (Buchen 2005). Different approaches to thinking about the future of their organisations are utilised by individuals and typically include relying on past experiences, intuition and imagining the future (Tonn & MacGregor 2008). It could be argued that similarly, these approaches are linked to the individuals' orientation to time, their style of thinking about the future and their eventual strategic decision-making.

Strategic leadership and decision-making has emerged as a primary indicator of organisational performance and sustainability (Finkelstein & Hambrick 1996). Yet what constitutes effective strategic leadership in terms changing values and competencies required to achieve this, requires further research (Hambrick 2007). Strategy as developed by an organisation's leaders is only meaningful in relation to interrogating the future (Narayanan & Fahey 2004, p. 38) and as such is the focus of this study. Foresight (Cunha, M. P. E. 2004, p. 133; Whitehead in Tsoukas & Shepherd 2004b, p. 2) and strategic thinking (Bonn 2001; Goldman 2007; Liedtka 1998) have been acknowledged as a critical inputs of effective strategy and organisational success.

Bonn (2001) refers to studies of senior executives among the 100 largest manufacturing companies in Australia who identified a lack of strategic thinking as the main problem facing the organisation. Similarly, Garrat (1995) refers to research by the Institute of Directors in London where over 90% of directors and executives had not been exposed to developmental interventions whose purpose is to enhance their thinking in terms of organisational strategy formulation. Garrat asserts that this percentage would likely hold true in "Europe, East Asia, Australia, New Zealand and the United States" (Garratt 1995, p. 242).

Foresight (Tsoukas & Shepherd 2004b) and strategic thinking (Goldman 2007) are linked to organisational sustainability which has dramatically become an imperative of organisational leadership, strategy and effective decision making. Sustainability is inexorably related to the future and how leaders perceive the future as this informs their decisions aimed at the sustainability of the organisation and the enabling of innovation to make this possible.

Foresight and strategic thinking, while frequently referred to in contemporary literature, are not adequately differentiated. This study seeks to conceptually clarify and operationalise the concepts of foresight competence and strategic thinking. It examines whether there is a statistically significant relationship between an individual’s orientation to time (Fortunado & Furey 2009), their foresight styles (Dian 2009; Gary 2008) as indicators of foresight competence, and their decision making style (Rowe & Boulgarides 1994) as an indicator of their strategic thinking within the context of formulating strategy.

1.2 Background to the Study

Competence in strategy is regarded as fundamental to effective organisational leadership (Boyatsis 2008; Boyatzis, Richard E. 1982; Courtney 2001; Day, G. & Schoemaker 2008) in much the same way as it is linked to conjectures of how the future may unfold (Narayanan & Fahey 2004). According to Alfred North Whitehead, foresight competence, is regarded as a vital characteristic of competent organisational decision making (Tsoukas & Shepherd 2004b). Despite agreement on the importance of foresight competence, failure of organisational strategy remains very predominant (Kaplan & Norton 2005) and may be associated with a lack of foresight competence and strategic thinking at leadership level.

Day & Schoemaker (2008) indicate that their research shows that 97% of surveyed companies lack the competence to anticipate future surprises. This illustrates that the inability to anticipate future conditions may be linked to the failure of organisational strategy and is likely exacerbated by rapidly changing environmental conditions. Strategy research has identified foresight as key in enabling leaders to creatively anticipate the future of organisations (Courtney 2001). More specifically, foresight competence is seen as one of three primary qualities of being an effective leader which in turn “greatly influence(s) their organisation’s capacity for vigilance”, thinking strategically and understanding how the future may unfold (Day, G. & Schoemaker 2008).

Strategic thinking precedes strategic decision making in organisations (Tavakoli & Lawton 2005). Decision making is a fundamental process of all organisations and the quality thereof influences the effectiveness of the leaders (Leonard, Nancy H, Scholl & Kowalski 1999a) and the performance of the organisation. Citing various studies, Bronn et al (1999, p. 356), indicate that a key characteristic of strategic thinking is the competence to think prospectively and act pro-actively. Both strategic thinking and strategic decision making are regarded by this study as tasks; the task of thinking which precedes the task of decision making and are linked to the ability to anticipate possible futures.

Strategic thinking offers leaders and their organisations the opportunity to move beyond the traditional application of strategy, primarily in terms of intended strategy, to identify and achieve breakthrough emerging strategies (Mintzberg 1995). Foresight, or “the ability to create and maintain a high quality, coherent and functional forward view and to use the insights arising in organisationally useful ways” (Slaughter, Richard A 1998, p. 382) has been linked to strategic thinking (Voros 2003), or “a particular way of solving strategic problems and opportunities at the individual and institutional level combining generative and rational thought processes” (O' Shannassy 2005). By investigating the relationship between these two concepts related to organisational strategy, this thesis will seek to provide insights as to how these concepts and their underlying constructs are linked.

Poorly constructed strategies can expose leaders’ inability to anticipate possible future conditions. Due to environmental and market flux, leadership’s emphasis on effective strategy is often downplayed in favour of avoiding the probability of ‘getting it wrong’. This features as one of the predominant obstacles to thinking about the future (Gelatt 1993) and strategic thinking in general.

Although strategy is critical to business success (de Geus 1997; Finkelstein & Hambrick 1996; Goldman 2007; Goll & Rasheed 2005; Hamel & Prahalad 2005), leaders seem either reluctant or cannot engage meaningfully in terms of the thinking that is required to anticipate the future. The reasons for this may be manifested in an incomplete understanding or lack of competence, and therefore confidence, on the part of leaders. Understanding the relationship between the temporal orientation of individuals, their knowledge foundations, experience and skills cumulatively (Boyatzis, R E 2008), are posited as indications of their competence. Understanding how these are related to how they anticipate the future within the organisational strategy context may provide meaningful answers to the problem.

The core competence view of strategy asserts that an organisation’s competitive advantage is an outcome of the organisation’s core competence to drive effective strategy (Hamel & Prahalad 1994). These core competences arise from the combination of individuals’ competences in the firm and thereby its capabilities, with a strong emphasis on the leadership of the organisation (Major, Asch & Cordey-Hayes 2002).

Competences can be derived from exposure to certain knowledge foundations through the elements of education (Sanchez 2004), experience and values (Boyatsis 1982). These point toward the characteristics of the decision maker and in this study their moderating effect on the relationship between the strategy-level leader’s foresight competence and strategic thinking (Hambrick & Mason 1984). In terms of Strategic Leadership theory these characteristics can function as proxy indicators which allow for the prediction of the strategic decisions that leaders make and their predicted effectiveness (Finkelstein & Hambrick 1996).

Although much has been written about foresight and strategic thinking, and their link to strategic leadership, there is a lack of quantitative empirical research related to these concepts (Gary 2009). Specifically, studies of foresight as related to the task of strategic thinking among strategy-level leaders are rare (Bonn 2001). The consequences of this to the development and practise of strategic leadership are that the contributing factors that enhance such competencies remain overlooked and misunderstood (Hambrick 2007).

1.3 Purpose

The purpose of the study is to investigate the conceptual relationship between the foresight and strategic thinking of strategy-level leaders. The study will explore how individuals’ orientation to time and styles of perceiving the future are related to their decision making in the context of organisational strategy. The study will further evaluate the effect of the age, education, experience of the strategic leader characteristics on this relationship and the formulation of strategy. The study’s apriori assertion is that foresight competence is positively associated with the strategic decision making (Cuhls 2003).

The study will be eclectic, drawing from the related fields of management, psychology, leadership and futures research. Its purpose is to develop a conceptual model of how the concepts are related and provide an epistemological foundation for further explanatory, interpretive and critical studies.

The study will confirm the factor structures of the operational measurements of foresight competence, strategic thinking and the strategy making processes of organisational strategy. It will investigate whether individuals' orientation to time (TS) (Fortunado & Furey 2009) and their foresight styles (FS) (Dian 2009; Gary 2008) are empirically associated and adequately measure the foresight competence construct. The study will further investigate the relationships between the Analytic and Conceptual Decision Styles (Rowe & Boulgarides 1994) of strategy-level leaders in order to determine whether they adequately measure the strategic thinking construct. These associations between these main constructs within the context of the strategy making modes (White 1998) of organisations are then investigated.

In summary, the purpose of the study is to answer the research question and research issues and thus contribute to the extant theory and literature in this regard.

1.4 Research question

Subsequent to an extensive review and synthesis of literature related to the background described above (for a detailed review see Chapter 2), the overall purpose of the research is to answer the following question: *How and to what extent are foresight competence and the strategic thinking of strategy-level leaders associated within the context of organisational strategy-making?*

Research Issues:

RI 1: Is foresight competence positively associated with the strategic thinking of strategy-level leaders?

RI2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?

RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?

1.5 Objectives

Main objective:

To examine individuals' orientation to time, how this relates to their foresight styles and adequately represents the construct of foresight competence as associated with the Analytic and Conceptual decision styles within the context of the strategic thinking construct and organisational strategy-making processes. The moderating effect of demographic strategic leadership predictor variables such as age, education, experience and strategy roles will also be investigated.

Sub-objectives:

1. To investigate the conceptual links between orientation to time, foresight style and construct of foresight competence of strategy-level leaders.
2. To investigate the conceptual links between the Analytic and Conceptual decision-making styles and construct of strategic thinking of strategy-level leaders.
3. To investigate the empirical relationship between foresight competence and strategic thinking as moderated by pre-determined leaders' demographic.
4. To investigate how strategic thinking in strategy-level leaders is related to the strategy making processes of organisational strategy.

1.6 Contribution

1.6.1 Contribution to theory

There is a dearth of research investigating foresight as a competence albeit that foresight is referred to extensively in the literature (Gary 2009). A Google Scholar search with the keyword "foresight" yielded 179000 scholarly references to the term. An empirical investigation of foresight and its relationship with strategic thinking is elusive if it exists at all.

The concepts of foresight and strategic thinking is under researched yet promises to yield valuable insights related to the 'black box' (Finkelstein & Hambrick 1996) of strategy making. Conceptual clarifications of foresight and strategic thinking are required prior to investigating the relationship between the concepts as they are often used erroneously and interchangeably in certain literatures (refer Chapter 2). This thesis contends that by examining this relationship, identified gaps in the literature will be addressed specifically in terms of a) the conceptualisation and operationalisation of foresight and strategic thinking b) providing greater insights in terms of leader's temporal orientation and cognitions related to strategic decision making, c) a sound theoretical and empirical basis for further interpretive and critical research in this regard.

Calls for further research include investigating the impact of leader characteristics on the content of strategy (Hambrick 2007), and the relationship between orientations of leaders to the future and strategic decision making (Das 2004). Boyatsis (2008) notes that there are few studies that investigate improvements to desirable behaviour as related to the development of competencies. The study will also seek to address this gap.

The study will further conduct confirmatory factor analysis (CFA) of the scales used in the quantitative instrumentation namely; the TimeStyle Inventory (TSI), the Foresight Styles Assessment (FSA), the Decision Making Style Inventory (DSI) and the Strategy Making Processes Scale (SMP).

The study establishes and tests a model of the effects of foresight competence on the strategic thinking of strategy-level leaders and how this is associated with the strategy making mode of the organisation. This model has not previously been proposed and presented and as such contributes to theory based on its analysis and conclusions.

Effective strategic thinking as a source of competitive advantage is critical to organisational longevity (de Geus 1997; Hamel & Prahalad 1994). Understanding foresight as a critical competence of leadership effectiveness (Cuhls 2003; Hamel & Prahalad 1994) and how it relates to strategic thinking not only contributes to the literature in this regard but also provides helpful insights to practitioners.

1.6.2 Contribution to practise

The study provides potential benefits to practitioners that have practical implications for organisations. These may be related to leadership development initiatives, recruitment guidelines, the practise of strategy in the organisation and change management.

Aspects related to the enhancement of the practise of strategy at the level of the practitioner will be clarified and provide insights that are beneficial to the organisation and management of human resources specifically in terms of developing organisational core-competency. The strategy-as-practise (S-A-P) perspective asserts that strategy is a dynamic activity fulfilled by individuals rather than just being regarded as a property that organisations have (Jarzabkowski, P., Balogun & Seidl 2007). The S-A-P perspective has a research foci related to the development of the strategy practitioner. There have been recent calls for further research relating to the development of competencies of strategists and to revert from the recent focus on research at an organisational level to questions at the individual level of the practitioner (Whittington & Mantere 2008). Accordingly, the proposed research will seek to contribute to the S-A-P perspective in this regard as related to strategy as an activity fulfilled by individuals and how this is related to the development of the strategist.

In summary, the study could yield benefits for organisational leaders, human resource and strategy practitioners by providing a clear understanding of how individual foresight competences, strategic thinking and the formation of strategy can be enhanced in order to develop more dynamic and effective processes of strategy formation.

1.7 Overview of the concepts

Competence: Definitions of a competence vary, primarily in terms of the use of terminology relating to whether a competence is a capability or whether capabilities, abilities and competencies are different concepts. The arguments related to the latter will be explored in detail in the literature review of the study. For the purposes of this study a competence is defined as an *individual's ability and made up of particular skills that support an underlying intent* (Boyatzis, R E 2008; Sanchez 2004). Conclusions to this effect are contemporary and supported by empirical studies (Boyatzis, R E 2008; Boyatzis, R E & Saatcioglu 2008; Rhee 2008; Sanchez 2004).

Foresight: Foresight has been identified as a core competency in leaders and organisations (de Geus 1997; Hamel & Prahalad 1994; Major, Asch & Cordey-Hayes 2002). Definitions of foresight have varied (Amsteus 2008) but are all concerned with perceiving how the future could develop, implications of such change and taking pro-active steps to achieve preferable alternatives in the future.

Foresight includes perceiving, analysing, acting in time, processing information, acting with provident care and implementing actions that will seek to achieve preferable future visions (Amsteus 2008). This study will define foresight as a *human ability to creatively envision possible futures, understand the complexity and ambiguity of systems and* *provide input for the taking of provident care in detecting and avoiding hazards while envisioning desired futures.* Foresight competence can therefore be regarded as the ability to act accordingly. Amsteus (2008) argues that the existence of foresight competence in individuals is measurable according to these behaviours.

To practice foresight in organisations is "to be trained in futures concepts, to become more future orientated at the fundamental levels of values, beliefs and philosophies" (Nanus 1977, p. 195). Individual foresight competence can be further developed by being exposed to discourse on foresight concepts, its methods and application (Alsan 2008) and the moderating effect of foresight formal education will be controlled for in the study.

Strategic thinking: In a review of strategic thinking literature O'Shannassy (2005, p. 14) defines strategic thinking as a particular way of solving strategic problems and opening up opportunities at the individual and institutional level combining generative and rational thought processes. Mintzberg (1995) describes strategic thinking as a synthesis involving intuition and creativity in an individual's cognitions related to strategy. Strategic thinking is seen as having to be both analytical and creative in terms of these cognitions (Raimond 1996). This is expanded to five elements in a model proposed by Liedtka (1998) and are: Intent focus; thinking in time; hypothesis driven; systems perspective, and; intelligent opportunism. Following from this, strategic thinking has been distilled into three main elements at the individual level: "a holistic understanding of the organisation and its environment, creativity and visioning" (Bonn 2001).

For the purposes of this study, strategic thinking is defined as *a synthesis of systematic analysis (rational) and creative (generative) thought processes that seek to determine the longer-term direction of the organisation*.

Strategy-making modes: White (1998) developed a conceptual framework that described the strategy-making styles of strategy-level leaders that are pervasive in organisations. These are cumulatively described as the strategy-making modes of the organisation. The framework describes the strategy-making styles of upper management as a reflection of the strategic decisions taken by these strategy-level leaders. Strategy-making modes are regarded by this study *as the most pervasive mode of making strategy in an organisation as a reflection of the strategy-level leaders' strategy-making styles.*

1.8 Methodology

This section introduces the methods used in the collection and analysis of data required to fulfil the purpose of this research and answer the research question adequately. Full details of the research design, strategy of enquiry and data analysis are provided in Chapters 3 and 4.

1.8.1 Purpose of the study

The purpose of the study is to investigate whether foresight competence is positively associated to strategic thinking in strategy-level leaders within the context of organisational strategy and to what extent leaders' demographic characteristics moderate this relationship. The study consists of a quantitative methodology conducted within the post-positivistic knowledge paradigm. The research approach and design is justified in detail in Chapter 3.

1.8.2 Research Design

The study is primarily exploratory and partly descriptive. The strategy of enquiry included the utilisation of an online survey questionnaire in order to collect primary data in two phases (see Chapter 3).

A pilot study included the submission of a draft questionnaire to experts for feedback and evaluation. Thereafter the pilot study administered an online administration of the survey, which included feedback from the panel of experts, to Master's degree graduates from the Institute of Futures Research at the University of Stellenbosch Business School. The pilot study feedback and data was analysed and served to a) validate the scales included in research instrument, b) collate and integrate feedback from respondents related to the content, c) gain an understanding of the data characteristics, and d) test the efficiency and effectiveness of the online administration of the survey.

The second phase of the study included the collection of primary data and included any amendments arising from phase one. The target populations included strategy-level leaders (as defined in Chapter 2) from Australian and South African organisations. Non-random purposive sampling was utilised following the principles of sampling theory namely; avoidance of bias in the selection, and the attainment of maximum precision as related to available resources (Kumar 1996). A more detailed description of this method is provided in Chapter 3. Descriptive and inferential data analysis methods were performed on the survey data. Descriptive statistics were generated in order to transform the raw data into data suitable for further analysis and in a form that would provide greater information to describe and summarise the information related to the sample (Zikmund 2003). An inferential analysis was used in order to conduct exploratory factor analysis (EFA), confirmatory factor analysis (CFA) of the scales used and test the structural equation model (SEM) proposed by the study utilising AMOS software using maximum likelihood estimation (Hair et al. 2006). The study further adopted multiple regression analysis to test for the associations between the lower order factorial structures and investigate the moderating influence of interaction terms on the hypothesised relationship between foresight competence and strategic thinking. These analyses are justified and described in greater detail in Chapters 3 and 4.

In short, a quantitative method was utilised to conduct the study in two phases of data collection for this study. The primary data was analysed and interpreted in order to answer the research question of the study.

1.9 Delimitations of the scope of the study

The study will primarily focus on an individual's orientation to time and how this translates into their style of engaging the future as a strategy practitioner as an indication of their foresight competence. The study will further consider their strategic thinking and how they interact with strategy in an organisational context. In this regard it should be noted that the definition of strategy is contestable and varies significantly in the literature (Mintzberg 1994; Porter 1996) which will delimit the study in terms of its interpretation and is outlined in Chapter 2.

The differentiation between praxis (what), practise (how) and practitioners (who) of strategy is well established in the strategy as practise (S-A-P) field (Whittington 1996) and are helpful in delimiting this study. A research focus of the S-A-P field is exploring how practitioners strategise, in particular, what formative processes enhance strategy making (Jarzabkowski, P., Balogun & Seidl 2007). "If learning is a holistic and prolonged process concerned with the strategist's own identity building, then formal education can play its part alongside the formative experiences of coping with the practical problems of everyday life" (Whittington & Mantere 2008, p. 10). Education levels and exposure to foresight related formal education will be incorporated as interaction terms whose effect, if any, on the relationships of the main constructs will be examined. Literature points toward bifurcations related to the concept of education, specifically in terms of learning. The scope of this study is unable to investigate these bifurcations. For the purposes of the study formal education as a leader characteristic is regarded as the teaching and learning of knowledge in a formal mode. In addition to education levels the study seeks to include an observation of the possible effect of the strategy-level leader's exposure knowledge foundations, methods and application of foresight concepts where indicated by the respondent.

Foresight is regarded as an innate human trait (Hayward 2003) common to all but varying in the knowledge it creates. It is recognised that it can be developed (Hayward 2005) and that this is regarded as foresight as part of the development of self. This is differentiated from foresight as a process, which is defined as a skilled procedure of "developing a range of views of possible ways in which the future could develop, and understanding these sufficiently well to be able to decide what decisions can be taken today to create the best possible tomorrow" (Horton 1999). This study is concerned with foresight as a concept related to the individual or "self" rather than the foresight process.

The study of foresight from a futures research perspective includes a number of interpretive and critical approaches to the concept and includes a number of bifurcations. Rather than being embedded in this critical paradigm, the study's eclectic approach will review the current discourse and seek to contribute to the quantitative empirical foundations required for further interpretive and critical work. It is therefore posited that the study does not fall into the discipline of futures research, if indeed it can be classified as a discipline composed of rigid boundaries. Rather, as Sardar (2010) asserts one should seek to contribute to the conceptual, methodological and academic discourse of futures perspectives. It is within this approach that this study is entrenched.

The sample will be drawn from strategy-level leaders in Australia and South Africa. Chapter 2 will define what constitutes the parameters of being classified as a 'strategy-level leader' as drawn from the extant literature and supported by theory. The populations of both countries are regarded as generally homogeneous (Abratt, Nel & Higgs 1992) in relation to their approaches to organisational strategy (see Chapter 3). As such, a cross-cultural comparative study will not be included in the scope of the study although it could be argued that the socio-economic and political differences of the country populations would support such a specific cross-cultural study. Despite this delimitation, the sample's demographic characteristics will be compared and test this assumption through triangulation. These include the age, gender, level and type of education, experience, industry affiliation and level of interaction with strategy as control variables which in addition to the statistical results related to the proposed associations between the constructs, will provide an insight as to the viability of this assumption.

The study will not investigate the relationship between effective strategy and organisational performance. This relationship has already been empirically investigated and it was concluded that effective strategy does result in increased organisational performance (Goll & Rasheed 2005; Morgan & Strong 2003). This is, in part underpinned by the Strategic Leadership theory (Hambrick 2007). The study's focus is at the level of the individual and relates only to the organisation in terms of the individual's interaction with organisational strategy.

While the scope of the study is limited as described above, it is posited that the study will make significant contributions to theory and practise.

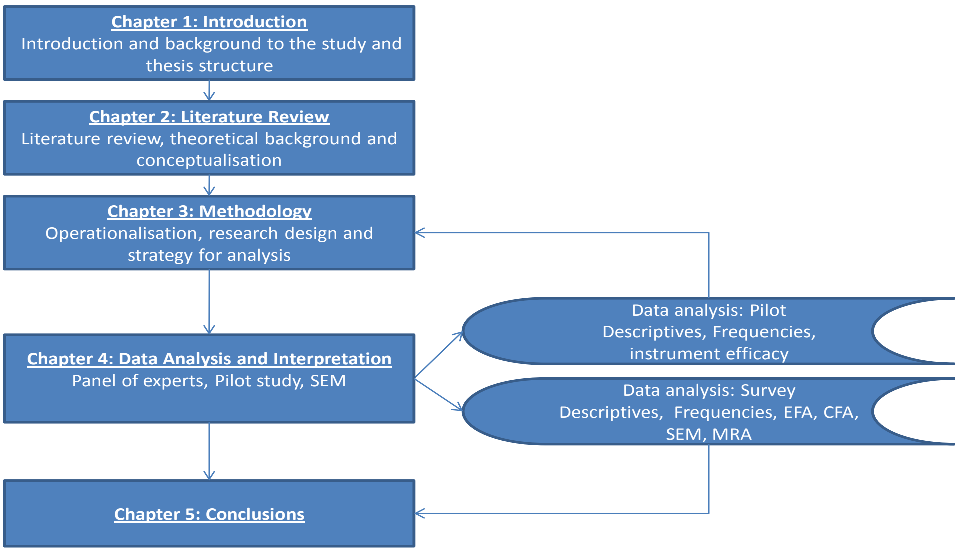
1.10 Thesis structure

This thesis began by providing a background to the study into the relationship between foresight competence and strategic thinking. It has five chapters as described by Perry (2008).

This Chapter provides an overview of the thesis. It describes the background of the research and includes the justification for the research, the research problem and issues, the methodological approach and the study's delimitations. Chapter 2 is based on an extensive literature review of the parent disciplines of strategy and leadership, and then focuses on the theories and related principles of competence based management, foresight competence and strategic thinking. From the findings the conceptual framework is developed and supported.

Based on the literature review and resulting framework, a methodology for the research is presented in Chapter 3, providing the rationale for the research design, the method for selecting the sample, the data collection strategy and data analysis techniques. The data collected by the online survey is then presented, analysed and examined in Chapter 4 as related to the research issues and hypotheses. The thesis culminates in Chapter 5 by outlining the conclusions as related to the research problem and issues. The unique contribution to knowledge and practise deduced from the research outcomes is then discussed. Limitations of the study and recommendations for future research conclude Chapter 5. Figure 1.1 provides the overall structure of the thesis based upon the methodology employed.

Figure 1.1: Overall thesis structure



Source: Developed for this research.

1.11 Conclusion

The first chapter of this thesis provided a brief overview of this research project. The background to the research was presented and highlighted the research problem and research issues to be addressed by the study. Definitions of the core concepts used in the study were described. The research methodology adopted by the study was then presented as were the delimitations of its scope and structure of the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

There is general agreement that strategy is only meaningful with reference to the future (Tsoukas & Shepherd 2004b) and is a future orientated process (Costanzo & MacKay 2009). It is concerned with the desirable outcome of being able to envision the position of the organisation in the future and plan accordingly so as to gain maximum advantage. Jarzabkowski, quoting Hamel, indicates that despite the long record of research into strategy formulation, a valid theory of how strategy is created is still lacking or underdeveloped (2005). In terms of the praxis of strategy, two concepts relating to creating strategy are addressed by this thesis; foresight competence and strategic thinking. How do these concepts relate and how are they operationalised within the context of the praxis of making strategy?

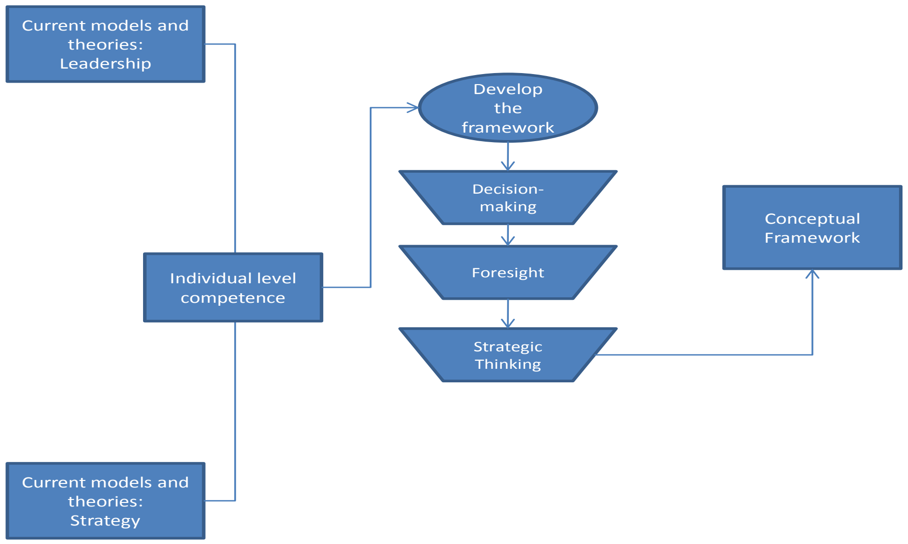
Foresight is unique and “highly valued human capacity that is widely recognised as a major source of wisdom, competitive advantage and cultural renewal” in organisations (Chia 2004, p. 21). Fayol stated that ‘looking ahead’ was critical to management, and that “if foresight was not the whole of management, then at least it is an essential part of it” (in Costanzo & MacKay 2009, p. 1). Greenleaf stated that “foresight is the lead that a leader has. Once leaders lose this lead and events start to force their hand, they are leaders in name only” (2002, p. 40). Whitehead noted at Harvard University that foresight was a crucial feature of a competent business mind (Tsoukas & Shepherd 2004b). This is a sentiment echoed by a number of proponents of the resource-based view of strategy (Hamel & Prahalad 1994) strategic leadership theory (Schwandt & Gorman 2004) and those arguing for greater foresight in leadership (Day, G. & Schoemaker 2008; de Geus 1997; e Cunha, Palma & da Costa 2006). Ahuja, Coff and Lee (2005) conclude that all the major theories of competitive advantage indicate the imperative of foresight in management. The relationship between foresight and organisational strategy needs to be clarified.

Similarly, strategic thinking is described as preceding strategic planning as a stage in the strategy creation process (Bonn 2001; Mintzberg 1994). Sound strategy development is reliant on strategic thinking (Gluck, Kaufman & Walleck 2000). Mintzberg further asserts that strategic thinking is the task of "developing an integrated perspective of the enterprise" using intuition and creativity in terms of the decision makers cognitions (Mintzberg 1994, p. 12). Bonn concludes that strategic thinking can be developed as an organisational core-competency that is the basis of sustainable competitive advantage (Bonn 2001). Hamel and Prahalad (1989), as proponents of the resource-based view of strategy refer to strategic thinking as 'crafting strategic architecture' and that strategy is driven by the gap between the current position of the organisation and its intent for the future (Hamel & Prahalad 1994). The latter authors also refer to foresight in their work thus indicating a differentiation in concepts.

The differentiation between strategic thinking and the competence of foresight is important. It is argued below that an individual's competences, or abilities to complete a task and fulfil underlying intentions in completing the task (Boyatsis 1982; Boyatsis & Saatcioglu 2008; Rhee 2008; Sanchez 2004) differs from the task itself. Although overlapping in parts, this chapter will provide theoretical support for the assertion that the concepts of foresight competence and the task of strategic thinking differ but are strongly related. This differentiation will illustrate more clearly the relationship between the praxis of strategy, its tasks and how this is related to the competence of foresight as preceding the 'crafting of strategic architecture' requiring strategic thinking. Similarly, the chapter will illustrate that orientation to time and foresight styles are reliable indicators of foresight competence and that strategic thinking is reflected in the style of an individual's decision making and the strategy making modes of an organisation.

This study is designed to investigate to what extent foresight competence is related to the task of strategic thinking prior to formulating organisational strategy. The following literature review provides an overview of the strategy and leadership fields in how they relate to the concepts of foresight and strategic thinking. The thesis will take an eclectic, trans-disciplinary approach in reviewing the literature in this regard. A convergence of the two fields is represented by the field of decision-making as a cognitive process that reflects how leaders behave strategically. As notable parts of strategy praxis and the competencies of leaders, foresight and strategic thinking are then reviewed and operationalised in order to provide insight as to the study's questions, hypothesis development and empirical analysis. Figure 2.1 illustrates the development of the study's conceptual framework.

Figure 2.1: Development of conceptual framework



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2.2 Strategy

2.2.1 Conceptualising strategy

Following on from the management breakthroughs in the early 20th century, strategy and strategic management in particular has been the source of significant academic endeavours. However, after some 40 years, there is still no commonly accepted theory of strategy (Jarzabkowski, P. 2005; Markides 1999). Rather, there have been differing perspectives of strategy, or views, which have dominated the strategy discourse.

From the origins of strategic management research, most notable by Chandler (1962), Ansoff (1965) and Andrews (1971), the concept of strategy has evolved and given rise to differing perspectives of what strategy entails. Probably due to its pluralistic nature and broad application, strategy is difficult to define but is nevertheless regarded as "a significant social practise in the contemporary world" (Whittington et al. 2003, p. 397).

There is no express consensus as to its definition (Jarzabkowski, P. 2005; Porter 1996). In an attempt to derive an underlying definitional consensus of the field Nag, Hambrick and Chen concluded that the it is "held together by agreement on basic definition and purpose, but is also engaged in a wide and ever-shifting range of theoretical and practical explorations" (2007, p. 950). The implicit definition resulting from their analysis was that "the field of strategic management deals with the major intended and emergent initiatives taken by general managers on behalf of its owners, involving utilisation of resources, to enhance the performance of firms in their external environments" (Nag, Hambrick & Chen 2007). This, however, does not fully address the concerns of system theorists who argue that national diversity in the understanding of what strategy meansThe number of concepts and frameworks do continue to increase (Hutzschenreuter & Kleindienst 2006) but as Nag et al. note "the same forces that create dissensus in a field also paradoxically provide grounds for consensus and commonality" (2007, p. 950).

Many of these perspectives overlap and while seemingly at odds, the different perspectives provide greater insights than the adherence to a single perspective could (Hutzschenreuter & Kleindienst 2006). Strategy concepts and discourse has always been recognised as interdisciplinary (Nerur, Rasheed & Natarajan 2008). It is not limited to research of management related disciplines only but pervades private and public organisations across a multitude of disciplines from geography to sociology (Whittington et al. 2003). This chapter adopts such a pluralist and eclectic approach to the research question (Chapter 1) drawing from multiple theories and disciplines. However for the purposes of this study, strategy is defined in line with Rumelt, Schendel and Teece's definition as "about the direction of organisations, … include(ing) those subjects of primary concern to senior management" (1995, p. 9) and "the match an organization makes between its internal resources and skills and the opportunities and risks created by its external environment." (Grant 1991, p. 114). Whittington et al. (2003, p. 398) confirm that this definition is appropriate as it acknowledges that the field is grounded in practise and exists because of its importance especially in terms of the strategic decision making of organisational leaders. It also challenges firmly entrenched mechanistic views of strategy which hold that organisations are subject to industry forces rather than the organisation's characteristics, a view that is increasingly questioned. It is however important to illustrate generally the prominent perspectives related to strategy development.

2.2.2 Approaches to the study of strategy

There are diverse study approaches to the field of strategy as a result of differing opinions and interpretations of how the economy, market and society is organised. Nerur, Rasheed and Natarajan (2008) suggest that there are four dominant intellectual communities that demarcate the discipline namely; financial and institutional economics, industrial organisation economics, the process school and the power / resource dependence school (Nerur, Rasheed & Natarajan 2008). These perspectives result in 'schools', or 'views' that range from a focus on analytical, corporate planning approaches to activity-based, social interactive approaches (Johnson, Scholes & Whittington 2005). Whittington (2001) distinguishes between four approaches to strategy;

2.2.2.1 The classical approach

The classical approach to strategy (see Chandler, 1962, Ansoff, 1965, Porter, 1980, 1996) is the oldest and still most influential approach to strategy as espoused by most mainstream textbooks (Whittington 2001). This approach is typified as being based on the view that strategy is a rational process of deliberate planning and actions (Nerur, Rasheed & Natarajan 2008). It is typified by the behaviour of the 'rational economic man', a centrally located strategic decision-maker acting with perfect rationality. Largely promoted in business schools the classical approach is intent driven, developing from the deliberate intent of senior managers and is aimed at profit maximisation and economic advantage as the primary objective and outcome.

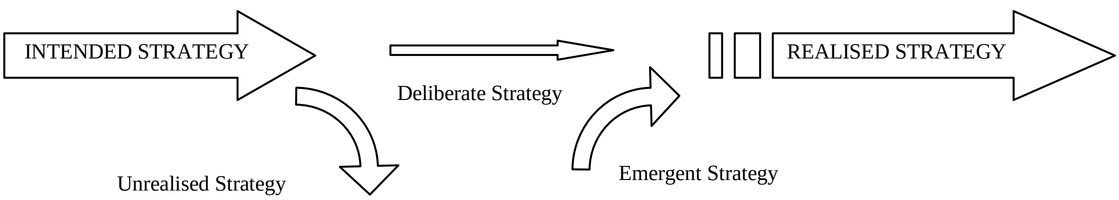
2.2.2.2 The evolutionary perspective

The evolutionary perspective to strategy is fatalistic, holding that the organisation's environment is unpredictable and that planning is often irrelevant. This approach is likened to natural selection, or more specifically, organisations that survive are selected in terms of their survival by the prevailing market. Environmental fit is most likely to be the result of good fate. So it is the market and not the decisions made by managers that will determine the longevity and profitability of the organisation. (see Hannan & Freeman and Williamson in Whittington 2001, p. 5).

2.2.2.3 The processual approach

The processual approach is sceptical about rational strategy making and holds that strategy emerges in organisations in incremental steps and is conceptually pragmatic. Largely influenced by the theory of 'bounded rationality' (Cyert & March 1963) where the cognitive limits and biases of decision makers are recognised, processualists question the classical perspective of decision makers acting in a rational economic way. Often underpinned by complexity and chaos theory, processualists view strategy as a way in which leaders simplify their operational environments and rely on logical incrementalism of strategy through learning (Quinn, 1980, p.89 in Whittington 2001). It is generally pessimistic about long-range planning. This is mostly due to the volatility and ambiguity typified by rapid change in the external environment. Its expected results are therefore more pluralistic and dependent on the way the market changes. The complexity of the environment and limitations as to how organisations can respond leads to the conclusion that planning in terms of the rational approach of strategy is not supported but rather that strategies emerge from this confusion. Mintzberg's (1987, 1994; 1998) view values a bottom-up, incremental development of strategy. It is likened to a continuous and adaptive process (Markides 1999) of crafting strategy (Mintzberg 1987) rather than sequentially defined stages of formulation and implementation operating in isolation. Mintzberg asserts that an organisation's actually followed strategy, or realized strategy will always differ in critical areas to that which was planned, or the intended strategy (Mintzberg 1994). This is due to emergent strategies that result from the continuous and adaptive processes of strategic thought within the firm. Figure 2.2 illustrates Mintzberg's approach in terms of intended, deliberate, emergent and realised startegies. As Sanchez and Heene (2004, p. 35) note, the emergence of strategy as transposed on intended strategy reveals that firms will have a "mix of deliberateness and emergence" in their strategy development.

Figure 2.2: Types of strategy



Source: (Mintzberg & Waters 1985, p. 258)

2.2.2.4 Systemic perspective

The systemic perspective is underpinned by systems theory and holds that strategy depends on the social system in which strategy making takes place. Strategy is regarded as important but not in terms of the classical approach but it is relative to environmental conditions. As such strategies by organisations from different social systems will reflect the diversity of these systems. Decision makers are recognised as being part of the social fabric within which the organisation operates, reflecting the values and norms of that system. The systemic approach does not regard leaders as primarily subject to economic transactions aimed at maximum financial gain or predictable market forces. This approach acknowledges the variability of strategies according to the social systems. Albert (in Whittington 2001, p. 5) illustrates this in the example whereby German / Japanese firms are said to take a long term view of strategy often including investments that may reduce short term profit maximisation but increase the likelihood of long term survival. They embrace analytical planning but, like the processual approach, value bottom-up emergent strategy. In contrast the Anglo-Saxon approach is said to be more aligned to the evolutionary perspective in terms of its short-termism and view that the fittest will survive in a constantly changing ruthless environment. Organisations are expected to be flexible and responsive. It however, unlike the evolutionary perspective does not rule out the analytical planning of the classical approach but has an aggressive approach to strategy in the external environment. Whittington (2001) notes that the shifting demands of the economic environment may result in varied success. As such particular models of strategy are not universal and will not always deliver the same results.

2.2.2.5 Summary

Whittington (2001) notes that strategy statements can become routine and through their single dimensionality and repetition, result in limiting potential opportunities as opposed to their objective of opening up new opportunities. The truth of this irony is not lost in terms of ongoing efforts to reframe the paradigms surrounding the development of strategy. Included in these paradigms are the often referred to concepts of foresight and strategic thinking, which despite their reported importance remain unconnected and understudied. Further research into these concepts, their inter-relatedness and their contribution to understanding the 'black box' of strategy development, is therefore highly relevant.

2.2.3 Dynamic model of strategy process

The static model of strategy process is typified by the differentiation between analysis, formulation, and implementation as designated steps in the strategy process. It is largely based on the perspectives of the classical approach to strategy. However, this contrasts to the dynamic model of strategy. The dynamic model of strategy process is relevant to the study of foresight and strategic thinking in that both concepts are underpinned by dynamic cognitive processes fundamental to strategy. This study proposes that both concepts are inter-dependent and ongoing, both contributing to the development and re-development of strategy (this is illustrated in section 5.3 below).

The dynamic model of strategy process recognises that strategy is an interactive and ongoing process. It challenges the traditional notions of strategy as a linear and deliberate process. It is rather regarded as an ongoing interaction between the practise (shared routines) of strategy, the practitioner as strategic actor and the praxis of strategy, or what the practitioner actually does in the practise (Whittington 2006). This interaction is characterised by ongoing episodes of strategic praxis and re-evaluation. It challenges the deliberate, planned and static strategy process typified by the classical perspective primarily due to the realisation that it does not represent a meaningful reflection of how strategy is developed. The dynamic model of strategy therefore recognises that intended and emergent strategy integrate into what becomes realised strategy as proposed by Mintzberg et al. (2003).

Markides (1999, p. 6) illustrates that strategy formulation and implementation is an integrated process requiring ongoing re-evaluation in an iterative cycle depending on the organisation's circumstances and stage of evolution. This dynamism recognises the need for an effective strategy which is the result of continuously asking the right questions and creatively thinking through the issues in order to develop new ideas rather than scientifically analysed answers (Markides 1999). The strategy process is therefore never ending, always seeking to achieve the fit between the organisation and its external environment while remaining flexible enough to adapt to rapid changes.

2.2.4 The core competence approach to organisational strategy

The concept of core-competence was introduced in the writings of Hamel and Prahalad (1989, 1993, 1994; 1990). They describe an organisation's core-competence "… as the collective learning in the organisation, especially how to co-ordinate diverse production skills and integrate multiple streams of technology" (Prahalad & Hamel 1990, p. 82). They illustrate the importance of recognising core-competencies in an analogy of determining the strength of a tree by only looking at its leaves in much the same way as the strength of competitors are determined by only looking at their end products (Prahalad & Hamel 1990). The same can be said about how organisational leaders view the strengths of their own organisation.

Prahalad and Hamel (1990) suggest that there are three aspects of core competence, namely; they provide long term strategic advantage, they contribute to quality, customer service and customer satisfaction, and they are difficult for competitors to imitate.

Javidan (1998) indicates that the Hamel and Prahalad definition of core-competencies requires further clarification and operationalisation. Two reasons are provided for this namely; that their definition is too broad and focuses on a limited aspect of the organisations value chain, and that it is not differentiated enough from capabilities (Javidan 1998). They conclude that an organisational competency is "a cross-functional integration and co-ordination of capabilities" (Javidan 1998, p. 62) with capabilities being organisational processes that are able to exploit the resources of the organisation. An interaction of competencies across the organisation when integrated, thus form a core-competency of the organisation. Developing strategy, from a core-competence approach, therefore requires being able to recognise competencies and promote their integration through continuous trans-organisational collaboration.

The core-competence approach does not seek to replace traditional strategic planning but rather inverts its modus from an outside-in analysis of the environment to an inside-out approach. Instead of analysing the external environment and then adjusting the position of the firm, the core-competence approach starts with an internal analysis of the skills and capabilities of the organisation and then examines its 'fit' with the external environment (Javidan 1998). Strategy developed in this way recognises the particular strengths of the organisation and then leverage its resources including its competencies and financial capabilities to position itself in the external environment. This corresponds to the view taken by the Resource-Based View of the firm.

2.2.5 The Resource-Based View

The classical approach of opportunity driven, externally focussed strategies, was regarded as limited by the fact that markets were volatile and constantly changing. This approach also did not take into account the resources that cannot be traded and that exist internally within the organisation. The resource-based theory (RBV) of firms recognised the importance of firm aggregated capabilities, individual's competencies, networks and other intangible assets in achieving organisational sustainability and competitive advantage. In terms of the resource-based view, gaining competitive advantage therefore shifts from an externally focussed, rationally analysed strategy of market positioning to a more dynamic and emergent strategy which focuses on the enhancement of the organisation's unique internal resources and capabilities. Capabilities relate to how resources are co-ordinated effectively in relation to a task and these together, when effective and unique, are what are described as the core competencies of the organisation (Grant 1991). Competitive advantage is juxtaposed between the strategy to track opportunity by market positioning and profit objectives (Porter 1980) to a strategy that seeks to enhance its internal competences and skills that are able to acquire opportunities externally (Hamel & Prahalad 1994). Hamel and Prahalad (1993) do not dismiss the need to position the organisation externally but illustrate that being strategic is how existing resources are leveraged in order to fit the 'stretch' between these resources and their strategic goals in the market.

2.2.6 The competence-based approach to organisational strategy

The competence-based approach of strategy recognises the importance of the organisational leaders' cognitive processes in the development of an organisation's core-competencies (Sanchez 2004). The competence perspective treats leaders' cognition as critically important in leading the development of an organisation's competencies by enhancing current capabilities, setting new directions and building new capabilities accordingly (Sanchez & Heene 2004). It also recognises that strategy making differs among diverse organisations leading to different kinds of strategies. This is primarily due to the approach agreement that strategies should emerge in different forms due to the bounded rationality and different cognitions of leaders (Mintzberg 1994). Therefore a part of an organisation's strategy will be more emergent than initially planned (Sanchez & Heene 2004).

The competence-based view does not regard planned strategy and emergent strategy as mutually exclusive but rather as integrated systemic processes. In this respect the competence-based approach recognises organisation's competencies as interacting system properties (Sanchez & Heene 2004) as opposed to differentiating between core or non-core competencies as suggested by Hamel and Prahalad. The core-competence approach and the competence-based approach have more in common than its differences. Essentially each recognise the importance of an organisation's resources, its ability to exploit these (capability) and the cross functional integration and co-ordination of capabilities into recognisable strengths (competency) (Sanchez & Heene 2004).

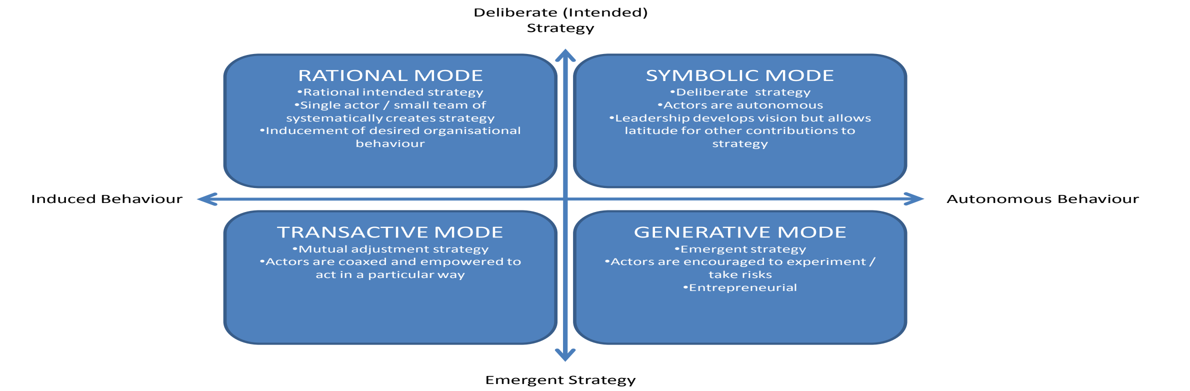
Strategic flexibility is an essential aspect of the competence-based approach to strategy (Sanchez 2004; Sanchez & Heene 2004). The cognitive limitations of perceiving potential changes in the external environment is a primary challenge facing decision makers as it is critical in developing a range of strategic options that match potential changes. Sanchez and Heene (2004, p. 38) recognise this as resulting in the primary cognitive challenge facing strategists, being "imagining a range of possible futures a firm may face, and then defining and developing the most appropriate set of strategic options for taking action in those futures". A number of leading proponents of the processual perspective, resource-based and competence-based approaches regularly confirm this view and refer to the need for foresight or 'seeing' in the strategic thinking of decision makers (Cunha, M. P. E. 2004; Day, G. & Schoemaker 2004, 2008; Hamel & Prahalad 1994, 2005; Major, Asch & Cordey-Hayes 2005; Mintzberg 1995; Mintzberg, Ahlstrand & Lampel 1998; Schoemaker 1992, 1995; Tsoukas & Shepherd 2004b).

2.2.7 Strategy-Making Processes

White (1998) developed a conceptual framework that described the strategy-making styles of strategy-level leaders that are pervasive in organisations. These are cumulatively described as the strategy-making modes of the organisation. The framework describes the strategy-making styles of upper management as a reflection of the strategic decisions taken by these strategy-level leaders. Strategy-making modes are regarded by this study *as the most pervasive mode of making strategy in an organisation as a reflection of the strategy-level leaders' strategy-making styles.*

White reviews the strategy-making models described in the literature since 1963. The strategy-making style framework describes an integrated view of strategy creation in practise as illustrated by prominent perspectives in the literature. Based on Hart's (1992) strategy-making model, the Strategy-Making Processes Scale developed by White is based on two dimensions prevalent in the literature; i) strategy-level leader intentionality ii) autonomy of organisational actors. Hart's (1992) integrative perspective of strategy-making modes in organisations arose out of the need to integrate the divergent typologies in the literature which were regarded as incomplete. Hart's typology therefore illustrates the varying roles of leaders and other organisational actors in the creation of strategy and is able to capture the interaction and contrasting roles as illustrated by the prevalent paradigms on strategy. The four quadrants of the matrix each represent a different generic mode of strategy creation as represented by the literature. These are the rational, symbolic, transactive and generative modes. Figure 2.3 illustrates these modes and reconciles the "rational-incremental debate" (White 1998, p. 288).

Figure 2.3: Strategy-making modes matrix



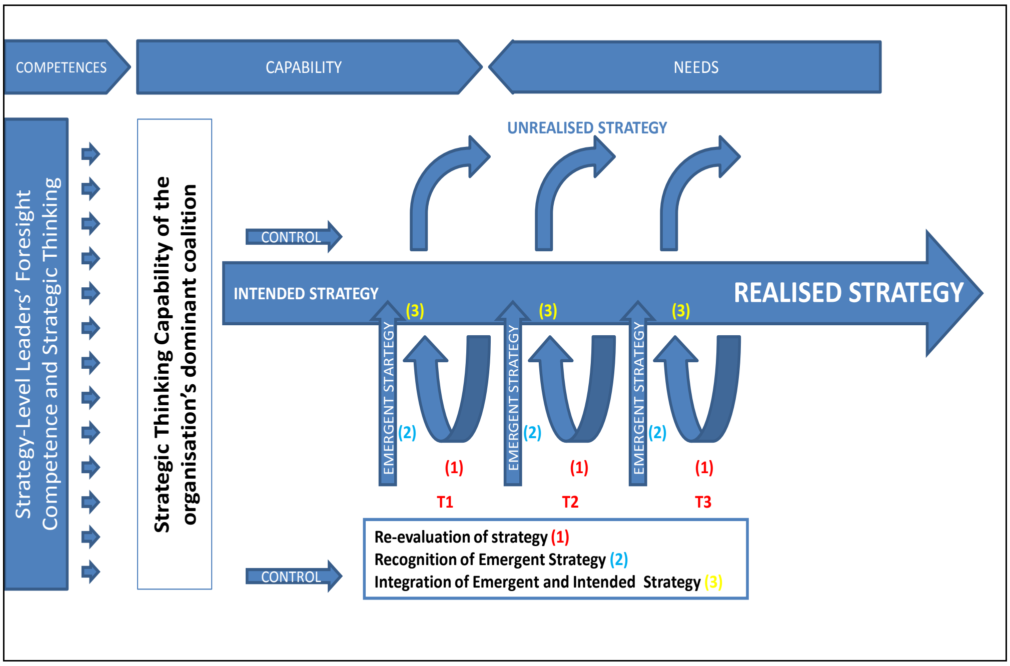
Source: (Adapted from Hart 1992; White 1998)

Of interest in this study is the relationship between the strategic thinking as reflected in the decision making styles of strategy level leaders and the predominant modes of strategy creation in their organisation. It further illustrates whether the organisational strategy-making modes reflect the predominant perspectives illustrated in the literature or the dominant decision-making style of the strategy-level leader.

The role of the dominant coalition in a dynamic model of the strategy process.

1. The study adopts the dynamic model of the strategy process. In terms thereof strategic thinking precedes strategy formulation and strategic planning in an iterative ongoing process of re-evaluating the strategic direction of the organisation. In order to formulate strategic decisions, the strategy-level leadership of the organisation are required to engage in the task of strategic thinking.
2. The dominant coalition made up of strategy-level leaders control the strategy-making process of the organisation. An organisation's dominant coalition that cumulatively contribute to a well-developed strategic-thinking capability, integrates intended strategy with emergent strategy in order to establish the realised strategy of the organisation. The developed processes of the organisation to do so are regarded as its strategic thinking capability. This capability is largely the result of feedback processes between its interaction with the strategic needs that are linked in a timely fashion to facilitate effective strategic decision-making (Grupp & Linstone 1999).
3. The organisation's strategic thinking capability includes the strategy-level leadership's strategic thinking competencies to recognise the value of vertically emergent strategy not originating from within the dominant coalition but rather from the input and innovation of lower echelons of the organisation. The role of the dominant coalition in the dynamic model of the strategy process is illustrated in Figure 2.4. The Idealised Integrated Strategy Process (IISP) model was developed for this research and integrates the important aspect of the dominant coalition's control and the convergence between intended and emergent strategies in iterative cycles of strategy creation.
4. Of particular importance is the control that the dominant coalition exerts on the strategy process. Within the context of this control it is important, in terms of the dynamic model of strategy that the dominant coalition has the ability to recognise and integrate vertically emerging strategy in terms of its controlling of the strategy-making process. The dynamic model of the strategy process serves to illustrate a working model within which the strategic thinking paradigm supported by this study, fits. However, strategy-making practise in organisations does not always follow this model.

Figure 2.4: The role of organisational strategic thinking capability and the development of strategy in terms of the Idealised Integrated Strategy Process model



Source: developed for this research.

2.2.8 Summary

There have been recent calls for further research relating to the development of competencies of strategists (Beer & Eisenstat 2000; Mintzberg 2004; Montgomery 2008). Also to revert from the recent focus on research at an organisational level to questions at the individual level of the practitioner (Whittington & Mantere 2008). Strategy is a dynamic activity fulfilled by individuals rather than just being regarded as a property that organisations have (Jarzabkowski, A. et al. 2007) and as such the development of competencies that stimulate optimal performance.

Strategy is about direction and leadership in relation to the organisation's internal and external environments. Strategy is regarded as a dynamic process where intended, or planned strategy integrates with emerging strategy as the future unfolds. While it is a constantly evolving and renewing process, its ongoing formulation and implementation are distinct in terms of the crafting of strategy according to the cognitions and the actions of decision makers. This study recognises the importance of the development of strategy at all levels of the organisation but will focus on individuals at the strategy-level of leadership of organisations. The approach of regarding this level of leadership as vitally important in terms of strategy is supported in the literature (Storey 2005). The meaning of strategy-level leadership will be discussed in the next section of this chapter.

2.3 Leadership

2.3.1 Introduction

Recent research seeks to integrate and develop further, the paradigms of what constitutes leadership (Avolio 2007; Bennis 2007; Hackman & Wageman 2007; Kotter 2007; Sternberg 2007; Vroom & Jago 2007; Yukl 2009; Zaccaro 2007). Despite general agreement that the study of leadership has attracted massive interest and attention (Storey 2005) it remains difficult to describe (Bennis 2007; Vroom & Jago 2007; Yukl 2009) and it is still regarded as uninformed (Hackman & Wageman 2007) and misunderstood (Cragg & Spurgeon 2007) despite the fact that understanding leadership better is regarded as crucial and urgent in these times (Bennis 2007). "The subject (of leadership) is vast, amorphous, slippery, and, above all desperately important" (Bennis 2007, p. 2).

Vroom and Jago note that "virtually all definitions of leadership share the view that leadership involves the process of influence" (2007, p. 17). Indeed, leadership refers to a capacity to influence others and is regarded as closely related to leader characteristics or competencies, which represent the decisions and the cognitive processes of the decision maker (Sternberg 2007).

Applications of leadership theory often differ according to the purpose of the study (Bass & Stogdill 1990). Rather than seen as discounting alternative theories, the theory selected to underpin the study is chosen as it best explains the phenomena being investigated. The purpose of this study is to determine whether there is a significant relationship between a leader's orientation to time, their foresight styles and their decision making styles which in turn reflects upon their cognitions as related to organisational strategy. The categorisation of leaders' approaches to strategy based on their decision making styles is well established in the literature on leadership (Williams 2006).

2.3.2 Leadership of organisations and in organisations

When considering the study of leadership in an organisational context, it is asserted that there is a difference between the levels of leadership and whether they are individual or team based or whether they refer to overall leadership of the organisation. Storey refers to this distinction as ‘leadership of organisations’ and ‘leadership in organisations’ (2005, p. 90). The latter refers to team leadership or leadership of particular functions within the organisation. The former however, refers to overall leadership which includes the responsibility for determining the strategic direction and architecture for the organisation (Storey 2005). This study will focus on the upper echelons or executive leadership *of* the organisation referred to by Storey as strategy-level leadership (2005) and notes the relative lack of research in this segment of leadership as compared to “the overwhelming focus on lower level leadership in the various studies” (Storey 2005, p. 90). In this study the terms executive leadership, upper echelon leadership and strategy-level leadership are treated as equivalent and may be used interchangeably.

When further considering what subjects are included in the strategy-level of organisational leadership the broad definition is that *they are those who exert a moderate to high influence on the strategy formulation and formation of the organisation*. Primarily due to the tendency toward flatter organisational structures and the diffusion of power, a simple demarcation of position as having high strategic influence is no longer applicable. These may differ between organisations and will be determined by the survey responses, but may typically include directors of boards, CEOs, senior managers in the executive team and those leaders of strategy (such as strategy practitioners) who collate strategic information, assimilate this and provide advice on matters related to the organisation’s strategy. The latter is regarded as those having a moderate to high influence on the development of strategy in the organisation due to their strategic task related functions. The area of interest in the study therefore focuses on the cognitions of strategy-level leaders and their cognitions in terms of strategic decision making in the organisation.

The link between leadership *of* organisations and its strategy has been established above. The question arises as to what theoretical framework supports this notion and provides a basis for answering the research questions of this study.

2.3.3 The development of Leadership Theory

Leadership theory has moved from focussing on the innate superior characteristics of leaders (Trait Theory), to their behaviours or styles (Behavioural Theory) and then the influence of the situation in which leadership is taking place (Situational and Contingency Theories), to integrated approaches that also acknowledge previous schools of thought. Out of these theories it is important to note that while all are generally acknowledged as representing some truth as to the source and nature of leadership; the idea of being a born leader with fixed, rigid and static traits is generally rejected "in favour of a more practical model of leadership which lends itself to development" (Cragg & Spurgeon 2007). Leadership is rather seen as modifiable, dynamic and able to be developed in individuals and in organisations (Sternberg 2007).

Prominent amongst the integrated theories have been Burns' 1977 distinguishing between Transactional and Transformational leaders where the latter are seen as a change agents giving rise to 'visionary leadership' (cited in van Maurik 2001) and 'charismatic leadership' perspectives (Conger 1989). Van Maurik goes on to indicate that the transformational leader paradigm emerged out of the "high levels of uncertainty experienced by leaders … and the whole organisation" (2001, p. 75). The conceptual weaknesses of the transformational and charismatic theories were however, significant (Yukl 1999, 2009) thus sparking renewed efforts to develop new paradigms of leadership.

Boal and Hooijberg (2000, p. 515) illustrate how the three main streams of contemporary leadership theory research can be integrated into what they believe is the "essence of strategic leadership". The three streams they identify are; Strategic Leadership theory as preceded by Upper Echelons theory, the "new" theories of charismatic, transformational and visionary leadership theories, and, the "emergent" theories of cognitive complexity, social intelligence and behavioural complexity (Boal & Hooijberg 2000). In their model they propose that the essence of strategic leadership include the characteristics of absorbtive capacity, capacity to change and managerial wisdom. Citing numerous authors and studies, they explain these as the ability to learn, ability to change and the combination of discernment and Kairos time respectively (Boal & Hooijberg 2000).

Leadership was mainly taught in terms of biographies of great men (Bennis 2007). There is academic agreement however, that leaders do not need superhuman qualities, but that leadership is a skill that can be developed (Cragg & Spurgeon 2007). Despite the criticism of especially the initial Trait Based Theories, it is acknowledged that there are some universal traits of leaders that are still associated with effective leadership (Avolio 2007). Hackman and Wageman (2007) puts the criticism in context in that the questions should not have been what are the traits related to effective leadership but rather how do these personal attributes interact with situations to shape outcomes? In terms of traits found to be related to effective leaders, Avolio confirms that these are not fixed with regards to their association with effective leadership and are significant in terms of leadership development (Avolio 2007). The impact of experience and learning in terms of such traits and related cognitions have been evidenced and thus become important aspects related to leadership development interventions. In terms of the calling for new integrated views of leadership that acknowledge the value of prior leadership theory paradigms, the inclusion of focussing on such traits as part of a broader framework are valid (Avolio 2007; Bennis 2007).

These include tolerance for ambiguity and cognitive ability as desirable traits (Yukl 2006). In terms of incremental theory, which views traits as able to emerge and be enhanced (Dweck & Leggett 1988). Cognitions related to the development of "self" are of particular interest in terms of the concept of foresight which is regarded in terms of developing "self" or as a process (Voros 2003). This will be discussed later but is relevant here. A new integrated theory of leadership would therefore integrate this knowledge with other aspects of leadership such as those based on context and relationship with followers in order to develop a more integrated view of leadership theory and development.

To achieve this, Bennis (2007) suggests a more eclectic approach to understanding leadership and urges greater integration of perspectives. This view is supported by Avolio (2007). Theory of leadership should be interdisciplinary, "a collaboration among cognitive scientists, social psychologists, … political scientists, historians, and others" (Bennis 2007, p. 4). The psychology discipline as an example, can contribute to understanding leadership better by identifying the characteristics of leaders that are imperative (Bennis 2007). This raises the question of leader characteristics and competencies. The next section will illustrate the competencies required of effective leaders and how they relate to the specific tasks tantamount to the success of the organisation. Storey indicates that the answer to this constitutes an important future research theme (2005).

2.3.3.1 Leadership and strategy

The studies of leadership and strategy have followed close parallel paths of development often being regarded as synonymous (Leavy 1996). Inherent in the development of the strategy and leadership fields is the contention that strategy is closely related to the decision making of organisational leaders. "Clearly, strategic choice ranks as one of the dominant roles and responsibilities of senior management" (Carpenter, Geletkanycz &

Sanders 2004, p. 772). Leadership is seen as the enabler of strategy (Colville & Murphy 2006). Storey states that "leadership is likewise taken as a critical given in modern strategic thinking" (2005, p. 92). The fields of strategy and leadership are therefore aligned. As they have evolved over time, certain indicators of their convergence arise in the literature. The concepts of decision-making and competence are common to both and illustrate this convergence. Similarly, the concepts of foresight and strategic thinking are mentioned in both literatures and are reflected in the decision-making and competences of both leaders and strategists.

Governance imperatives support the assertion that organisational leaders at the senior level of an organisation are responsible for strategy. Creative thinking and crafting have been closely associated with both strategy (Mintzberg 1987, 1995; Mintzberg et al. 2003) and leadership (Garratt 1995; Hamel & Prahalad 2005). Leaders are expected to enable innovation and creativity in the organisation (Amabile 1998; Storey 2005) in order to explore and discover new strategic directions and solutions to current strategic impasses. It is an essential characteristic of leadership (Sternberg 2007) requiring amongst others temporal reflexivity. Amabile (1998, p. 76) asserts that this can be achieved by developing thinking capacity, developing expertise through accumulated experience and through creating motivational environments.

The classical perspective of strategy (see 2.1.3 above) has generally asserted the view that strategists are an embodiment of effective managerial professionals of their organisations (Whittington 2001). Their view of strategy is focussed on the rational-economic approach related to external positioning requiring an instrumental view of leadership (Leavy 1996). As the predominant paradigm in Western models of strategy and especially in their view of leadership, the mainstream classical approach has also dominated educational paradigms in leading business educational interventions. Chandler (1990, as cited in Whittington 2001, p. 42) confirms that it is indeed the professionally educated managers from these business schools that have generally risen to positions of leadership in the major economies of the West. The dilemma arising out of this fact is clear in that the paradigms related to strategy as promoted in such educational programmes then dominate the cognitions of decision makers in a large proportion of the organisations and thus the prevailing economic paradigms of these countries.

Largely influenced by Burns (1979) and Mintzberg (1987, 1990, 1994, 1996) the swing toward so-called soft skills of leadership that value vision and creativity emerged, especially in terms of the increased support of the theory of transformational leadership. In terms of strategy, the predominance of the classical perspective was said to be inadequate in its operational intent and focus on system maintenance (Storey 2005). Mintzberg's differentiation between formulated strategy and the emergence of strategy suited the change and visionary orientated emerging views of leadership. The differentiation was significant as it recognised that not all realised strategy was the result of pre-planning or fully under the control of the organisational strategists (1987). Rather that the cognitions of a broad cross section of the organisation all contribute to the strategy of an organisation as the strategy evolves. Leavy (1996) in his discussion of studying leadership in the context of strategy indicates significant levels of academic support for Mintzberg's conceptualisation of how strategy is formulated and formed and how this relates to the role of the leader. While acknowledging the perspective of organisation wide influence on strategy, it still needs to be evidenced that the majority of strategy formulation and formation does not take place at the top level of the organisation. Mintzberg does not deny this, rather he illustrates that strategy as previously understood and taught, does not reflect how strategy evolves and that it is not limited to one segment (or individual) of the organisation only.

Rapid change and volatility in the organisation's environments will require its top leaders to use their skills and wisdom in making effective critical decisions (Avolio 2007; Boal & Hooijberg 2000). In the case of this study the focus is on the top level of leadership of the organisation that exert the most influence on the organisation's strategy. Storey refers to this as strategy-level leadership (2005). Other researchers also refer to these as the executives, strategic leaders, upper echelons or top management of the organisation (Boal & Hooijberg 2000; Cannella Jr & Monroe 1997; Carpenter, Geletkanycz & Sanders 2004; Finkelstein & Hambrick 1996; Goll & Rasheed 2005; Hambrick 2007; Hambrick & Mason 1984; Waldman, Javidan & Varella 2004).

2.3.3.2 Upper Echelons theory

Significant evidence has demonstrated the central premise of the theory that demographic profiles of executives act as valid proxies of their cognitions, values and perceptions which are highly related to strategy and performance outcomes of organisations (Hambrick 2007). In essence the central hypothesis of the Hambrick and Mason model is that leader's demographical profile can influence their decisions (Carpenter, Geletkanycz & Sanders 2004).

Upper echelons theory expounded that executives' decisions are based on their interpretations of the strategic situations they face and that these interpretations, or cognitions are the result of their experience, values and personalities (Hambrick 2007). The theory was based on the premise of bounded rationality (Cyert & March 1963) where the complexity of organisational behaviour is not objectively knowable. Rather that in order to understand the actions and performance of organisations, it is necessary to consider their most influential decision makers.

The theory is underpinned by two underlying assumptions, namely; that by focussing on the characteristics of the Top Management Team (TMT) and their cumulative cognitions, competencies and affiliations, the researcher will be better able to predict their strategic decisions, and; that the demographic characteristics of the executive decision makers can be used as valid proxy indicators of their cognitions (Hambrick 2007). The theory acknowledges that the latter assumption yields an incomplete understanding of executives' exact cognitions due to its complex psychology and social processes but that characteristics such as education, experience and affiliations can be reliably used to predict their strategic actions (Hambrick 2007). Evidence in support of this indicates that "demographic profiles of executives … are highly related to strategy and performance outcomes (D'Aveni, 1990, Eisenhardt and Schoonhoven, 1990, Boeker, 1997 cited in Goll & Rasheed 2005; Hambrick 2007). In essence, considering the fact that recruitment efforts have used demographic information (in terms of curricula vitae) in its selection processes, illustrates the logic that demographics can predict performance albeit limited.

Carpenter et al. (2004) confirm that there has been a proliferation of research based on upper echelon theory and that the empirical results validate the theory and indicate its application to diverse contexts. Strong relationships have been found to exist between the characteristics of executives and strategy development (Papadakis & Barwise 2002). This study will extend these findings to the relationship between foresight and strategic thinking in strategy-level leaders.

2.3.3.3 Strategic leadership

Despite the relative lack of studies specifically related to strategy-level leaders, there have been some notable strands of study conducted since the introduction of the upper echelons theory by Hambrick and Mason (1984). Upper echelons theory evolved into strategic leadership theory (Finkelstein & Hambrick 1996). This was a more comprehensive approach to how organisational leaders and their strategic decisions impact organisational outcomes (Cannella Jr & Monroe 1997). Strategic leadership theory acknowledges that strategies can emerge from lower echelons in an organisation as proposed by Mintzberg, but asserts that due to their unique position in the organisation they are able to exert the most influence on the organisation's strategy.

Strategic leadership theory posits both a theory and a methodological approach (Carpenter, Geletkanycz & Sanders 2004). As a theory it predicts that an organisation will be a reflection of the cognitions and values of its most influential leaders. The leaders' cognitions and values are similarly recognised as affecting their field of vision and their interpretation of information (Cannella Jr & Monroe 1997). As a methodology it depends on *demographic proxies as valid representations of underlying cognitions and behaviour of these leaders*.

This study posits that the orientation to thinking in time, foresight styles and decision styles of strategy-level leaders will reflect their cognitions, values and field of vision. These are aspects directly related to the concepts of foresight and strategic thinking. The study will further demonstrate the moderating effect of demographic variables in this relationship as further indication of the relationship between leaders' foresight and strategic thinking.

2.3.4 Who are the strategic leadership?

Carpenter et al. (2004) indicate that the concept of Top Management Teams (TMT) was meant to reflect the dominant coalition of an organisation which refers to the social network of individuals that exert the greatest influence on the development of an organisation's strategies (Pearce 1995). As such reference to dominant coalition has often been used synonymously with the concept of TMT. Originally, TMT members were identified as the executives who also sit on the board of directors (Carpenter, Geletkanycz & Sanders 2004) but generally referred to those executives at the top of a firm's organisation chart. Definitions were mostly associated with position titles or compensation levels (Carpenter, Geletkanycz & Sanders 2004).

The dominant coalition derives its authority to determine the strategic direction and allocation of resources of the organisation from the collective influence of its members (Pearce 1995). The concept of dominant coalition is useful because it grants that both individuals and groups have influence (though not equal) over organizational actions. Dominant coalitions are as diverse as organisations are different. These often depend on the governance of the organisation or how power has been institutionalised (Cyert & March 1963) by previous dominant coalitions thus setting precedents for the future (Pearce 1995). It also does not exclude the possibility that the dominant coalition can change depending on the control of resources and the emergence of new strategically valuable resources (Pearce 1995).

In terms of convenience sampling according to theoretical constructs mentioned above, the definition may also vary broadly as do the diversity of disciplines and the theories associated with them. In terms of agency theory of leadership, as an example, the dominant coalition may be regarded as the board of directors who exert control over the CEO or it may even be legitimately conceived that the large scale shareholders constitute the dominant coalition (Chowdhury & Wang 2009). This then cannot technically constitute the managers of the organisation and as such reference to TMTs may be misguided.

In defining who members of an organisation's dominant coalition are, it is noted that research confirms that individuals outside the traditional notion of TMTs also have an impact on the upper echelons model (Carpenter, Geletkanycz & Sanders 2004). These may include directors on the board, individuals outside the organisation that control vital resources (such as finance) or those who advise the executives of the organisation such as professional strategists.

Carpenter et al. (2004, pp. 755-8) illustrate that the parameters used for defining the dominant coalitions and included; "Top managers involved in strategic decision making" (10 out of 31 studies) and "Vice president and above" (7 out of 31 studies). A number of the studies recognise the influence of the board of directors but none refer to individuals outside the organisation. The focus however, was on the most influential team located at the apex of the organisation recognising the effect of the dominant coalition on an organisation's strategy and outcomes (Tihanyi et al. 2000). Storey (2005, p. 90) equates this level of leadership in an organisation with what he terms "strategy-level leadership" or “strategic leadership”. Storey goes on to cite upper echelons studies such as that by Finkelstein and Hambrick (1996) and Boal (2000) as focussing on the same level of leadership and as such the terms become synonymous.

This study will adopt the view that the strategy-level leadership are made up of those that exert the highest influence on the organisation’s strategy and outcomes (Pearce 1995). This includes board directors, executives and strategic advisors. It aligns with both the perspectives listed by Carpenter et al. (2004) and conforms to the broader definition of dominant coalitions related to influencing strategic decisions as set out in Pearce (1995). It introduces a parsimonious approach to the definition of who constitutes the dominant coalition (Storey 2005).

2.3.5 Leader competencies

The analysis of leadership has generally focussed on the characteristics, behaviours and situations of leaders. The concept of leader competences seeks to identify the skills and knowledge that are required to superior performance in fulfilling the tasks required of leaders and how these can be developed to function in diverse situations and contexts.

Bartram’s Great Eight competency domains (2005) describe the elements of both foresight and strategic thinking under the domains of *Analyzing and Interpreting* and *Creating and Conceptualizing.* These domains include such competency dimensions such as “demonstrate systems thinking”, “analysing and evaluating information”, “testing assumptions and evaluating”, “creating and innovating” and “formulating strategies and concepts” (Bartram 2005, p. 1203), and are concluded in the study to predict overall job performance. These dimensions are also broadly reflected in both the concepts of foresight and strategic thinking. Deductively then, there is empirical support for the assumption that in relation to organisational strategy foresight and strategic thinking are encapsulated as highly desirable leader competencies and have greater predictor value in terms of effective organisational strategic leadership.

2.3.5.1 Definition of competence and competency

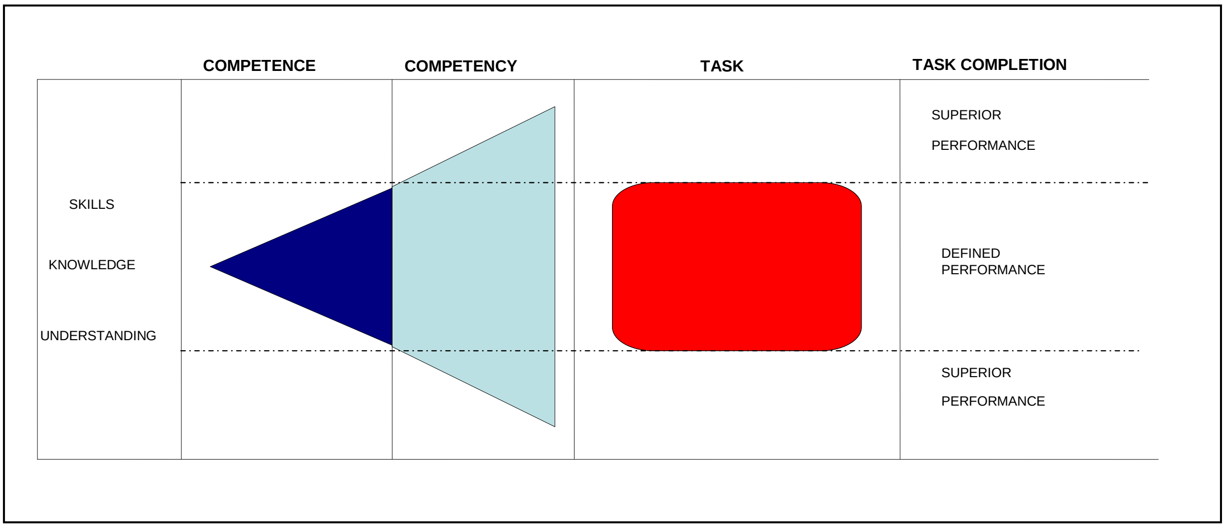
Definitions of a competence vary, primarily in terms of the use of terminology relating to whether competences, capabilities, abilities and competencies are different concepts. The literature is elusive in its definition of the concept of competence and its distinction from competency. Competence has been defined as “sets of behaviours that are instrumental in the delivery of desired results or outcomes" (Bartram 2005, p. 1187). For the purpose of this study a competence is defined as *an individual's ability and made up of particular skills that support an underlying intent* (Boyatzis, R E 2008; Sanchez 2004) and more specifically competencies are defined as "characteristics that are causally related to effective and/ or superior performance in a job" (Boyatsis 1982, p. 23). (See also Boyatzis, R E 2008; Boyatzis, R E & Saatcioglu 2008; Rhee 2008; Sanchez 2004).

Le Deist and Winterton (2005) review the divergence of competence research and suggest that a one dimensional approach is no longer adequate. They suggest a typology of competences that distinguish between functional (task orientated), cognitive (knowledge orientated), social (behaviour orientated) and meta- competences (transcendent higher-order competence). In terms of the latter, significant debate has arisen and remains unresolved relating to the hierarchical nature of identifying meta-competences. However, within the Le Deist and Winterton typology, the three dimensions of cognitive, functional and social competences are "universal and are clearly consistent" with mainstream approaches (2005, p. 39). An argument supporting the notion of foresight as a meta-competence could be validly made but the scope of this study is limited in terms of the complexity and exploratory nature of such a research issue. As such this study will adopt what has been noted by the authors as 'universal and consistent' in terms of the three dimensions noted in the literature. As such this study adopts the approach that strategic thinking as a task is made possible in terms of a competence to think strategically (as a predominantly functional competence) and is enhanced by the competence of having foresight (as a predominantly cognitive competence). Le Deist and Winterton recognise that while an analytical differentiation of the three dimensions is possible, most competences overlap in practise retaining aspects of all three.

In terms of the theory of action and job performance which is the basis of for the concept of competency, performance is optimised when a person's abilities match the responsibilities and tasks of a particular job demands and the context of the organisational environment (Boyatsis 2008). 'Job demands' are the responsibilities of a particular position and the tasks that need to be performed. In terms of organisational leadership a primary responsibility of the position is the formulation or 'making' of strategy. Among the tasks required to do this effectively is strategic thinking.

However, due to the importance being placed on organisational leaders needing to make decisions that gain competitive advantage, additional attributes are being associated with superior performance and these are holistically referred to as a competency or in the plural, competencies (Boyatzis, 1982; Spencer, 1995). Figure 2.5 indicates a conceptual illustration of how competence and competency differ in terms of the conceptual terms adopted by this study, and its relationship to task completion performance as related to defined and superior performance.

Figure 2.5: Definition of a competence and competency in the context of a task.



Source: Developed for this research.

Figure 4 illustrates three features occurring in the context of competences (Hirsh & Strebler 1994) a) its association with a role and the organisation within which it exists, b) its association with performance, c) specific behaviours that can be observed. Competence is distinguished at times from the concept of capabilities. The use of capabilities is often confused in its use to describe a competence and vice versa. Sanchez (2004, p. 519) notes that capabilities are repeatable patterns of action that "arise from the coordinated activities of groups of people who pool their skills in using assets". Boyatzis (2008) refers to a competence as being an individual capability or ability. Out of this confusion there is growing reference to a capability as an organisational ability to organise its resources or develop processes (Griffiths & Boisot 2006) and as such this study will refer to a competence as an individual's ability and a capability as describing the mobilisation of resources in an organisation related to the 'pooling' of individual competences or competencies.

Winterton and Winterton (1999) note that it is perhaps more accurate to refer to degrees of competence from where an individual meets a threshold of defined parameters of a task but can be developed further in terms of greater knowledge, understanding and skills. If these are developed so as to facilitate superior performance the competence evolves into a competency. There is a positive relationship between higher competency levels and individual performance (Levenson, Van der Stede & Cohen 2006). Boyatzis (2008, p.10) lists research supporting ways in which competencies can be developed to strive toward maximum performance. These include formal education in addition to expanding experience and cognition. Competencies can be developed in adults (Boyatzis, R E 2008; Portnoy 1999; Rhee 2008) and there is sufficient evidence that this contributes to developing effective leaders.

2.3.5.2 Leadership competencies

Numerous studies have sought to identify the competencies required for effective leadership. These vary according to the academic area of interest and the level of focus in terms of the organisation’s stage of development, its changing environments and industry. However, time orientation is implicitly referred to in leadership theory, but “explicit in practise and should be studied further” (Thoms & Greenberger 1995). This inadvertently relates to the competences of leaders.

There have been attempts to identify generic lists of leadership competences. These are often grouped together into generic categories either at the organisational or individual levels. Groupings of competencies are often referred to as competency domains (Bartram 2005; Sandwith 1993), frameworks (Bartram 2005; Cragg & Spurgeon 2007) or units (Hunt 2002; Hunt & Wallace 1997). Generic lists of identified competencies can exceed ninety items (Hunt 2002; Hunt & Wallace 1997). Certain competencies however, have been found to be entry level criteria expected of each strategy-level leader and includes foresight competence (Thompson, Stuart & Lindsay 1997, p. 70). Other entry level competences are suggested to include ability to change, communication skills, global awareness, ability to motivate, initiative flair, having a focussed mind and being tenacious. The conclusions reached by Thompson et al. (1997) based on strategic leadership theory are statistically valid but the identification of generic lists remains tenuous. Despite this, foresight competence prominently features in the majority of such generic lists.

It is difficult to determine which leadership competencies best fit particular organisational contexts and stages in their evolution. Following on from Section 2.3 and 2.4, the core competence approach and Resource-Based View of the firm suggest that the identification and development of an organisation's core competence leads to competitive advantage and provides an indication of which competencies are most valued by the organisation. This involves the identification and aggregation of leaders' competencies in order to develop leadership that in itself can be regarded as a core-competence. The individual competencies therefore, should also be aligned with organisational needs and strategies and ultimately combine to differentiate the organisation from their competitors. As noted by Jarzabkowski et al. (2007) the strategic leadership and strategy of an organisation can be viewed as an organisational resource but the recognition that it is a sum of its parts must also be taken into account in future research. Using the strategic leadership framework (see section 5.1), Kakabadse (1991) illustrates empirical evidence of the link between the competence of strategy-level leaders and the performance of their organisation.

Boyatzis (2008) refers to research that validates the view that three clusters of competencies differentiate superior performance from average performance. These are cognitive competencies, emotional intelligence and social intelligence. A *cognitive intelligence competency* is "an ability to think or analyse information and situations that leads to or causes effective or superior performance" (Boyatzis, R E 2008, p. 8).

Being able to identify emergent patterns in an organisation's future, acknowledging the complexity of its environment and understanding the system within which it operates are competencies that differentiate outstanding from average performance in leaders (Boyatzis, R E 2008). This study associates these outcomes with the *cognitive intelligence competencies* of foresight and strategic thinking. Despite numerous references to these essential competencies, there remains a gap in the literature as to how 'seeing' the future relates to the strategic decision-making cognitions of leaders.

2.3.5.3 Suggested future research in leadership

There have been recent calls for further research relating to focussing on competencies of effective leaders (Beer & Eisenstat 2000; Mintzberg 2004; Montgomery 2008; Sanchez & Heene 2004; Storey 2005). Also to revert from the recent focus on research at an organisational level to questions at the individual level of the practitioner (Whittington &

Mantere 2008). Strategy is a dynamic activity fulfilled by individuals rather than just being regarded as a property that organisations have (Jarzabkowski, A. et al. 2007) and as such individual level studies are justified. There is thus support for both organisational and individual focussed research related to the development of competencies.

Storey (2005, p. 102) suggests future research that addresses "what competencies are required to discharge these expected functions effectively?" Focussing on two selected and possibly related individual level competencies within the leadership and strategy fields fit the scope of this thesis.

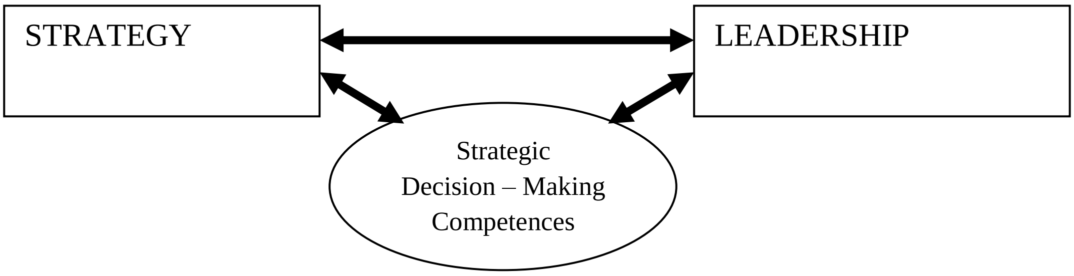
2.3.6 Summary

The study of leadership has been an evolution of ideas, differing perspectives and academic disagreement. It is marked as being nebulous and difficult to define. It contains a large number of models, frameworks and theories that describe it. Attempts to integrate the merits of previous theories have marked recent developments in the field in terms of 'integrated theories' in addition to still newer paradigms.

Stemming from the study of leadership is the question as to what qualities constitute effective leadership at an individual and organisational level and ultimately superior performance. The answer to this question has been addressed in terms of varying discipline and theoretical perspectives. A prominent approach has been the perspectives based on leadership competencies. Concepts of core-competence, competence-based approach and managerial competence have played an important role in defining the area but have also led to a convergence between mainstream strategic management and leadership studies. Competencies associated with each, overlap due to the importance of strategy associated with leadership. Illustrative of this convergence is the strategic leadership theory upon which certain studies of competencies have been based.

The strategic leadership theory is influential across academic fields and is able to accommodate different academic nuances in understanding the leader's effects on organisational outcomes (Carpenter, Geletkanycz & Sanders 2004). The theory stems from an interest in the psychology of leaders and how their cognitions, values and perceptions impact on decision making and organisational outcomes. Due to the difficulty in measuring the psychology characteristics of mostly avoidant leaders, the theory established that their demographic profiles offered predictive value to the construct. The construct of interest is therefore, the psychological profile of leaders as tested by their demographic characteristics and the relationship between the leader's background and their decisions (Donaldson 1997). "Therefore strategic leadership theory is very much a decision making theory" (Cannella Jr & Monroe 1997, p. 220). Figure 2.6 illustrates how the fields of leadership and strategy converge in terms of the competences required in the context of strategic decision-making.

Figure 2.6: The convergence between Leadership and Strategy



Source: Developed for this research.

This study thus establishes significant theoretical justification for the integration of the largely independent yet overlapping disciplines of leadership and strategy. It goes further in determining that decision making is common to both, mostly executed by the same actors, primarily in the strategy-level of leadership in organisations.

2.4 Decision-making

2.4.1 Introduction

Yukl (2006) notes that the success or failure of an organisation is directly related to the decisions of its leaders. Decisions could indicate limited consideration of its implications often at the expense of the organisation or they can indicate prudence and wisdom. Within the context of strategy and leadership, decisions made by leaders in terms of the strategies of their organisations are particularly relevant. As noted above, decisions related to the intended strategies, ongoing evaluation and inclusion of emergent strategies all contribute to the organisation's realised strategy (Mintzberg & Waters 1985) and are one of the primary responsibilities of leaders. Both competence-based approach to strategy (Sanchez & Heene 2004) and strategic leadership theory (Finkelstein & Hambrick 1996; Hambrick 2007) stress the importance of leader cognitions in the making of strategic decisions. Both argue that while cognitions are difficult to measure, being the 'black box' of strategy formulation, characteristics and proxies are able to generally predict their strategic decision making tendencies. Decision-making theory (Martinsons & Davison 2007) indicate that decision styles fulfil a similar function and illustrate a convergence of both strategy and leadership.

Leaders are expected to make strategic decisions that address ambiguous and complex issues facing organisations. Decision quality is therefore of primary interest as it reflects on the strategic cognitions of the decision maker. Evidence supports the argument that an antecedent of quality strategic decisions are the cognitive competences of the strategy-level leaders (Amason 1996). The effectiveness of strategic decision making has been found to directly influence the organisation’s performance (Goll & Rasheed 2005) and are largely dependent on the cognitions of leaders. Literature further supports the approach that foresight or “visiting the future” can alter the style in which decisions are made (Chermack & Nimon 2008). Decision-making styles have offered a way of studying patterns adopted by individuals in decision making and how an individual responds to a decision-making situation (Chermack & Nimon 2008).

Rowe and Boulgarides’ Decision Style Model (1994) was found to provide a meaningful framework for the study. Recent studies confirm the current applicability of the model and related measurement scale in terms of evaluating leader’s cognitions (Fox & Spence 2005; Martinsons & Davison 2007; Pennino 2002). A fundamental assumption of the study is that an individual’s conscious perceptions and ideas affect his / her actions and decisions.

2.4.2 Conceptualising decision-making

The study of decision making has evolved since the beginning of the last century with the dominant focus being in the field of psychology. A number of decision-making frameworks, in different disciplines, have evolved since the earlier studies By Dewey, Jung and the development of the Myers-Briggs Indicator (Pennino 2002; Thunholm 2004). These range from economic, political and rational models to behavioural and psychological foci. Some researchers suggested that there were no differences between decision makers and generic frameworks for making optimal decisions were proposed such as the expected utility theory. More recently, research related to decision-making styles suggests that such a narrow approach is incorrect and does not reflect the cognitive differences among decision-makers.

Decision-making has been described as involving making choices (Rowe & Boulgarides 1994) usually involving two or more alternatives (Hammond 1999). Decision-making theory has typically focused on the ability and cognitive process of an individual when making a decision. Cognition is described as a "process by which people think, evaluate information and understand meaning" (Rowe & Boulgarides 1994, p. 71) and the way in which the mind uses information to reason about and understand problems.

Effective decision making is regarded as fundamental to leadership. It is asserted that the individual's decision styles are the "backbone of effective decision-making" (Rowe & Boulgarides 1994, p. 22). Strategic decisions are those that span a long period of time and are usually only able to be defined as effective long after the decision is made. "Effective decision makers can act to reduce the organisation's uncertainty in dealing with future outcomes" (Rowe & Boulgarides 1994, p. vi). Differences in how these decisions are reached and their effectiveness, point to underlying differences between individuals and how they process decisions. The terms cognitive styles and decision-making styles are closely related (Thunholm 2004, p. 932) and suggest a link between individual thinking "central to the understanding of decision processes".

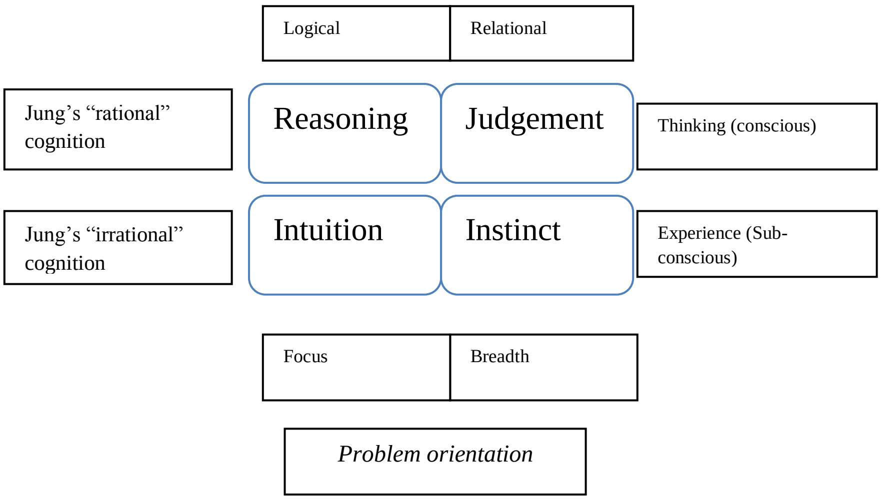
2.4.3 The cognitive model of decision-making

The manner in which individuals process decisions differs significantly and depends on numerous factors. These include the context in which the decision is made, and the perceptions, understanding and values of the decision maker (Rowe & Boulgarides 1994). It is suggested that the two most important influences on decision making are the cognitions and values of the decision maker (Martinsons & Davison 2007). Both are regarded as having a significant effect on how the decision maker will perceive and respond to conditions and the stimuli that indicate the need for a decision (Messick 1999).

Different leaders in the same decision making situation may act very differently depending on their cognitions and values. These variations in behaviour can be aligned with different types of decision makers according to the way in which they process information, also known as cognitive style (Leonard, Nancy H, Scholl & Kowalski 1999a). These cognitive styles are regarded as "relatively stable dispositions which lead to differences in behaviour in the decision-making process" (Leonard, Nancy H, Scholl & Kowalski 1999a, p. 407). Leonard et al. (1999a, p. 418) indicate that decision styles are strongly influenced by cognitive styles, but that decision styles are "also influenced by the needs values and self concept of different individuals". They conclude that the Rowe and Boulgarides (1994) model of decision-making styles address this aspect by integrating cognitive styles with other value based needs in terms of the four decision-making styles they propose.

In the context of organisational strategic decision-making, it is the strategy-level leaders who ultimately determine the choices among alternative options in the strategy process. These choices are mostly dependent on the cognitions, whether conscious or sub-consciously of the leader. The Rowe decision-styles model describes cognition as being made up of two dichotomous pairs of cognitive functions, either rational or irrational. The rational functions are made up of 'thinking' and 'feeling' and the irrational functions are made up of 'intuition' and 'sensing'. Rowe and Boulgarides' cognitive model of reasoning illustrate four styles of reasoning related to decision styles (Rowe & Boulgarides 1994) and these correspond to Jung's two pairs of cognitive functions. Figure 2.7 illustrates the overlap of these concepts.

Figure 2.7: Jung's cognitive functions and the Rowe and Boulgarides cognitive model.



Source: (Rowe & Boulgarides 1994, p. 67)

From Figure 2.7 reasoning and judgement are related to thinking which can be regarded as conscious acts. Intuition and instinct are related to experience or unconscious acts. The former relate to Jung's 'rational' functions of cognition which are noted as being 'thinking' and 'feeling' while the latter is related to Jung's 'irrational' functions of cognition which are noted as being 'intuition' and 'sensing' (Rowe & Boulgarides 1994, p. 111). These functions interact and thus assimilate when making decisions but also differ in their constitution in individuals. This study assumes that based on the above description of cognition and its supporting theories that foresight and strategic thinking correspond to the different functions and interact. The concepts in the literature overlap in differing degrees but are regarded as emanating from different cognitive functions. It is proposed that the difference between strategic thinking as a conscious function and foresight as a sub-conscious function emanate from the 'reasoning' or 'rational' aspects of cognition and the 'intuitive' or 'irrational' aspects of cognition respectively.

2.4.4 Decision-making styles

Scott and Bruce (1995, p. 820) define decision-making style as "the learned habitual response pattern exhibited by an individual when confronted with a decision situation". Scott and Bruce's definition differs from Rowe and Boulgarides in that the former refer to decision-making style not as a trait but as a "habit-based propensity to react" (1995, p. 820) whereas the latter focus on the cognitions and values of the decision maker regardless of whether it is habitual or not. Both agree that context within which the decision is made is an important factor. Contemporary empirical studies continue to validate both approaches (Leonard, Nancy H, Scholl & Kowalski 1999a; Loo 2000; Martinsons & Davison 2007; Pennino 2002; Thunholm 2004). For the purposes of this study it was determined that the due to the focus on leader cognitions and values of the Rowe and Boulgarides approach and its higher factor scores in previous studies, its measurements and framework would be used.

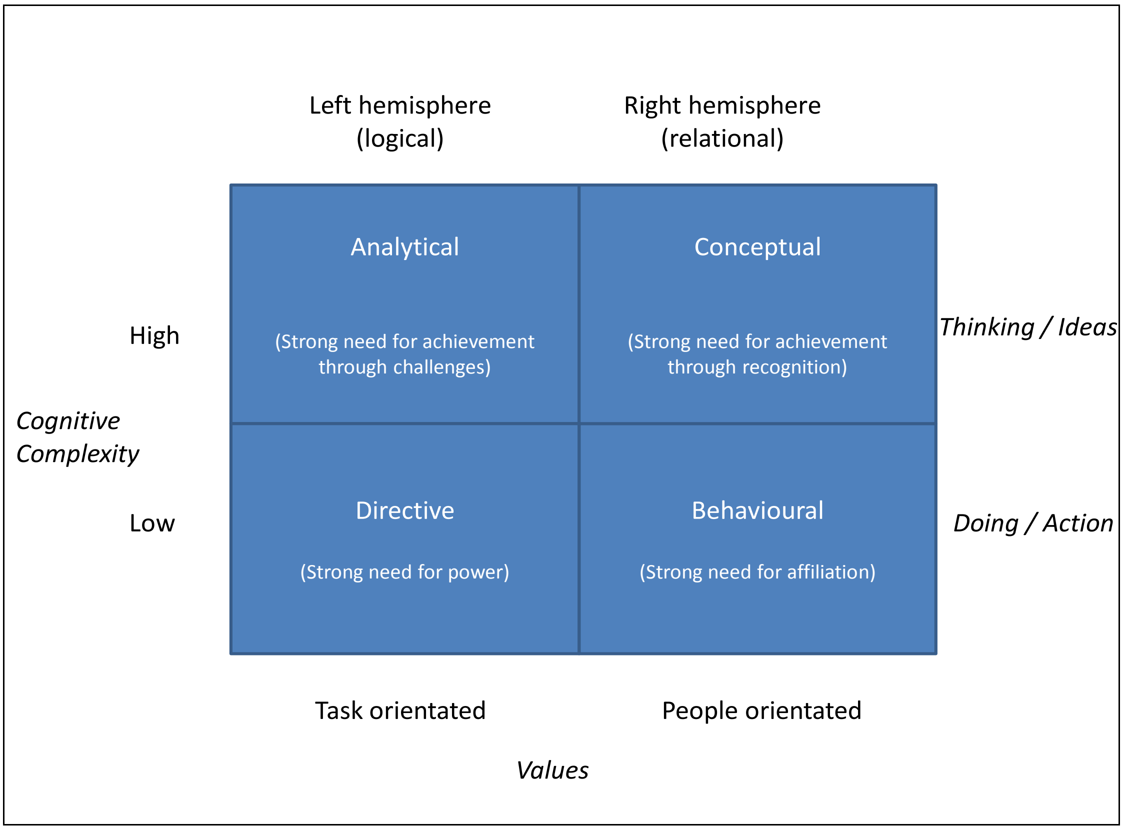
Stylistic differences in the Rowe and Boulgarides approach relate to an individual's cognitive complexity and the manner in which they deal with uncertainty and ambiguity (1994). These differences also relate to the individual's values which are typified as either human / socially orientated or task / technically driven (Rowe & Boulgarides 1994).

It was concluded by Nutt (1990) that decision style is a key factor in explaining strategic action and illustrates the perceived risk in taking this action on the part of the decision-maker. Nutt's study further found that decisions made by strategy-level leaders are more style dependent than those of lower level decision makers. As such, this study adopts the view that the decision styles of leaders reflect their foresight styles and strategic thinking as related to strategic decision-making.

2.4.5 Rowe's Decision Style Inventory

The choice to include Rowe's Decision Style Inventory (DSI) (Rowe & Mason 1987b) is based on the validity and reliability of the instrument, its focus on leadership, its cognitive complexity and values orientation. Its use is also contemporary with recent studies confirming its continued validity (Martinsons & Davison 2007; Williams 2006). Its application is also applicable in a variety of organisational contexts. The latter is an important consideration as it is widely accepted that many styles and psychometric evaluations do not take situational conditions into account. The DSI measures the relative propensity of decision-maker's reliance on certain styles and does not measure absolute values on each style and is thus useful in comparing decision-styles of groups or individuals (Martinsons & Davison 2007). Further, the DSI is based largely on an integrated approach to leadership theory literature (Williams 2006). Its questions are also specifically related to situations typically facing a strategy-level leader in an organisational context rather than in social settings or just generally. Figure 2.8 illustrates the Decision Style model.

Figure 2.8: Decision-Style Model



Source: Adapted from Rowe and Boulgarides (1994, p.29)

The decision-style model is based on two dominant criteria: the decision-maker's cognitive complexity and values orientation (Figure 2.8). The first criterion determines whether the decision-maker is predominantly task or people orientated as a reflection of their core values and was originally developed by Blake and Mouton (1985 in Rowe & Boulgarides 1994). The second criterion is based on the level of ambiguity a decision-maker can tolerate when making decisions stemming from Zaleznick's construct related to leader's cognitive complexity (1970 in Rowe & Boulgarides 1994). This was further developed to include the amount of information used and the number of alternatives considered by decision-makers when making decisions. These two criteria, values orientation and cognitive complexity, combine to define the four decision-making styles measured by the DSI. Figure 2.8 illustrates how the inventory classifies decision-making styles: a) directive – task oriented and low in cognitive complexity, b) behavioural – people oriented and low in cognitive complexity, c) analytical – task oriented and high in cognitive complexity, and d) conceptual – people oriented and high in cognitive complexity. Theoretical support for their model is provided in recent leadership literature (Bennis 2007; Hackman & Wageman 2007; Vroom & Jago 2007).

The strength of the DSI is that it is embedded in the fact that it measures propensities to use alternative styles thus amounting to the decision-maker having a repertoire of styles. The DSI uses relative scores to determine if a decision maker has a dominant predisposition to a particular style. Therefore each respondent has, if applicable, a 'dominant' style (a style used most often), 'back-up' styles (used when the dominant style is regarded as inappropriate) and a least preferred style (reluctant to use if at all). Table 2.1 lists the cognitive and value characteristics of the DSI styles, namely conceptual, analytic, behavioural and directive. The figure also contrasts the DSI with Scott and Bruce's Decision Making Styles.

Table 2.1: Characteristics of DSI Styles

	Rowe and Mason's Decision Style Inventory
Conceptual **High cognitive complexity** **People Orientated**	**Judgement (values and beliefs)** *Needs recognition, praise and independence* Tolerance for ambiguity Future / Long-term orientated Initiates new ideas Humanistic / artistic Creative / generates multiple alternatives / independent thinker
Analytic **High cognitive complexity** **Task orientated**	**Reasoning (inference)** *Needs achievement through challenges* Tolerance for ambiguity Problem solver / thinker Uses considerable data Enjoys variety / is innovative Careful analysis / wants control
Behavioural **Low cognitive complexity** **People Orientated**	**Instinct (feelings)** *Needs affiliation* Uses persuasion Needs structure Supportive / Empathetic Communicates easily / prefers meetings Uses limited data
Directive **Low cognitive complexity** **Task orientated**	**Intuition (expertise)** *Needs power* Aggressive / expects results / autocratic Acts rapidly Uses rules Uses intuition and limited alternatives Is verbal

Source: (Adapted from Rowe & Boulgarides 1994)

Pennino notes that the investigation of decision-styles should not be conducted in isolation (2002). Certain decisions, especially those related to strategy, entail considering the long-term alternatives as to how those decisions may unfold in the future. This requires the ability, or competence, to balance hypothesised future alternatives with present conditions and likely actions. These hypotheses of the future thus form part of the decision-maker's cognitive process and reflect their foresight competence. The task of cognitively balancing these insights into the future and evaluating the most appropriate decision given the current situation reflects strategic thinking. The study of the relationship between decision-styles and the concepts of foresight and strategic thinking could yield unique insights in related fields, yet remains relatively unexplored.

In considering that decision-styles reflect the competences, perceptions and behaviour of decision makers it is proposed that the elements of foresight competence and strategic thinking are positively related to certain styles and theoretically illustrate conceptual linkages. These conceptual linkages in relation to the DSI styles will be addressed in this study.

Reliability and validity studies of the DSI are extensive (Leonard, Nancy H, Scholl & Kowalski 1999a). These include studies conducted in Western and Eastern contexts and thus exhibit flexibility in a variety of cultural contexts. It has a very high face validity and reliability with respondents agreeing with the outcomes of the instrument (Martinsons & Davison 2007).

2.4.6 Summary

Decision making is a cognitive process of perceiving, processing, judging and deciding (Rowe & Mason 1987b).

Decision-making style refers to the way in which individuals process information and evaluate the consequences related to making decisions. The decision-maker's behaviour, unlike those typified by other psychometric evaluations, is variable depending on their flexibility and according to the situation and the individual's repertoire of decision styles. In terms of the application of foresight and strategic thinking which are very context reliant, the notion of variable style usage, provides a suitable framework for investigating the conceptual linkages. An effective strategy-level leader should therefore be flexible enough to adapt their style according to the situation at hand and in the case of long-term strategy and innovative solutions be able to adopt a conceptual style (Pennino 2002). The literature therefore provides a theoretical linkage between the conceptual style and foresight and strategic thinking.

Information can be perceived either consciously (sensing) or unconsciously (intuition), and judged by rational thinking or subjective feelings. These perceptions and judgements play an important role in the decision-making of every strategy-level leader. Often strategic decisions are made without the leader being able to recognise the foresight or strategic dimensions thereof. An enhanced understanding of these dimensions in decision-making can lead to greater awareness and efficacy in strategic decision-making. Yet little is known about the relationship between foresight and strategic reasoning, and decision-making. This study will investigate, based on theory, the conceptual linkages between strategic thinking and decision-making styles. It will further explore the empirical relationship between strategy-level leaders' orientation to the future, their foresight styles and decision-making styles.

2.5 Foresight

2.5.1 Introduction

Contemplating the future is an imperative of meaningful strategy. The future is in essence unknowable as it has not yet occurred. The future, as a dimension in time, is a "cognitive construction" of how individuals perceive, imagine and judge the future to unfold (Narayanan & Fahey 2004). This study however, asserts that foresight is a critical antecedent to the focal act of strategic thinking as a task, which precedes making strategic decisions.

Foresight has been identified as a critical competency in leaders and organisations (de Geus 1997; Hamel & Prahalad 1994; Major, Asch & Cordey-Hayes 2002). Definitions of foresight have varied (Amsteus 2008) but are all concerned with perceiving how the future could develop and implications of such change.

2.5.2 Conceptualising foresight

"Foresight is the product of deep insight and understanding" requiring a sustained and deliberate deconstruction of cognitions that dominate our habits of thought (Chia 2004, p. 21). Chia confirms that foresight is a "highly valued human capacity" that is manifested in human cognition and evokes a "generative field of potentiality" (Chia 2004, p. 22). Chia asserts that foresight can be cultivated by systematically developing 'peripheral' rather than 'frontal' vision. This aligns with more recent literature that urges peripheral vision and foresight in becoming more effective leaders (Day, G. & Schoemaker 2008) and optimise performance in developing the *cognitive intelligence competencies* (Boyatzis, R E 2008). Foresight is a "cognitive temporal perspective that leaders use to anticipate, clarify, and structure the future, so as to guide their organisation in the present based on future opportunities" (Gary 2008, p. 4).

Many strategy authors concur that foresight is a critical leadership competency Place these into table with their references(Alsan 2008; Attila 2003; Boyatsis 2008; Boyatsis & Saatcioglu 2008; Buchen 2005; Chermack 2004; Chia 2004; Costanzo & MacKay 2009; Day, G. & Schoemaker 2008; de Geus 1997; Hamel 2009; Hamel & Prahalad 1994; Kouzes & Posner 2002; Major, Asch & Cordey-Hayes 2005; Montgomery 2008; Sanchez 2004; Sanchez & Heene 2004; Tsoukas & Shepherd 2004b; Yukl 2006). Ahuja illustrates that all major theories of strategy related to competitive advantage assume that strategy-level leaders must all have some degree of foresight (Ahuja, Coff & Lee 2005).

Literature on the subject of foresight can be regarded as sparse (Fuller, Argyle & Moran 2004). Foresight as a concept has been used in terms of describing an individual's competences, cognitions, a distinct process or institutional programme (Major, Asch & Cordey-Hayes 2002). Table 2.2 illustrates some of the definitions of foresight that appear in the literature. These often overlap and can be a source of confusion. In an attempt to differentiate foresight concepts terms such as *strategic foresight*, *foresight process*, *organisational foresight*, *pathfinding* and others have arisen in the literature.

Table 2.2: Definitions of foresight

SOURCE	DEFINTION	APPLICATION
WEBSTER'S	Act or power of foreseeing, prescience, and act of looking forward with provident care or prudence.	Human cognition
OXFORD	The application of care and attention to the likely outcome of something or to future needs.	Human cognition OR Technique
(Reid & Zyglidopoulos 2004)	Understanding and anticipation of the future.	Human cognition
(Raimond 1996)	Foresight has to be both predictive and creative ('creative imagination'). Predictive – the ability to identify critical factors in external environment, how they will behave in the future and how they will affect the organisation along the planned course of action. Creative – not concerned with predicting but what the future ideally could be if we could make it happen. Imagination of ideal futures then seeks ways to make it a reality.	Institutional technique
(Slaughter, 2007)	An emergent capacity of the brain-mind system. Boundaries of perception are pushed forward by (1996): a) Consequence assessment – assessment of implications of present actions b) Early warnings and guidance – detecting and avoiding problems before they occur c) Pro-active strategy formulation – considers present implications of possible future events d) Normative visions – envisioning desired futures	Human cognition
(Coates, 1985)	A process by which one comes to a fuller understanding of the forces shaping the long-term future which should be taken into account in policy formulation, planning and decision-making.	Technique
(Voros 2003)	'Foresight opens up an expanded range of perceptions of the strategic options available so that strategy-making is potentially wiser' (2003, pp.12)	Technique
(Horton 1999)	Foresight is a process of developing a range of views of possible ways in which the future could develop, and understanding these sufficiently well to be able to decide what decisions can be taken today to create the best possible tomorrow (1999, pp.5). Foresight is a key business skill linked to knowledge creation and areas such as innovation. It is a combination of understanding possible futures of an organisation and acting upon that understanding.	Technique
(Amsteus 2008)	Degree of analysing present contingencies and degree of moving analysis of present contingencies across time, and degree of analysing a desired future state or degrees or states a degree ahead of time with regard to contingencies under control, as well as degree of analysing courses of action a degree ahead in time to arrive at the future state.	Human cognition OR Technique
(Hayward 2005)	The capacity to bring a consideration of the future into the present decision perspective (as opposed to foresight actions) An attribute or competence Important element of in a person's foresight competence is their Future Time Perspective (FTP) – cognitive understanding of expectations of the future (2003, p. 5) a) Detection and avoidance of hazards b) Assessment of consequences of actions c) Envisioning desired future states.	Human cognition

(Tsoukas & Shepherd 2004a)	The engagement of memory and expectation that enlarges the consciousness of the present – know how is brought forward from the past and extrapolations to the future are made (2004b, p. 11) a) Act of looking forward b) Taking provident care c) Ability to anticipate beyond seemingly ambiguous and complex systems d) Understanding ways in which patterns of the future can emerge (2004a)	Human cognitive
(Cuhls 2003)	a) Enlarge the choice of opportunities, assess impacts and chances. b) Prospect for the impacts of current research c) Ascertain new needs, new demands and new possibilities d) Focus selectively on the environment / system e) Define desirable and undesirable futures f) Start and stimulate continuous discussion processes.	Technique

Source: Developed for this research

Of critical importance to the study of foresight is the differentiation of; a) foresight as a cognitive capacity from foresight as a technique or method, and b) foresight from strategic foresight.

As noted in Table 2.2, numerous studies have recognised the *cognitive perspective* of foresight. It is described as 'innate', 'a human capacity', 'a vision of the mind' and based on 'deep insight and understanding'. In its simplest form, foresight is described as anticipation before action (Godet 2001) but is underpinned by the concept of 'self'. The concept of 'self' relates to seeing oneself as an agent of future change, being able to 'create' the future. Foresight is also defined in the literature as a process (Horton 1999) or technique. As both relate to process, the process perspective will be termed *foresight technique* to avoid confusion. A number of national and international initiatives (Blind, Cuhls & Grupp 1999; Cragg & Spurgeon 2007; Héraud & Cuhls 1999; Kuwahara 1999; Martin & Johnston 1999) adopt the *foresight technique* view of foresight in that it is an institutionalised technique of gathering, interpreting and understanding information in order to develop a range of views of the future and develop actions to achieve the preferred possible futures. Foresight at an organisational level institutionalises the technique combining the perceptions of multiple contributors to develop a range of alternative formulated views of how the future may unfold *and* the best decisions that will be organisationally useful (Martin & Johnston 1999). However, foresight at an individual level focuses on the mental processes, both rational and irrational, used in developing images of the future as a form of cognitive intelligence. Individual foresight competence therefore compliments the institutionalised technique or process of foresight in its aggregated form.

Foresight technique could be described as emulating the cognitive processes of foresight in an individual's mind but is distinctly different in that it resembles a methodology that primarily a) implies necessary action, and b) has structure (Horton 1999). If foresight in terms of the *cognitive perspective* is 'a vision of the mind' and 'anticipation before action' (Godet 2001) it can be deduced that it precedes further tasks or actions and does not necessarily follow a conscious structure but does involve a process that seeks to identify and understand the forces that shape the long-term future that should be taken into account in decision making (Coates 1985). As such, this study adopts the perspective that individual foresight is a cognitive function common to all humans in differing degrees and is primarily concerned with the mental processes involved in creating images of the future in the mind of an individual. Foresight in individuals can be developed and enhanced (Hayward 2005). It does not imply any external method, decision, action or fulfilment of an organisational task. In the context of this study which seeks to investigate the relationship between foresight as an individual competence and strategic thinking as a task which precedes strategic decision-making, it thus becomes important to distil the concept of foresight to its original description as an innate human cognition.

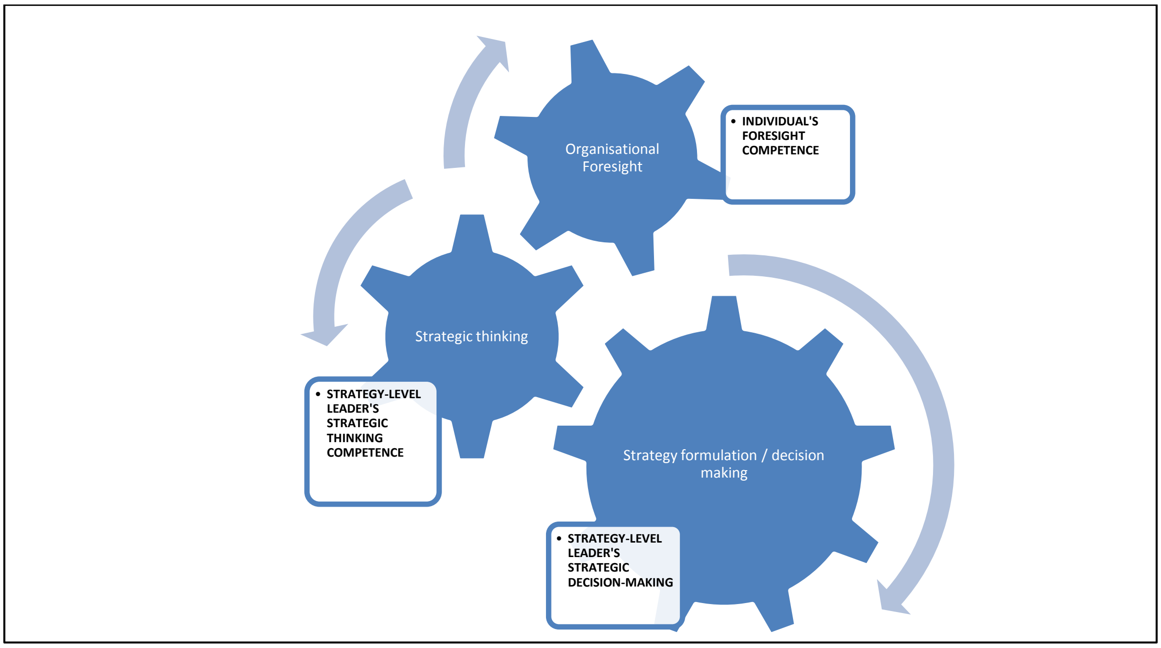
2.5.3 Individual foresight in organisations

To practice foresight in organisations is "to be trained in futures concepts, to become more future orientated at the fundamental levels of values, beliefs and philosophies" (Nanus 1977, p. 195). Individual foresight competence can be further developed by being exposed to discourse on foresight concepts, its methods and application (Alsan 2008). Leadership that links vision to action and organisational cultures that are responsive to futures contributes to having future orientated institutions (Nanus 1984, p. 407) .

Voros confirms the marginal difference between cognition and action in stating that "foresight in an organisational context is an aspect of strategic thinking, which is meant to open up an expanded range of perceptions of the strategic options available, so that strategy-making is potentially wiser" (2003, p. 12). He continues by stating that foresight focuses on expanding the range of perceptions related to the future, not the actions required for strategy development which would include the taking of strategic decisions, or strategic planning which is required to implement the actions. In terms of his framework, Voros indicates that foresight is an "element of strategic thinking, which is an input into strategy-making [decisions], which then directs strategic planning and action"

(2003, p. 13). Voros' generic framework is set in the organisational context but does not address the individuals' input in greater detail. Support for the generic process can be found in the strategy literature as noted in Section 2.2 above. Figure 2.9 illustrates the role of the strategy-level leader as related to this generic process and indicates the cognitive competence of foresight contributing to organisational foresight, the functional competence of strategic thinking contributing to the strategic thinking capabilities of the firm and how these contribute to strategy-making. The figure also illustrates the inter-connectedness of the process making provision for ongoing evaluation, emergence and re-formulation as suggested by the Dynamic Model of Strategy (Section 2.2.2.1).

Figure 2.9: Organisational strategy-making and the role of strategy level-leaders



Source: Developed for this research.

Based on the rationale of Figure 2.9 the study defines foresight as an individual's cognitive competence to creatively envision possible, probable and desired futures, understand the complexity and ambiguity of systems and provide input for the taking of provident care in detecting and avoiding hazards while envisioning desired futures. Foresight competence is therefore regarded as the ability to act accordingly and 'provide input' to the task of strategic thinking as an antecedent of effective strategic decision-making. Being a task, strategic thinking's effective fulfilment requires a functional competence which is described in the study as strategic thinking competence. The concept of strategic thinking as a functional competence as differentiated from foresight as a cognitive competence will be discussed below.

2.5.4 Foresight as a cognitive competence

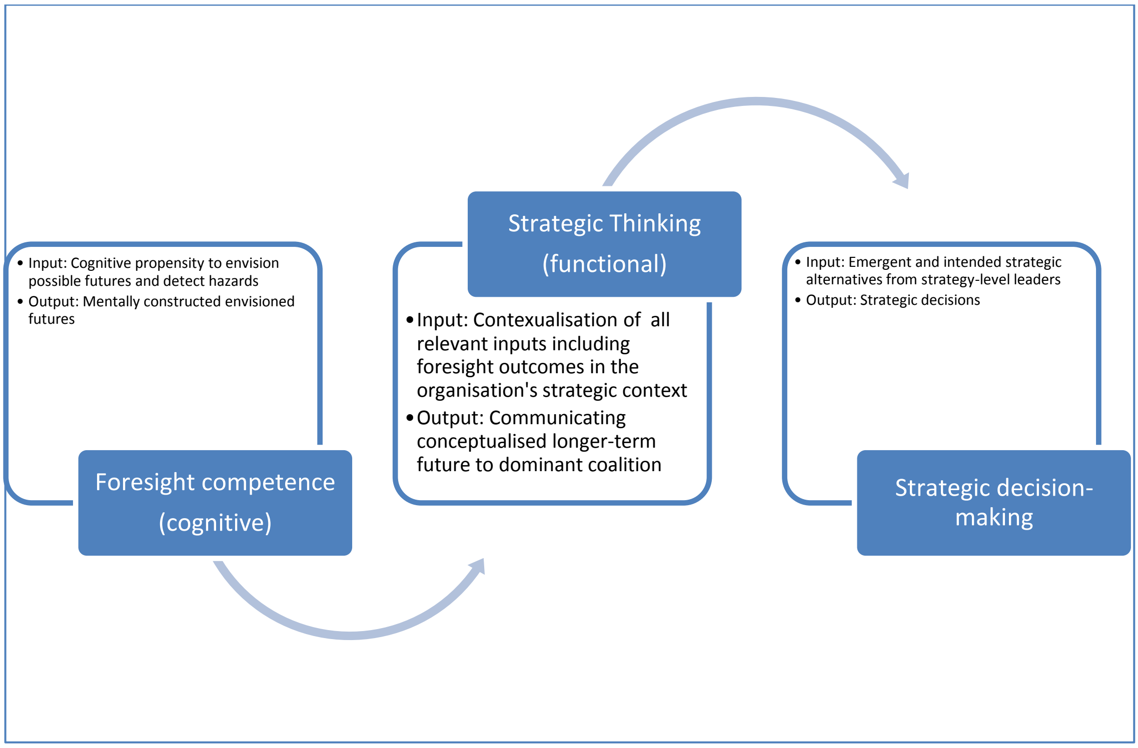
This study places a strong emphasis on the role of individuals as strategy-level leaders in their relation to their role in strategic decision-making. The concept of competence links strategy with individual job performance (Sandberg & Pinnington 2009). As modes of work have increasingly become more knowledge orientated, the understanding of how knowledge is connected with action is regarded as an important research focal area (Sandberg & Pinnington 2009). Strategy, particularly in terms of the resource based view of the firm is largely based on knowledge as a source of competitive advantage. The concept of foresight as a cognitive competence is fundamentally, such ‘knowledge work’, and thus constitutes an important perspective in terms of how knowledge is connected to action.

Strategy and leadership research have illustrated the importance of individual competences which, when ‘pooled’ develop organisational capabilities and competencies (Sanchez 2004). Individuals’ competencies are central to the development of organisational core-competencies and leaders’ propensities form part of the collective learning of the organisation (Prahalad & Hamel 1990). Indeed, it is asserted that the accumulation of a company’s foresight core-competence and use of foresight builds on the competency of one leader or the competencies of small teams (Major, Asch & Cordey-Hayes 2005). As such, the identification of individual foresight competencies in organisations is required to develop foresight core-competency. This is of great importance to organisations especially in terms of thinking about, and making strategy. Thompson, Stuart and Lindsay (1997, p. 70) confirm that “Foresight and Strategic Planning competencies … were highly correlated against the top team members who exceed expectations” and were of “critical importance”.

The concept of foresight as a competence, and competence approaches in general, has been subject to criticism. This is primarily due to the perceived emphasis competence places on tasks and the effective completion thereof at the expense of the social context. It is argued that many of these tasks cannot be adequately measured or are cognitively too complex to be reduced to a matching competence. Boyatzis (2008, p. 6) addresses this criticism by describing competence as “manifestations of intent, as appropriate in various situations or times” which can capture a “subtle competency like emotional self-awareness” as an example. A more subjective approach to competence can therefore accommodate the nuances missed by a purely rational approach which has been prevalent in the literature (Pate, Martin & Robertson 2003). This includes acknowledging the interaction of concepts involved in dynamic strategy development. It further suggests that tasks are not linear but complex, involving information that is incomplete and uncertain. Similarly, strategy has evolved from linear, separate planning processes based on rational thought to acknowledging the dynamic nature of strategy development within the context of uncertain environments involving incomplete information. Effective strategy at this level requires non-linear and complex tasks that overlap and integrate in terms of the competence outputs of those involved.

The knowledge, understanding and skills that are integrated to constitute foresight competence in strategy-level leaders can be summarised in terms of its definition. Foresight competence is defined as a *human ability to creatively envision possible futures, understand the complexity and ambiguity of systems and provide input for the taking of provident care in detecting and avoiding hazards while envisioning desired futures.* Figure 9 notes that this involves the cognitive ability to process incomplete information, detect patterns and creatively envision alternative possible and probable futures and is distinguished from the act of communicating the outcomes of this ability which have been found to follow, over longer periods, the cognitions originally conceived (Seidl & van Aaken 2009). This distinguishes the mental processes of foresight from the act of contextualising and communicating the outcomes within the context of an organisation's strategy (see Figure 2.10). The conclusion is that contextualising and communicating of foresight outcomes is regarded by this study as integrated into the task of strategic thinking and subsequent strategic decision-making.

Figure 2.10: Separation of tasks in strategic decision making



Source: developed for this research.

2.5.5 Measuring foresight competence

Foresight at the level of the individual and in terms of his / her cognitions is regarded as "an attribute, or a competence" (Hayward 2003, p. 16). Amsteus (2008) argues that the existence of managerial foresight in individuals is measurable according to their behaviours. In contrast, this thesis supports the view that foresight is not always observable in terms of behaviour but is rather a reflection of the individual's cognitions either conscious or unconscious and is aligned with foresight being defined as an innate human cognitive ability. Amsteus' definition of foresight (2008, p. 58) can be applied to measurement according to both behaviour or cognition. The reason for this is that the definition does not imply nor disregard an observable action. It can be interpreted equally as an observable behaviour (as indicative of the foresight technique and its imperative to communicate) or an individual's cognitive process (mentally constructed images) which is often only expressed later in the context of an associated task. While no agreement has been reached in the literature in terms of its operationalisation, there is sufficient congruence between the elements of what defines foresight competence and existing valid measures to support a measurement of the construct. Foresight is regarded as the temporal orientation of the strategy-level leader and contributing to an organisation's macro- and micro-analytical strategy practise (e Cunha, Palma & da Costa 2006). Temporal perspective is defined as the "totality of the individual's views of his psychological future and his psychological past existing at a given time" (Lewin, 1951 cited in Gary 2008, p. 5).

This study has adopted the view that foresight as a temporal mental ability differentiates it from the dynamic macro-processes of strategy formulation. Outcomes derived from foresight knowledge processes as generated in the cognitions of leaders thus contribute to the strategic considerations, strategic decisions and ultimately the strategic direction of the organisation. The broadened perceptions of the decision-maker created by foresight competence are orientated in time and generate knowledge of the future. While formulated in the mind, such knowledge is not necessarily expressed unless required in terms of the fulfilment of an attendant task. Foresight competence may therefore seldom be expressed or observable in relation to work related tasks. This may be due to structural obstacles in the organisation, detachment from the organisation's strategy, rational strategy-making modes of the organisation, inadequate forums or other such reasons. In essence, foresight takes place in the mind of the individual and requires an external catalyst in the form of a task to find expression.

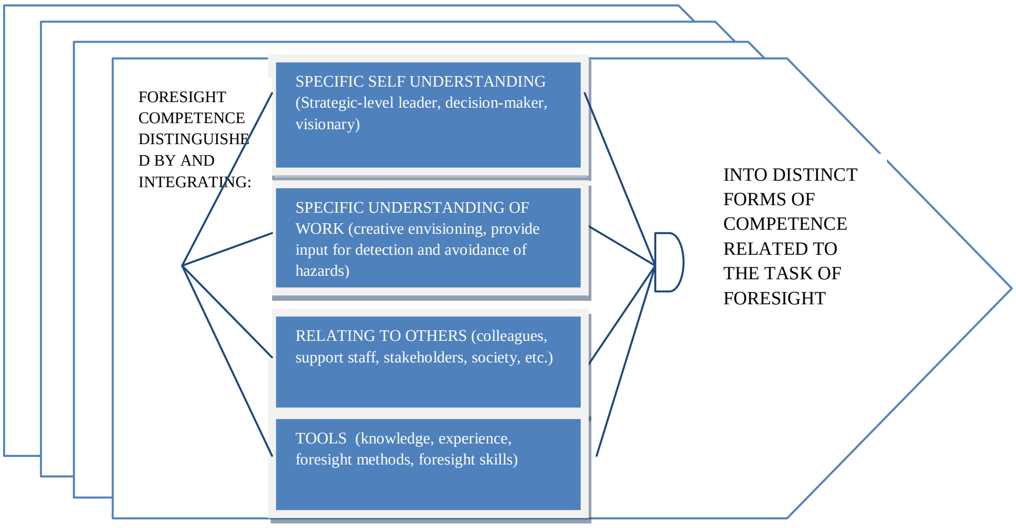
2.5.5.1 Foresight as a cognitive competence

Foresight is regarded by this study as a cognitive competence. Cognitive competence is concerned with an individual's cerebral abilities. This approach to competence can be regarded as able to bridge research areas such as that between competence and decision-making (Nelson & Narens 1990). Nelson and Narens note that the predominantly rational one-dimensional approach to competence is no longer adequate in explaining the nature of competences. A more multi-dimensional holistic approach is better suited in terms of explaining human abilities and the attendant aspects thereof.

An existential ontological view of competence describes competence as 'ways of being' (Sandberg & Pinnington 2009). Rather than defining the competence in terms of observable scientific and positivist criteria only, foresight competence can be described in terms of aspects of professional practise (Sandberg & Pinnington 2009). These include overlapping skills in initiating, formulating, monitoring and evaluating one's own cognitive processes; the experience and knowledge involved in problem solving;

understanding complexity, coping with uncertainty and tolerating ambiguity while being able to use effective cognitive aids and methods. This perspective includes describing competence as the understanding of self, understanding of work tasks, engagement with other people and the tools used including knowledge and skills. This matches Boyatzis' (2008) conceptualisation of competences as the particular skills, knowledge and understanding of an individual. Figure 2.11 illustrates Sandberg and Pinnington's (2009) conceptual model used for measuring competences of practitioners and is adapted to illustrate the multi-levelled nature of foresight competence.

Figure 2.11: Foresight Competence as a way of 'being'.



Source: (Adapted from Sandberg & Pinnington 2009, p. 1162)

Of particular relevance to this study is that the measurement of foresight competence is captured by the scales used in this study which are related to the taxonomy proposed to Sandberg and Pinnington. These include the TimeStyles scale which measures orientation to time and the Foresight Styles Assessment which determines the style of foresight adopted by an individual. Chapter three will discuss the relevance of these measures to competence in greater detail. It is argued that the framework as proposed and empirically tested by Sandberg and Pinnington (2009) contributes to the validity of evaluating foresight competence in terms of the instrumentation used.

It should be noted from Figure 2.11 that the multiple layers depicted as underlying the composition of competence, denote contextual and style variability. The competence is therefore not limited to only one way of constructing images of the future but recognises the individual uniqueness of this ability. Constructs such as mental time travel (Suddendorf & Corballis 2007), MindTime (Fortunato & Furey 2009) and Foresight Styles (Dian 2009) acknowledge this variability in our human ability to react to external change, investigate the future and visualise the future. Prominent in the measuring of foresight is an individual's ability to travel in time with Thoms (2004) concluding that future-orientated people are able to develop detailed cognitive maps of what the future could be and are good at creating visions.

2.5.5.2 Mental time travel

The concept of mental time travel illustrates that the human ability to "mentally project themselves backwards in time to re-live, or forwards to pre-live events" with the ability to mentally engage with the future, is regarded as the "ultimate evolutionary advantage" in terms of shaping the future (2007, p. 299). The authors investigate, biologically, the evolutionary nature of how organisms anticipate changes in their environment and shape the future to mitigate or adapt to its effects. Humans have been particularly successful in foreseeing such changes in the environment and respond accordingly (Suddendorf & Corballis 2007). Similarly, leaders' orientation to time in terms of focussing on the past, present and future has been noted in leadership literature as of great importance assuming their ability to do so (Thoms & Greenberger 1995). Indeed, leaders able to envision the challenges and opportunities facing society have long been highly valued by societies as noted in religious, mythological literature and historical artefacts.

Based on information contained in both episodic and semantic memory, mental time travel in the future allows for the mental reconstruction of conditions that incorporate what are conceived as known elements but are imaginatively re-arranged to create an experience of a future event (Suddendorf & Corballis 2007). This reconstruction within the mind implies an ability to disengage from the present and locate the constructed image elsewhere in the time continuum. This ability varies from individual to individual and is as unique as the individual themselves. The framework is further supported by the notion that mental time travel provides input for "increased behavioural flexibility to act in the present to increase future survival chances" (Suddendorf & Corballis 2007, p. 302). The researchers note that the conceptual purpose of mental time travel is to enhance the mental ability of engaging the future. An increased 'fitness' in mental time travel is regarded as being able to provide more options with which to imagine and formulate possible future (Suddendorf & Corballis 2007). This is clearly linked to the having the ability or competence in foresight.

Importantly, the researchers distinguish mental processes that detect and track pertinent information from action orientated processes that determine behaviour (Suddendorf & Corballis 2007). Accordingly, and specific to this study, is the separation of perception from action. Perceptual systems, or cognitions, are manifested in humans in differing degrees while actions systems also differ in humans in terms of their flexibility and response (Sterelny 2003). While these abilities are regarded as innate in humans, the degrees to which these are evident in individuals differ. Suddendorf and Corballis (2007) conclude that mental time travel in humans is open-ended, generative in nature and facilitates foresight.

Research confirms that the same neurological pathways are used when recalling the past and envisioning the future with the only exception being that when envisioning the future, "additional neural areas are activated" (Dian 2009, p. 60). The degrees to which these additional areas are activated would explain the variances in the ability to perceive future conditions. It would also explain why it is important when conceptualising strategy formulation, to separate perceptions of the future among strategy-level decision makers from the action orientated task they perform in terms of formulating strategic responses and decisions. Temporal orientation is therefore differentiated from action orientation.

2.5.5.3 Theory of MindTime

Fortunato and Furey (2009) refer to Furey's theory of MindTime. Closely related to Suddendorf and Corballis' concept of mental time travel, the theory proposes that "three distinct patterns of thinking evolved in concert with the ability to engage in mental time travel" referred to as Past, Present and Future thinking perspectives (Fortunato & Furey 2009, p. 241). The theory asserts that; i) the extent to which individuals utilize the thinking perspectives differ and can be constituted in terms of a combination of perspectives, ii) the differences of extent can be measured, iii) the extent to which the perspectives are utilized determines how the individuals develop perceptions of and interact with their environment and others (Fortunato & Furey 2009).

The three thinking perspectives proposed by the Theory of MindTime are illustrated in Table 2.3. These are defined in terms of the individual's ability to engage in mental time travel and are illustrated in terms of what typifies each pattern of thinking.

Table 2.3: Abilities and characteristics of MindTime thinking perspectives.

Thinking perspective	Mental time travel ability	Characteristics
Past thinking	Retrieval of past experience and knowledge by reflection and contemplation in order to reconstruct, analyse and critical evaluate information in order to reduce risks associated with anticipated current and future events.	Dominantly risk reductive. Contemplative thinking. Accesses past experiences and knowledge.
Present thinking	Organised thinking based on current observations that integrate Past and Future perspectives in order to develop actions, allocate resources and efficiently apply them.	Dominantly orientated toward 'getting things done' Organised thinking. Mentally 'stepping out of time'.
Future thinking	Creatively imagine infinite hypothetical future possibilities in order to foresee and adapt to environmental changes. Generative process of creative problem solving and divergent thinking in order to detect gaps in knowledge, patterns and trends.	'Big picture thinking' Imaginative thinking. Ability to see gaps in knowledge, patterns and trends that diverge.

Source: (Fortunato & Furey 2009)

The theory of MindTime proposes that the patterns of thought linked to the ability of the mind to travel in time are distinctive in terms of their orientation to time. Its assumptions are based on this ability which as noted above describes a cognitive competence. As such, the measurement of an individual's orientation to time using Fortunato and Furey's TimeStyle Inventory contains face validity in that it describes the individual's propensity to predominantly utilise imaginative thinking, organised thinking or contemplative thinking, and the degrees to which there is a combination of these. The content validity of the measurement of this construct will be discussed further in Chapter 3.

2.5.5.4 Foresight Styles and competence

Dian (2009) proposes that Foresight Styles are in essence a reflection of the style with which individuals cognitively respond to change and their envisioned prospects of the future. Foresight is embedded in the roles and tasks of strategy-level leaders. Foresight Styles explain the how foresight cognitions differ from individual to individual within the context of their internal disposition used to understand the future. Gary (2008) notes that these cognitive dispositions emerge from an individual's innate innovativeness and time orientation. These differ according to their propensities to tolerate risk, creativity, tolerate ambiguity, their value orientations, in addition to their predominant focus on the past, present and future.

Dian's (2009) typology measured by the Foresight Styles Assessment (FSA) suggest that there are six distinct styles: Futurist, Activist, Opportunist, Flexist, Equilibrist and Reactionist. Measurement of these dispositions is not directed at identifying a superior style in isolation but rather determines the values of each as differentiated across the spectrum of dispositions. As such the typology is recognised to describe the cognitive tendencies, differing from individual to individual, that interact with their temporal orientation and environmental change. Dian describes the styles as "distinct, yet co-occurring, relatively stable aspects of a person's time perspective" (Gary 2008, p. 5).

The Foresight Styles Assessment instrument has undergone further tests for validity and research by Gary (2008) has indicated that a reduced four factor version had greater factor loadings and fit. Gary (2008, p. 76), in his study to empirically test the FSA, concludes that the refined four factor FSA "is valid and reliable with minimum construct validity for exploratory research". The four factors and attendant characteristics are listed in Table 2.4.

Table 2.4: Foresight styles

Foresight style	**Characteristics**
Framer	Interrogates the future Future time orientated Interested in the long-term issues that define the future Envisions 'bigger picture' futures
Adapter	Adjusts to new situations as future demands Balances multiples challenges and choices Helps others adapt / Is flexible / Activates action Flexible leadership / Change Orientated Influencer
Tester	Adopts new trends / Confirms diffusion of innovation theory Experiments with new trends when they arise Opportunistic / Not cognitive trend analysis
Reactor	Preserves own position Mitigates and resists change

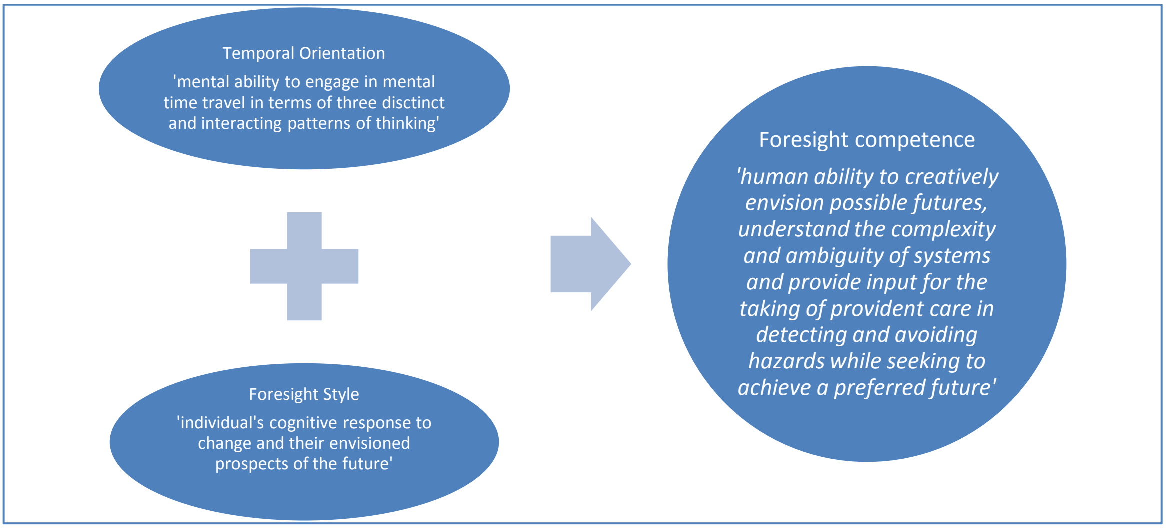
Source: (Gary 2008)

An assumption may prevail that in order to be competent in foresight one would need a dominant style described as Framer by the FSA. While this is certainly related to the characteristics of an effective strategy-level leader, it is the ability to switch between styles according to the circumstances that may describe foresight competency better (Gary 2008). Certainly aspects of other styles such as the Adapter's ability to adjust to new situations as the future demands may contribute to foresight competence. One would expect however, that individual's that have a propensity to be Framers, would rely on Tester and Adapter styles depending on the situation but reject the Reactor style.

This study seeks to describe foresight in individuals, in particular strategy-level leaders, in terms of their competence to do so. Foresight is innate to human beings yet differs from individual to individual depending on a number of elements, primary of which is the temporal orientation. Their competence to exercise it is related to the cognitive ability to meet the need to envision possible futures.

The construct of foresight competence is therefore described in terms of orientation to time described by mental time travel (Suddendorf & Corballis 2007) as incorporated in the Theory of MindTime (Fortunato & Furey 2009) in addition to the Foresight Styles (Dian 2009) of the individual. The characteristics described by these orientations and styles are linked to the definition of foresight competence listed above. Figure 2.12 illustrates how the study's construct of foresight competence is operationalised. Of particular importance is that not only does this construct describe the foresight propensities of individuals acknowledging the variance according to context, but the use of both measures allow for triangulation in the analysis. This latter aspect relating to internal validity will be described in Chapter 3 below. The construct further addresses Gary's (2008) concern that the aspects of foresight that could have been captured in the Reactor Style are omitted from the revised Foresight Styles Assessment. Gary's concern is that the Reactor style could have captured positive aspects of this style's orientation to the past. This concern is addressed in the proposed construct by illustrating the linkages between foresight competence and an orientation to the past specifically in terms of drawing on memory to inform decision-making.

Figure 2.12: Foresight competence construct related to orientation to time and foresight styles.



Source: Developed for this research.

2.6 Strategic Thinking

2.6.1 Introduction

Strategy is not driven solely by the future, but finds impetus in the gap between the present reality and the intent for the future (Hamel & Prahalad 1994; Stacey 1992). This is an important observation illustrating the distinction between foresight and strategic thinking. Foresight is driven by understanding and anticipating alternative future possibilities. Strategic thinking however, is concerned with deriving intent as to the future of the organisation, and combining generative and rational thought processes in terms of crafting the strategic architecture to bridge the gap between the status quo and the intention.

2.6.2 Definition of strategic thinking

The literature is indecisive about what strategic thinking is (Bonn 2001; Goldman 2007; Heracleous 1998) and faces the possibility to being used so broadly and generically that it faces the risk of being "almost meaningless" (Liedtka 1998, p. 121). In a review of strategic thinking research, O'Shannassy (2005, p. 14) deduces that strategic thinking as "a particular way of solving strategic problems and (opening up) opportunities at the individual and institutional level combining generative and rational thought processes". Mintzberg (1994) describes strategic thinking as a synthesis involving intuition and creativity. Strategic thinking is seen as having to be both analytical and creative

(Raimond 1996). Table 2.5 illustrates leading definitions of strategic thinking in contemporary literature.

Allio (2006) defines strategic thinking as the "systematic analysis of the organisation and the formulation of its longer-term direction". From these definitions it is clear that strategic thinking is regarded as analytical in terms of current conditions and involves a level of creativity in terms of choosing a future direction. Allio's definition seeks to balance this choice of direction between the longer-term (implying beyond short-term as opposed to long-term) and the realistic anticipation of long term ambiguity and disruption. It also implies making a choice from alternative future options and makes provision for possible emergent strategies that will contribute to realised strategies. This is a significant observation that focuses the leader's thought processes to the evaluation of strategic choices based on a mixture of analysis and creative prospects. The outputs of foresight competence then, contribute to this evaluation of options by providing representations of possible futures.

Table 2.5: Definitions of Strategic Thinking

WEBSTER'S	Thinking - higher cognitive function and comprises activities like creative thinking, problem solving, and decision making. The analysis of thinking processes is part of cognitive psychology.
Inter-American Development Bank (Personnel Decisions, 2001)	A leadership competency. Going beyond the questions that are routine or required for one's job recognising the broader 'context' of 'the big picture'. Indentifying key or underlying issues in complex situations.
Allio (2006)	The systematic analysis of the organisation and the formulation of its longer-term direction.
(Mintzberg 1994)	A way of thinking that synthesises intuition and creativity whose outcome is an integrated perspective of the enterprise. Strategic thinking is not strategic planning.
(Hamel & Prahalad 2005)	Crafting strategic architecture emphasising creativity, exploration and understanding discontinuities.
(Bonn 2001, p. 64)	Strategic thinking at an individual level comprises of i) a holistic understanding of the organisation and the environment, ii) creativity and iii) a vision for the future of the organisation.
(Liedtka 1998)	A particular way of thinking that includes five elements i) a systems perspective ii) intent-focussed iii) thinking in time. iv) Hypothesis-driven and v) intelligent opportunism
(Goldman 2007, p. 75)	A distinctive management activity whose purpose is to discover novel, imaginative strategies which can rewrite the rules of the competitive game and to envision potential futures significantly different to the present including being conceptual, systems-orientated, directional, and opportunistic.
(O' Shannassy 2005, p. 14)	A particular way of solving strategic problems and opportunities at the individual and institutional level combining generative and rational thought processes.
(Dickson et al. 2001, p. 216)	The mental models used by managers in the conjectures they make in their planning and strategising.
(Tavakoli & Lawton 2005, p. 6)	A cognitive capability. The cognitive process that precedes strategic planning or action whereby an individual contemplates the future development of the organisation whilst considering its attributes, its past and present and the external realities within which it operates.

Source: Developed for this research.

2.6.3 Conceptualising Strategic Thinking

Of particular importance in terms of conceptualising strategic thinking is agreeing on what it is not. Mintzberg states that "strategic planning is not strategic thinking" (1994, p. 107). This distinction is a common theme in strategic thinking literature as it separates the purposes of each in terms of outputs. The output of strategic planning is a plan which has been analytically programmed according to already determined strategies. The output of strategic thinking on the other hand is "an integrated perspective of the enterprise" (Mintzberg 1994, p. 107) aiding strategy formulation and decision making. The difference between the iterative processes of strategic thinking and strategic planning and their outputs is illustrated in Figure 2.13 and are separated by the actions of making strategic decisions and evaluating strategy after planning.

Figure 2.13: The iterative process of and differences between strategic thinking and strategic planning.

Source: (Adapted from Heracleous 1998; O'Shannassy 2003)

Stacey (1992), whose work predates those critical of the rational approach to strategy such as Hamel and Prahalad, and Mintzberg, is also critical but from a different perspective - that of complexity theory. Stacey (1992) asserts that strategic thinking is not a determination of the likelihood of what will happen as determined by pre-programming. Rather, it is about learning and creating new ideas using qualitative similarities and analogies. "New strategic directions emerge spontaneously from the chaos of challenge and contradictions through a process of real time learning and political interaction" (Stacey 1992, p. 15).

Leaders need to invent, discover and create their long-term intentions as they proceed not seek to repeat or imitate successes of the past (Stacey 1992). Stacey therefore agrees with the contemporary view that strategic thinking is a synthesis of creativity and intuition based on learning through interactive strategic considerations. This corresponds to Allio's (2006) perspective in that 'longer-term' direction setting of strategic thinking is dynamic and changeable.

Stacey is critical of attempting to pre-determine the future as it is fundamentally unknowable. The creation of a long-term vision therefore, constitutes what he refers to as a ‘defence fantasy’ that is formulated to disguise the inherent complexity of the environment and uncertainty of the future. Stacey argues that he is not suggesting the abandonment of long-term concerns and is not dismissive of interrogating the future of the firm and continues by stating that;

> “So when this book claims that visions and long term plans are merely fantasy defences against anxiety, it is not recommending that you shut your eyes to the long term. On the contrary it invites you to drop the fantasy defence and open your eyes to the only processes that are realistically available for dealing with the long term … Furthermore when you see the world through the new lenses, you will realise that you cannot reduce your risk by simply letting the long term take care of itself … for in complex systems, even doing nothing could have escalating consequences” (Stacey 1992, p. 18)

The essence of Stacey’s argument is that in the context of strategy one needs to handle current issues that will have long-term consequences in a more creative and innovative way, by not abandoning the long-term view but by realising that the future is unknowable but can be influenced by current decisions. This is the point of departure of foresight. Its “processes … are realistically available for dealing with the long term” (Stacey 1992, p. 18) and as such its outputs have high strategic value for the strategic decision-maker within the context of their task of strategic thinking. This also underpins the conceptual framework of this study.

Conceptually, *strategic thinking is regarded as a synthesis of systematic analysis (rational) and creative (generative) thought processes that seek to determine the longer-term direction of the organisation*. It is a dynamic and interactive iterative process integrating emergent strategy with intended strategy in order to achieve realised strategy. Strategic thinking implies flexibility and tolerance for ambiguity that is required as a result of environmental uncertainty. The ability to fulfil this task can be regarded as strategic thinking competence and is conceptually linked to decision making.

2.6.4 Strategic thinking at the individual level

Bonn (2001) indicates that strategic thinking manifests at two levels; individual and organisational. This view of strategic thinking acknowledges the influence of individuals' characteristics and mental models (Malan 2010) on strategy formulation but also allows the researcher to focus on the individual's strategic thinking ability in relation to other concepts. By indicating that "Good strategists are able to recognise good ideas that have been put forward by other people … to visualise the value of ideas put forward by others might be even more important than generating an original idea" (2001, p. 65), Bonn not only echoes the participative importance of strategic thinking but also opens up the possibility of a construct whereby previously derived ideas such as those flowing from foresight competence serve as a valuable input to strategic considerations. This is also aligned with Stacey's assertions.

2.6.5 The elements of strategic thinking

Strategic thinking is a way of thinking encompassing certain characteristics (Mintzberg 1994). Liedtka (1998) indicates that strategic thinking connects the past, present and future and in this way uses both the institution's memory and its broad historical context as critical inputs into the creation of the future. It is the oscillation between past, present and future is essential for both strategy formulation and execution (Lawrence 1999, p. 8).

Bonn (2001, p. 64) distils strategic thinking into three main elements at the individual level: "a holistic understanding of the organisation and its environment, creativity and visioning". The model proposed by Liedtka (1998) is based on identifying the characteristics of strategic thinking as a *way* of thinking and consist of 5 elements which are: Intent focus; thinking in time; hypothesis driven; systems perspective; and intelligent opportunism. This approach in terms of cognitive styles mirrors decision styles as illustrating the propensity of leaders in making decisions. Goldman (2007) and Malan (20100 support Liedtka's classification of these elements and agrees that strategic thinking is inherently linked to leaders' cognitive abilities which can be enhanced.

Systems perspective; The strategic thinker has a holistic understanding of the organisation's complete system, both internally and externally, and how value is created in terms of its inter-dependencies. Liedtka (1998) points out that the concept of strategic thinking is built on the foundations of systems thinking. Understanding the competing networks of inter-acting system components in the external environment is therefore critical in terms of thinking strategically about how to position the organisation in the future. Similarly, understanding the inter-relationships among the internal components that make up the organisation's whole allows for determining how the internal resources are organised. This is especially pertinent to the development of core-competencies. Liedtka notes that it is critical to understand the internal personal dimension of these relationships as a leader, encouraging participation and the optimisation of the organisational system as a whole.

Intent-focused; The strategic thinker is focused on the intent to realise a longer-term competitive position for the organisation. The intent "conveys a sense of direction" and "implies a competitively unique point of view about the future" (Hamel & Prahalad 1994, p. 129). Drawing from social psychology, Liedtka (1998) illustrates that strategic intent creates an impetus for individuals in the organisation to achieve goals by harnessing their energy toward increased performance. The intent is recognised to be subject to 'shaping' and 're-shaping' of intent as per the dynamic model of strategy. Liedtka (1998) is careful not to define intention in terms of the rational analytical perspective of intention-based planning approaches but agrees with Stacey that the intention focuses on what, why and how to achieve the envisaged competitive position. This links to the next element of intelligent opportunism.

Intelligent opportunism; The strategic thinker is open to new ideas and opportunities as they emerge. It serves to advance intended strategy while also recognising the potential for emergent strategy and the possible re-shaping of strategy and intent. This aspect of strategic thinking is participative and encourages the possibility of strategy emerging from lower level employees while also being perceptive of the opportunities that may arise within the system as a whole.

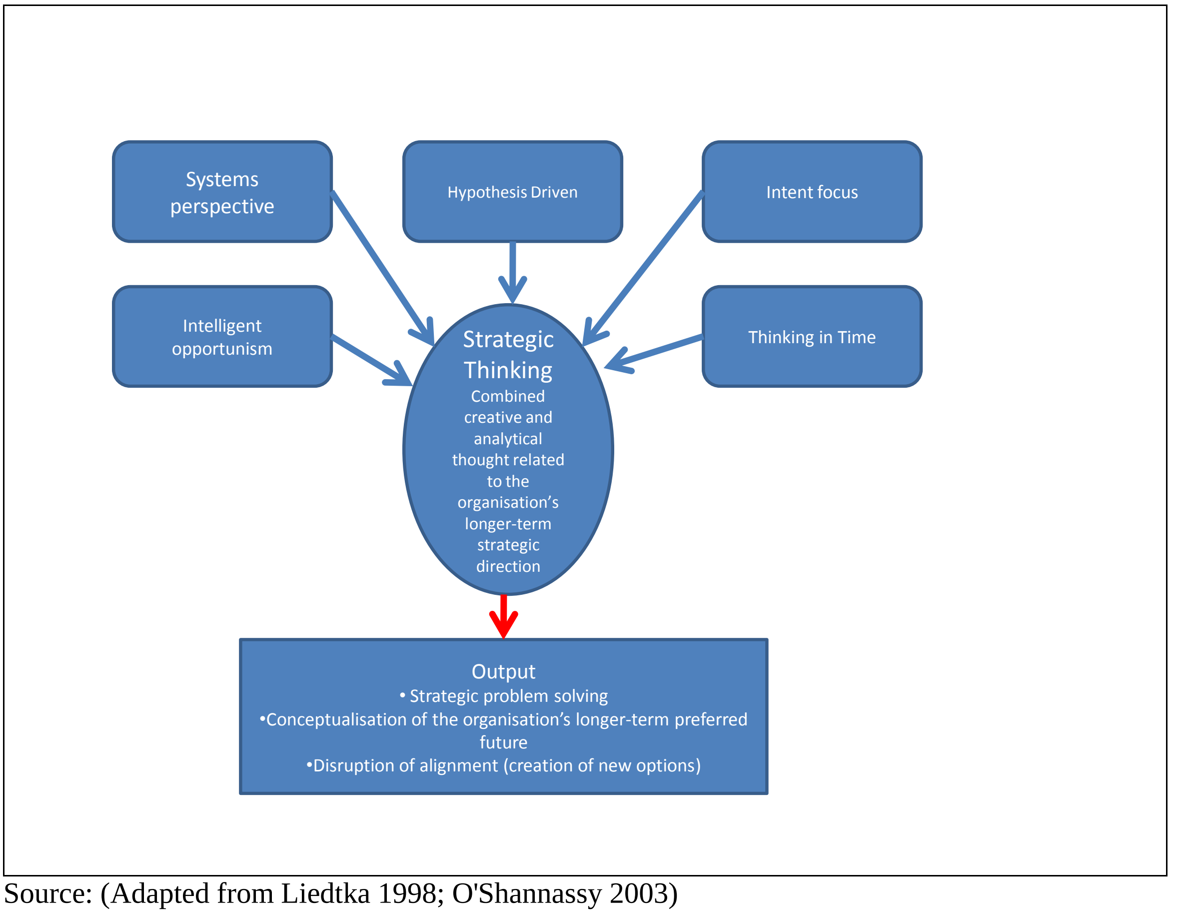
Thinking in time: The strategic thinker connects the past, present and future and as such 'thinks in time'. They recognise the predictive value of the past and what matters in the future. The ability to continuously compare the present to the future taking into account the past in an iterative cycle of thought constitutes thinking in time. The historical context of the organisation, its memory and de facto current circumstances facilitate cognitions related to what is required in creating the future (Liedtka 1998). Of importance in this element is being able to choose the strategic direction based on deep and broad insights as to how the past, its emerging patterns and the discontinuities of the future are able to merge in diverse ways. A range of possible futures, and then the choice amongst these constitutes an answer to what is retained from the past, lost from the past and created in the present to achieve this.

Hypothesis driven: the strategic thinker recognises that strategy is a hypothesis-driven process in that judgements need to be formulated that underpins the assumptions of realistically achieving a future position. The analytical - intuitive debate is avoided in that strategic thinking is regarded as both creative and critical (Liedtka 1998). It has long been considered that in order to think creatively, critical or analytical thought needs to be suspended. However, despite troubling cognitive psychologists for a long time (Liedtka 1998), models such as the Decision Style Model (Rowe & Boulgarides 1994) recognise that decision makers oscillate between most-preferred styles of thinking and back-up styles of thinking which, in the case of strategic thinking would include styles that balance analysis with creativity as is illustrated by the style. This assumption will be tested in the study.

O' Shannassy (2003) interprets these elements into different semantic terms to be: strategic intent, thinking in time, problem solving in terms of a systems perspective; participation; and flexible inputs of organisational resources. In terms of *flexible inputs*, O'Shannassy links this with Liedtka's (1998) element of understanding of the whole system, or systems perspective. O'Shannassy introduces *problem solving* as an element resembling Liedtka's idea of the strategic thinker being hypothesis-driven, and thus able to link both creative and analytical thought in terms of a 'scientific' orientation. However, the two models differ somewhat in that O'Shannassy highlights *participation*. It is contended that by participation, O'Shannassy focuses on the recognition and incorporation of emergent strategy which is sufficiently addressed in Liedtka's elements of systems perspective and intelligent opportunism. These allow for vertically emerging strategy in the system and openness to new strategies based on a changing environment respectively. Liedtka's model however, not only addresses this sufficiently but includes the element of intelligent opportunism which O'Shannassy's model does not highlight as an element. It is argued that intelligent opportunism is fundamental to strategic thinking as it indicates an entrepreneurial, innovative and flexible approach inherent to the strategic thinker "being able to recognise good ideas" and "visualise the value of ideas"

(Bonn 2001, p. 65). As such, Liedtka's model as illustrated in Figure 2.14 will be adopted for this study taking into account the insights raised by O'Shannassy.

Figure 2.14: The elements of strategic thinking



Source: (Adapted from Liedtka 1998; O'Shannassy 2003)

2.6.6 The outputs of strategic thinking

The outputs of strategic thinking at the individual level are illustrated in terms of decisions related to the strategic thought processes that have occurred. The outputs then feed into the strategic planning process which programmes and operationalises the vision and determines the action plans to achieve it (Heracleous 1998; Liedtka 1998; O'Shannassy 2003; Raimond 1996). This process is not linear as traditionally defined in terms of the rational perspective of strategy formulation but is an ongoing iterative process of interaction between thinking and planning (Heracleous 1998).

Stumpf (1989) suggests that strategic thinkers have the ability to analyse, interpret and apply information and can arrange this information in different ways so as to develop different courses of action. Tavakoli and Lawton (2005) illustrate that deficiencies of strategically relevant information and knowledge undermine the appropriateness and quality of strategic decisions. The combined effect of the elements suggested by O' Shannassy which builds on the Liedtka model, infers a capacity for strategic thinking that meets what Day (1994) refers to as the fundamental tests for strategic value. However, this capability depends on the quality and variety of information available to the strategy-level leader (Tavakoli & Lawton 2005). It is suggested that the elements of strategic thinking point to the nature of required relevant information part of which are carefully developed possible futures, the output of foresight.

2.6.7 Strategic thinking reflected in decision style

Tavakoli and Lawton (2005) link strategic thinking and decision making. Strategic thinking precedes and is reflected by the strategic decisions made. It is therefore assumed that the decision-making propensity, or styles, of strategy-level leaders reflect the dominant cognitions of the individual and thus serves as a reliable indication of their strategic thinking propensity. The Decision Styles Inventory (Rowe & Boulgarides 1994) show parallel indicators to the elements of strategic thinking illustrated in Liedtka's model and as such will serve to operationalise the concept of strategic thinking. The validity and reliability of this assumption will be discussed in Chapter 3.

2.7 Similarities and differences between foresight and strategic thinking

2.7.1 Introduction

This study proposes that leadership and strategy research converges at the level of the organisation and at the level of the individual. Of particular interest in terms of the research problem is how the concepts of foresight and strategic thinking, which feature prominently in the literature of each of the disciplines, are related in terms of strategy development in an organisational context. While often used interchangeably in the relevant literature, the study asserts that the concepts of foresight and strategic thinking are overlapping yet distinct. The differentiation of the concepts is thus critical in terms of the purpose of this research and will be explored in this section.

2.7.2 Strategy and leadership

Leadership is regarded as an essential aspect of organisational strategy selection (Allio 2006). The strategy and leadership fields can generally be regarded as converging at the level of the individual or the level of the organisation in terms of strategic decision-making within the paradigms of strategic leadership and the competence-based approach to strategy.

The concept of competence in individuals is widely acknowledged, is able to take contextual nuances into account and is broadly applicable to the study of individuals' cognitions. This review has sought to adopt definitions of competence and competencies at the level of the individual and what is understood by the term capabilities within the organisational context.

The conceptual framework of the study is therefore based on the convergence of the leadership and strategy fields as framed by the concept of individual competences and how these relate to an organisation's strategy-making.

2.7.3 Similarities and differences between Foresight and Strategic Thinking

Strategy is embedded in the need to contemplate the future of the organisation within the context of a holistic and systematic understanding of the organisation and its environment. Strategic thinking requires rational and generative thought processes in the formulation and conceptualisation of an organisation's longer-term future direction and strategic choices. It is proposed in this study that *foresight competence enhances strategic thinking*, the competence that allows leaders to make effective strategic decisions based. The decisions are an exercising of choice based on an enriched range of possible choices formulated by strategic thinking.

Strategic failure is linked to the failure to make clear and explicit choices (Markides 2000). It is argued by this study that foresight expands the range of alternative organisational futures and thus enhances the formulation of strategic choices in terms of strategic thinking. Strategic decision-making therefore not only reflects the decision-maker's strategic thinking but arguably the decisions are also enhanced in this process thus reducing the potential failure to make clear and explicit choices. A comparison of the types of thinking, activities and purposes of foresight, strategic thinking, strategy formulation and strategic planning are illustrated in Table 2.6 below.

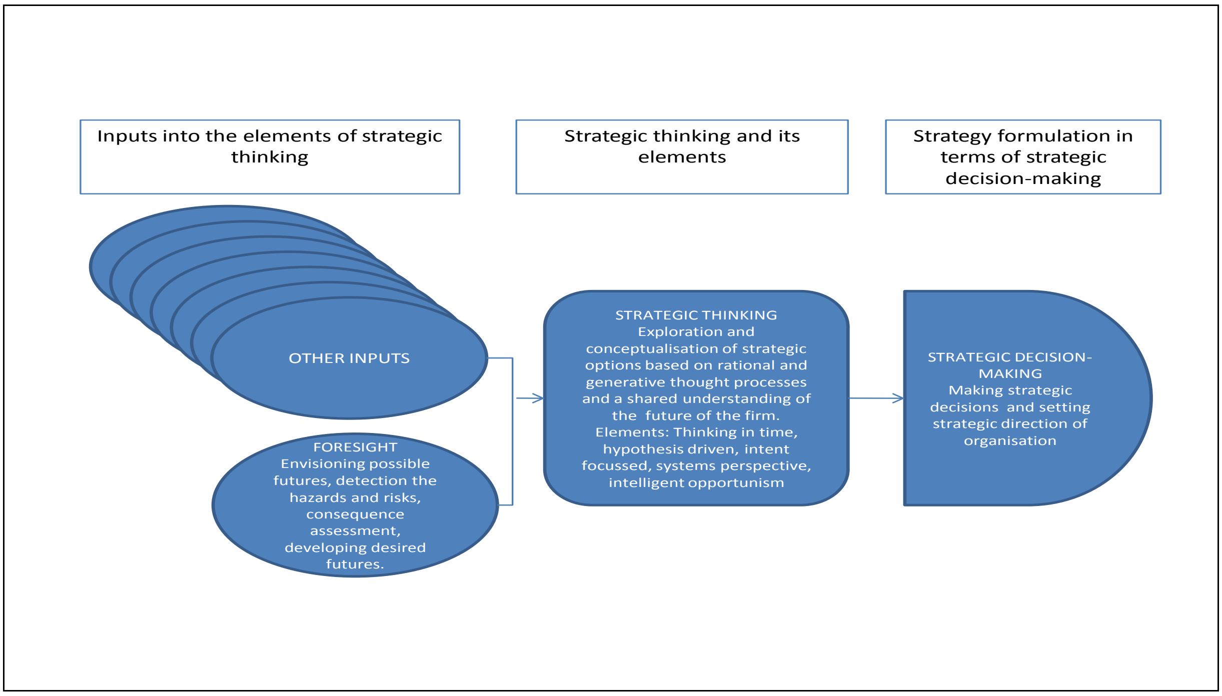
Table 2.6: The thinking, activities and purposes of foresight, strategic thinking, strategy formulation and strategic planning.

	Foresight	**Strategic thinking**	**Strategy formulation**	**Strategic Planning**
Type of thinking	Prospective, explorative, creative	Synthesis, inductive, rational and generative	Exercising choice.	Analytical, logical, deductive, pragmatic
Activity	Future orientated cognitive processing of incomplete information. The detection of patterns and the creative envisioning alternative possible futures.	Formulation of an integrated perspective or single vision of where the organisation should be heading. Re-evaluating strategy. Is enhanced by numerous cognitive abilities and inputs, one of which is foresight.	Decision-making based on choice of intent.	Operationalisation and programming of the strategic choices exercised in terms of strategic decision making. Analysis of steps to be implemented to achieve intent.
Purpose	Enhancing the knowledge value chain. Envisioning alternative possible futures; detection of associated hazards and risks; consequence assessment; developing desired futures.	Exploration of strategic options and formulating applicable choices choices while considering all aspects related to the longer-term direction of the organisation. Includes re-evaluation of strategy in iterative cycle.	Making decisions and setting direction.	‘Road-map’ of actions required to achieve strategic objectives and direction as determined by strategic decisions.

Source: Developed for this research.

From Table 2.6 it is acknowledged by the study that foresight competence provides one of a number of necessary inputs required in terms of strategic thinking. The scope of this study does not explore the composition of complimentary inputs into strategic thinking. Rather it investigates the relationship between foresight competence and strategic thinking in terms of the shared importance of contemplating the future and considering the alternatives available to decision makers in their formulation of organisational strategy. Figure 2.15 illustrates this relationship.

Figure 2.15: The inputs and purpose of strategic thinking



Source: Developed for this research.

The concepts of foresight and strategic thinking have been assessed as overlapping yet distinct. It is proposed that foresight competence in individuals enhances their strategic thinking. The elements of strategic thinking include aspects that are outside the parameters and purposes of foresight. Table 2.7 illustrates the similarities and differences between these concepts.

Table 2.7: The similarities and differences between foresight competence and strategic thinking.

FORESIGHT	STRATEGIC THINKING	SIMILARITIES / LINKAGES	DIFFERENCES
Act of looking forward / ability to generate normative visions – envisioning desired futures	Intent focus directional, competitively unique, dynamic Thinking driven by intent to achieve longer-term competitive position Inspires sense of direction and goal orientation Provides focus	Concerned with developing images of the future Pro-active future-direction setting	Foresight competence's focus on long term normative (ontological) alternative visions of the future and belief that this can be pro-actively created: creation of desired futures over the long term acknowledging the lack of predictive value. ST's focus is on shaping and reshaping intent in order to provide the focus for individuals to achieve a strategic direction and goal: organisationally focussed and shorter term.
Ability to understanding ways in which patterns of the future can emerge	Thinking in time orientated in time, Connects past, present and future in oscillating cycle Focused on what is required for the future	Connecting past, present and the future in terms of dynamic oscillation between them in order to create the future. Acknowledging predictive value of past, action value of present and future departures from the past	Foresight competence's emphasis on alternative futures that may be disconnected from the past – future focussed. ST emphasis on feeling of control in the midst of change – operationally focussed while avoiding breaking with the past.
Ability to anticipate beyond seemingly ambiguous and complex systems	Systems perspective ambiguous, inter-related, complex, multi-faceted holistic understanding of the system and value creation Understands external inter-relations and best organisational position Understands internal inter-relations allows for multiple perspectives to arise vertically	Systems thinking orientation	Foresight competence's emphasis on expanding range of alternative futures, tolerating ambiguity and the complexity of systems. ST's emphasis is on the mental model of understanding the complete system of value creation related to the interdependencies within the system: focus on value creation within the system.
Taking provident care / Assessment of consequences of actions / Detection and avoidance of hazards	Hypothesis driven creative, critical, controlled Formulated judgements of assumptions required to achieve envisaged future position	Creative and critical. Ability to develop hypotheses of the future and test them in terms of detecting and avoiding hazards	Foresight's emphasis on normative values and broader societal consequences of hazards and risks ST's emphasis on capacity to generate hypotheses of assumptions in achieving a future position for the organisation

	Intelligent opportunism ambiguous, innovative, embraces new ideas Promotes new ideas to advance intended strategies Tolerates ambiguity of emerging strategies Generates multiple alternatives	Openness to new ideas to take advantage of emergent strategies. Cross sectional involvement by all stakeholders	Foresight's normatively determined desired futures may exclude emerging opportunities in the interests of broader humankind / society. ST 's preferred longer-term future seeks to embrace emerging opportunities in the interests of the organisations future position.

Source: Developed for this research.

Foresight and strategic thinking overlap and differ in terms of the following key characteristics:

2.7.3.1 Context and inputs of foresight competence and strategic thinking

Foresight and strategic thinking both function in particular contexts requiring a prospective approach to particular situations. In this study the context is related to organisational strategy. The interaction between the concepts has been illustrated above in terms of their contribution as antecedents of strategic decision-making.

This study asserts that foresight has a broader application than strategic thinking which is linked to the development of organisational strategy – this is asserted by the researcher as value-futures focussed (VFF). The confines of *a* strategy limit the application of strategic thinking in terms of the task that is required to achieve this, or consider alternatives to arrive at a single strategic intent – this is asserted by the researcher as operational-future focussed (OFF). Foresight, as illustrated in terms of the evolution of the human ability to engage in mental time travel (Section 2.5.2), is unrestricted in terms of the contexts within which it can be applied and can accordingly be regarded as primarily concerned with the providence of humanity. It can also be argued that this differentiation is negligible. For the purposes of this study, the task of strategic thinking is limited by the parameters of organisational interests and the purposes of considering the best future alternative for the organisation – therefore operationally its best future alternative. Foresight, as defined by this study, is concerned with the value chain of knowledge seeking to convert information to knowledge, understanding and ideally, wisdom in order to conceive alternative futures.

It is proposed by the study that due to the specific purpose of strategic thinking within the context of formulating organisational strategy, its inputs include but are not limited to the outputs of foresight. The purpose of foresight in the context of strategic thinking is primarily to expand the boundaries of perception of the strategic thinker and present them with a broader range of normatively determined alternatives of how the future could evolve. Other inputs that meet strategic needs such as those required as a result of crises or shorter-term shareholder demands, play as an important role in evaluating the strategic options available to the organisation and the greatest value add within the system.

2.7.3.2 Pro-active engagement with the future

Both concepts are prospective and seek to develop representations of the future. Both acknowledge the predictive value of the past, action values of the present and possible departure from the past of the future. They include cognitive iterative cycles of connecting the past, future and present in developing images of the future.

The timeframes typically considered by each concept are generally described as 'long-term'. However, the difference between organisational long-term prospects is starkly dependent on the nature and context of industries in addition to the external market forces faced by the organisation. 'Long-term' in organisational strategy is generally regarded as timeframes extending beyond three years and is therefore rather termed 'longer term' in this study implying a time horizon that exceeds the short- to medium-term planning horizons commonly employed. However, in terms of foresight programmes, long-term is regarded as implying time-frames exceeding 10 years, with a number of studies considering time-frames extending beyond 15 years (Blind, Cuhls & Grupp 1999; Héraud & Cuhls 1999; Kuwahara 1999; Martin & Johnston 1999). As such, this study asserts that foresight and strategic thinking differ in terms of the time horizons envisaged.

The distinction between a preferred future as the result of exercising a choice as opposed to desired futures illustrating a range of normatively determined possible futures is significant in the distinction between foresight and strategic thinking. Foresight does not predict the occurrence of a single future. Strategic foresight however, implies the selection out of a number of options, of a preferred future state.

Strategic thinking considers available choices related to the selection of a long-term, single preferred future (vision) for the organisation. The purpose of foresight is however, to seek to expand the range of alternative futures that are possible and desirable. Foresight does not predict a single future. Rather, depending on present action, many futures are possible (multifinality), but only one of them will happen (Grupp & Linstone 1999). In contrast, strategic-thinking is action-focussed based on the iterative resolution of intent.

The intent is manifested in the choices made by decision-makers and based on a single longer-term preferred direction and future state of the organisation based on the control and understanding of how maximum value is created in the organisation’s system.

A company cannot be everything to everyone; resources are limited and therefore choices on how to use them have to be made (Drucker 1993b; Eisenhardt and Sull 2001; Hammonds 2001; Itami 1987; Kreilkamp 1987; Markides 1999c; 2000; Porter 1996). It is the task of strategic management to do so and thereby “…enable the organization to concentrate its resources and exploit its opportunities and its own existing skills and knowledge to the very fullest” (Mintzberg 1987c 30).

Foresight includes a normative evaluation of what may constitute desired futures according to broader criteria than that of an organisation’s ideals. The normative criteria arise from the values and subjective cognitions of the individual and include such considerations as the human well-being and the curatorship of the environment. Desired futures as expounded by foresight may therefore not correlate with the preferable future as expounded by the strategic thinking choices of an organisation.

2.7.3.3 Systems thinking

Both concepts recognise the importance of understanding internal and external environments in terms of a systems perspective. The ambiguity and complexity of systems are also acknowledged in terms of both concepts as is the systematic approach to develop understanding the way in which the future may evolve. A holistic approach as proposed by a systems perspective is able to detect emergent qualities in the systems that cannot be detected by analysis.

While both foresight and strategic thinking emphasise the importance of a systems perspective, the purposes of each differ. Foresight emphasises a systems perspective to aid in the development of broadening the spectrum of alternative futures through an understanding of underlying inter-relationships and their relationship with the system as a whole. An understanding that changes in the system are separated by space and time gives rise to the ability to perceive futures that are disconnected from the past. Seemingly innocuous events have the potential of being catalytic and may lead to large changes in the systems. Foresight asserts that understanding the interdependence of systems allows one to recognise the possibility of system breaks and key uncertainties. The outcomes are therefore a broad variety of alternative futures based on an understanding of systems.

Strategic thinking however, emphasises the consideration of alternative future possibilities to exercise a choice of a preferable future state. The future direction of the organisation is based on the mental models of how value is created in its system allowing the exercising of a choice as to how best to facilitate this. The outcomes are therefore utilising an understanding of the system in order to exercise the best choice to add value.

2.7.3.4 Creative and critical

Both concepts acknowledge the need for both critical and creative thinking. Both recognise the importance of in depth analysis of existing information in addition to creative imagination and the ability to disconnect from patterns implied by episodic and semantic memory. They seek to develop hypotheses of how the future may evolve and detect the consequences of this.

Bartram's Great Eight competency domains (2005) include the domains of Analyzing and Interpreting and Creating and Conceptualizing. Both domains are described as "general mental abilities [and an] openness to new experience" that are aligned with the study's conceptualisation of foresight and strategic thinking (Bartram 2005, p. 1187). The dimensions of these domains also align with the elements of both foresight and strategic thinking (see section 3.6). As such the links between analysis and creative thinking in both foresight and strategic thinking have validated empirical support as related to their predictor value in terms of a competence approach and strategy-making specifically.

Despite the similarities of both concepts in recognising the value of both analytical and creative approaches to processing information, the purposes thereof differ. This is especially apparent in terms of the detection of hazards and risks. The purpose of strategic thinking is to formulate hypotheses of assumptions related to the most preferred future positioning of the organisation. It is both analytical and creative in terms of accurately formulating such hypotheses based on accurate interpretation of existing information and having the mental ability to creatively imagine value enhancing positions for the organisation. Foresight similarly, recognises the importance of accurate analysis and the creative ability to derive alternative futures separated from the patterns of the past. However, it includes broader normative values in terms of exercising *provident care* in describing desired futures. The emphasis is therefore, the achieving of a sagacious level of wisdom which may extend beyond the preferred future of an organisation and the hypotheses developed to achieve it.

2.7.3.5 Openness to new ideas

As noted above both foresight and strategic thinking are described general mental abilities typified by openness to new ideas. This assertion is empirically supported by Bartram's Great Eight competency domains (Bartram 2005) amongst others (Hunt 2002; Pate, Martin & Robertson 2003; Thompson, Stuart & Lindsay 1997).

While both foresight and strategic thinking share the characteristic of being open to new ideas, they are differentiated by the objectives driving such an approach. It is argued that strategic thinking places importance on this characteristic primarily in order to open up new opportunities that are competitively unique. Broadly encompassing innovation, the striving toward competitive advantage can be regarded as a key driver in leaders' recognition or creation of new ideas. Chermack (2004) warns that despite best practises of strategic thinking in decision making, organisations are still susceptible to decision failure due to folly. Folly is described as an "erroneous course of action is maintained through poor decisions even though the negative effects are realized and avoidable" (Chermack 2004, p. 296). The solution to this form of decision failure underpins this differentiation between foresight and strategic thinking. Chermak supports the notion that foresight methods, scenarios in particular, can function as an input into strategic thinking that strategic improves decision making. This is primarily due to the expanded alternatives presented by foresight and emphasis on provident care that encourages the avoidance of negative effects.

The objective of foresight not only encompasses the benefits of innovation and creativity but is primarily underpinned by the aim of expanding the boundaries of perception. In essence, the objective is to present a broader range of alternatives related to possible futures available in decision-making while detecting and avoiding hazards.

2.8 Conceptual framework

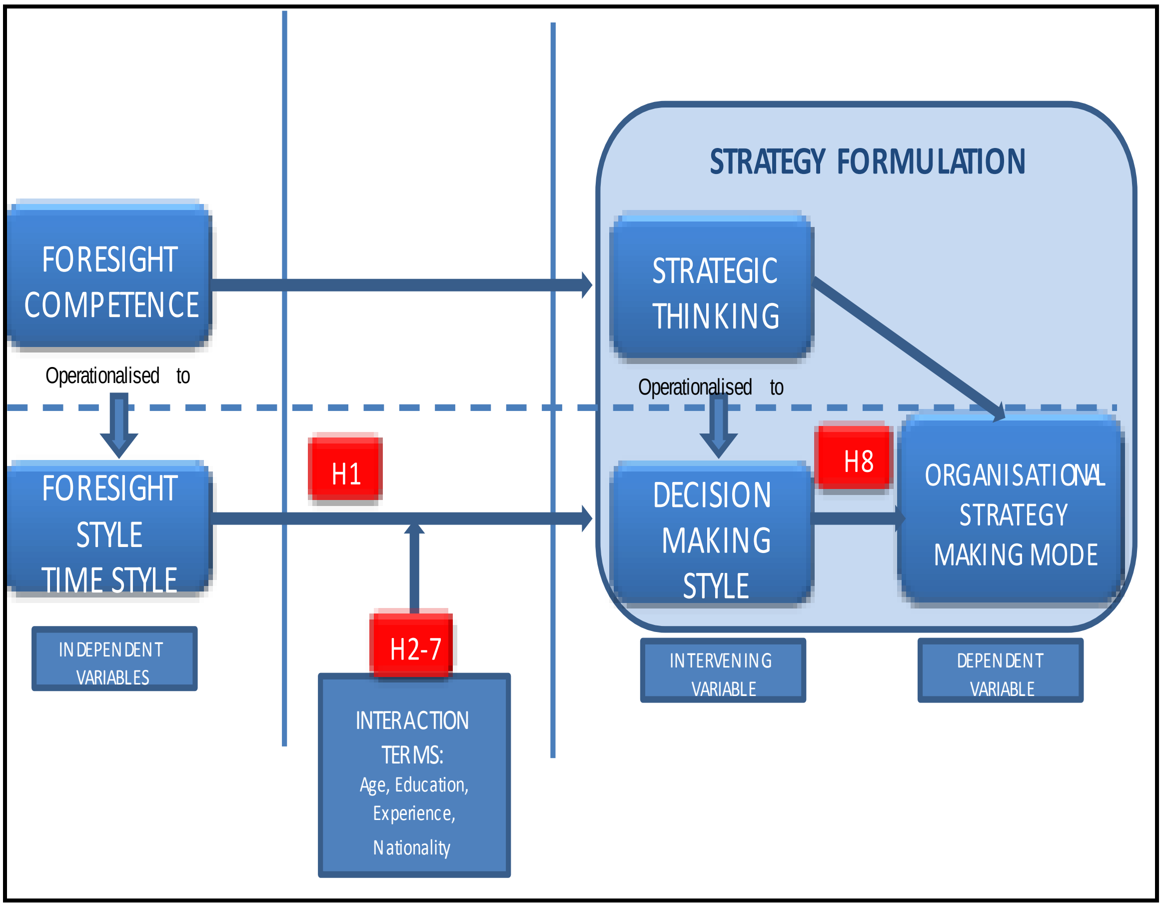
2.8.1 Introduction

The study is primarily focussed on foresight competence and how it relates to strategic thinking prior to strategy formulation. Strategic thinking is recognised as preceding strategy formulation and strategic planning (Voros 2003). Strategic decision-making by strategy-level leaders is linked to organisational performance (Finkelstein & Hambrick 1996) and as such strategic thinking, as an antecedent of strategy formulation, is linked to organisational performance (Fairholm & Card 2009). Strategy underpins the organisation's success (Markides 1999). This study posits that the independent variable, foresight competence is positively related to strategic thinking in individuals. The strategic thinking of the organisation's strategy-level leaders has the effect of determining the strategy-making modes and capabilities of the organisation (White 1998).

Chapter 2 thus far has provided a background of the literature relevant to the disciplines of strategy and leadership; the convergence of these in terms of decision-making and individual competences; and then using the insights gained from the extant theories to illustrate the conceptual link between foresight competence and the strategic thinking of individuals. The latter concepts are operationalised in terms of the theories supporting the TimeStyles, Foresight Styles, and Decision Styles constructs respectively. This section develops the conceptual framework that guides the research study. Figure 2.16 illustrates the conceptual framework adopted by the study and explained in this section.

It is proposed in this section that the innate cognitive ability of foresight in individuals enhances their strategic thinking. When the foresight ability meets or surpasses a foresight related task it becomes a competence and competency respectively. The competence in foresight also meets aspects of the task of strategic thinking when formulating organisational strategy. This is especially apparent in terms of the common purpose of considering how the future may evolve. The conceptual framework therefore seeks to provide the parameters for measuring this relationship and to what extent the strategy-level leader's strategic thinking influences organisational strategy-making processes. The conceptual model further illustrates the possible effects of interaction terms on the relationship between foresight competence and strategic thinking.

Figure 2.16: Conceptual framework of study



Source: developed for this research.

2.8.2 The relationship between foresight competence and strategic thinking

This study asserts that foresight competence and the strategic thinking of individuals are highly inter-related and overlapping concepts but are distinctly different. The study further illustrates that current literature treats the concepts as distinct but that there is a gap in terms of how they are aligned and conceptualised within the disciplines of strategy and leadership. This study seeks to fill part of this gap in the literature by operationalising the concepts and investigating empirically, the relationship between them. Although validated measures for both concepts have as yet not been developed, the literature supports constructs that allow for the operationalisation of each. Therefore, this research will address the following research problem:

How and to what extent are foresight competence and the strategic thinking of strategy-level leaders associated within the context of organisational strategy-making?

2.8.3 Strategy-level leaders' foresight competence

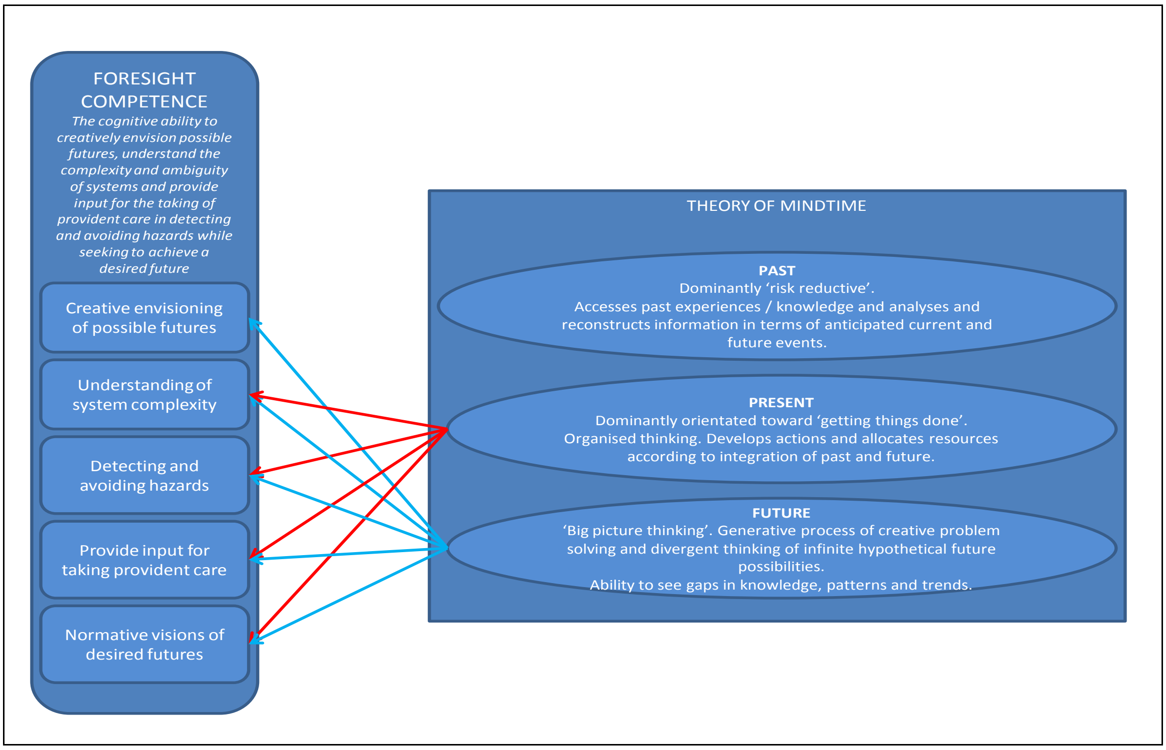
Foresight competence has been described above as the cognitive ability *to creatively envision possible futures, understand the complexity and ambiguity of systems and provide input for the taking of provident care in detecting and avoiding hazards while seeking to achieve a desired future.*

Although numerous prominent leadership and strategy studies refer to the cognitive ability of foresight, attempts to conceptualise and operationalise it are scarce. Only a handful of studies have previously investigated foresight in terms of psychological measures (Hayward 2005) or conceptualised in terms of foresight styles (Dian 2009; Gary 2008). The relationship between orientation to time and leadership have also been conducted (Thoms 2004; Thoms & Greenberger 1995) and provide support for the assertion that orientation to time presents a significant contribution to a construct of foresight.

While a construct of foresight remains elusive, it is this study's assertion that Gary's refinement of Dian's foresight styles (2008) and Fortunato and Furey's MindTime dimensions (2009) meaningfully represent an individual's foresight competence. They have been assessed as having construct validity (Fortunato & Furey 2009; Gary 2008). Psychological constructs, whether measuring personal differences, cognitive abilities or time perspectives are acknowledged as contributing to foresight research and decision making (Gary 2008; Tonn, Hemrick & Conrad 2006; Tonn & MacGregor 2009).

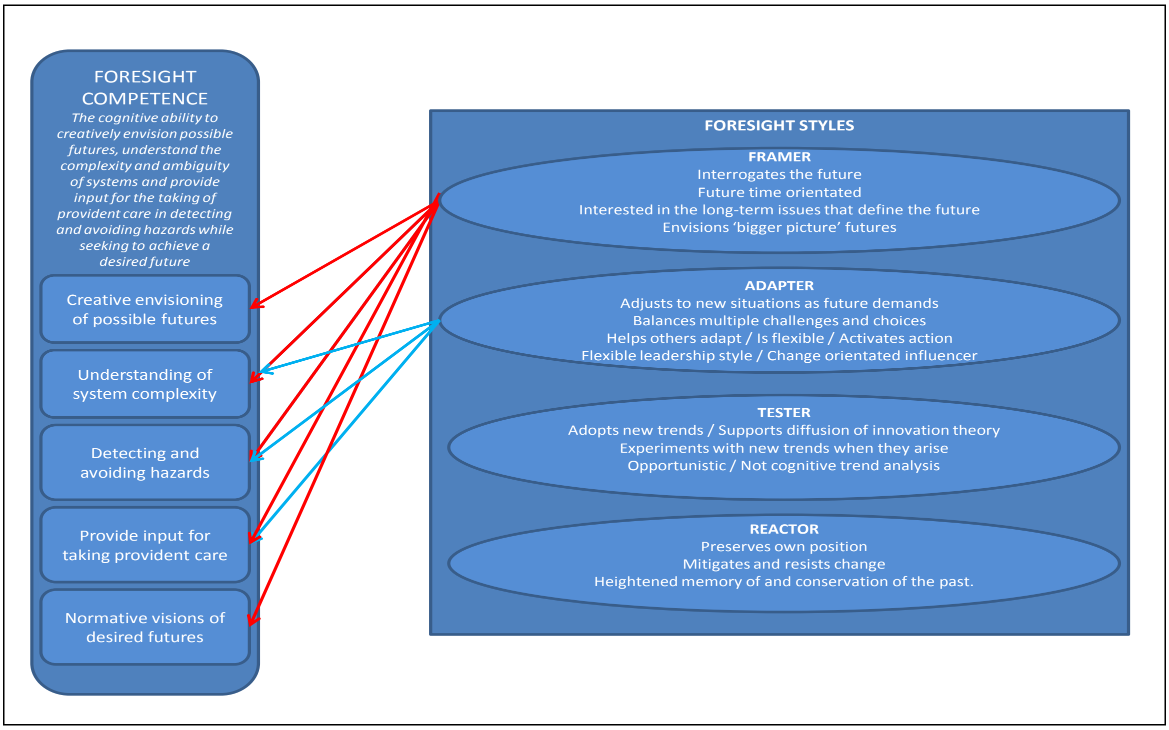
Despite the support for the development of a construct of foresight competence based on psychological measures, this study supports Gary's (2008, p. 7) assertion that such measures remain limited in comprehensively describing the meaning of foresight and are "less than the eloquent concept of foresight". However, it is contested that measuring foresight competence (as opposed to the concept of foresight itself) as a cognitive ability is meaningfully reflected in validated psychological measures that clearly describe the elements of such ability. Figures 2.17 and 2.18 illustrate the proposed dominant linkages between the psychological measures and the elements of foresight competence as adopted by this study.

Figure 2.17: Foresight competence and the theory of MindTime



Source: Developed for this research.

Figure 2.18: Foresight competence and foresight styles



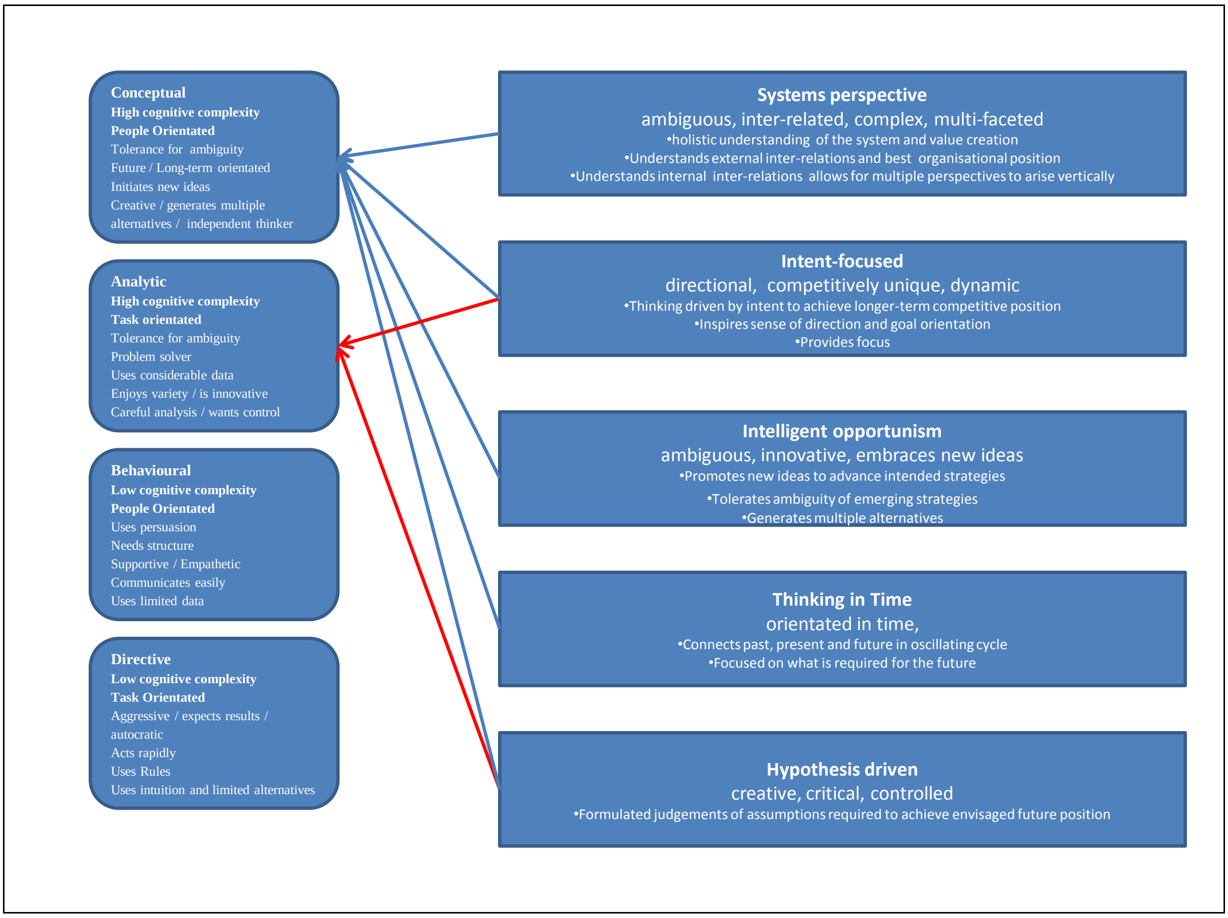
Source: Developed for this research.

Figures 2.17 and 2.18 demonstrate the operationalisation of foresight competence as measured by two psychological constructs. This study proposes that the literature supports the associations illustrated above between the psychological measures and the elements of foresight competence. Possible co-variance between the measures will be tested in the analysis.

2.8.4 Strategy-Level Leaders' Strategic Thinking

Decision styles reflect the cognitive differences of individuals' propensities to strategic decision-making. The cognitive nature of strategic thinking suggests that the evaluation of decision styles serves as an indicator of the strategic thinking propensity of strategy-level leaders. It is proposed by the study that the elements of strategic thinking are associated with certain decision styles. These proposed associations are illustrated in Figure 2.19.

Figure 2.19: Strategic thinking and decision styles



Source: Developed for this research.

The elements of strategic thinking identified as *systems perspective*, *intelligent opportunism* and *thinking in time* correspond to the Conceptual Decision Style as described by the Decision Style Inventory (Section 2.4.5). The elements of *intent focus* and *hypothesis driven* are clearly linked to both the Analytic and the more creative

Conceptual Decision Styles. The study therefore assumes that propensities toward the Conceptual Decision Style as a dominant style with a back-up Analytic Style would reflect the propensity of an individual to be a strategic thinker. Goldman (2005) supports the assertion that strategic thinking is fundamentally one of conceptual style and resides at the level of the individual. It is thus asserted that while the Analytic Decision Style reflects the analytical aspects of strategic thinking, the dominant style of decision-making propensity by strategic thinkers would be the more creative Conceptual Decision Style. Goldman agrees that the “natural place to look for understanding is cognitive science” (Goldman 2005, p. 4) which includes decision-making research and thus supports the study’s operationalisation of strategic thinking.

Foresight competence and strategic thinking is proposed by this study as being positively related. A lack of foresight competence is noted to limit strategic thinking and is a form of bounded rationality or myopia (Dickson et al. 2001). Conversely, greater foresight competence, or indeed a competency in individuals, is asserted to be positively related to greater strategic thinking ability. In terms of the conceptual framework of the study, individuals displaying higher levels of the psychological dimensions linked to foresight competence will display greater propensities toward the decision-styles linked to strategic thinking.

Therefore, this research will address the following issue:

Is foresight competence positively associated with the strategic thinking of strategy-level leaders?

Flowing from this question the following hypothesis and sub-hypotheses emerge;

H1: Foresight competence is positively associated with strategic thinking in Strategy-level leaders.

H1a: Strategy-level leaders’ orientation to the future is positively associated with the Conceptual Decision Style propensity.

H1b: Strategy-level leaders’ Framer foresight style is positively associated with the Conceptual Decision Style propensity.

H1c: Strategy-level leaders’ Adapter foresight style is positively associated with the Analytic Decision Style propensity.

H1d: Strategy-level leaders' orientation to the past is positively associated with the Analytic Decision Style propensity.

H1e: Strategy-level leaders' orientation to time is positively associated with their Foresight Styles.

H1f: Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style

.H1g: Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style.

H1h: Strategy-level leaders' orientation to time is positively associated with their Conceptual Decision Style.

H1i: Strategy-level leaders' Foresight Styles are positively associated to their Analytic Decision Style.

H1j: Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style.

2.8.5 Moderating effect of Strategic Leadership demographic proxies

Upper echelons theory and later strategic leadership theory (Finkelstein & Hambrick 1996) has been the basis of a number of empirical studies related to the relationship between leader characteristics and various organisational variables. However, there have been a limited number of empirical studies related to the influence of leader characteristics on strategic decision-making (Papadakis & Barwise 2002) despite the vast number of significant studies that present empirical justification for the continued use of the strategic leadership approach (Goll & Rasheed 2005). Goll and Rasheed (2005) conclude that strategic leadership research is suited to studies of strategic decision-making. As such it provides a basis for the investigation of the impact of leaders' demographic proxies, not only as predictors of strategic decisions but specifically in terms of the proposed relationship between foresight competence and the strategic thinking of strategy-level leaders.

The consideration of strategic decision choices by strategy-level leaders is illustrated as a cognitive intervening process which is shaped by prior determinants in the form of leader characteristics (Finkelstein & Hambrick 1996). This assertion corresponds to the study's conceptual framework in that strategic thinking is regarded as an intervening variable prior to strategy-making and the demographic proxies are recognised as having a prior effect as moderating variables. This construct aligns with strategic leadership theory's assumption that human behaviour can be predicted by investigating prior determinants that fall outside of the control of the leaders. The moderating variables of this study represent such determinants.

2.8.5.1 Strategy-level leaders' demographic proxies as interaction terms

The demographic proxies most often used in strategic leadership research include tenure, and education (Papadakis & Barwise 2002) but also include age, gender and industry affiliations to predict strategic choice (Finkelstein & Hambrick 1996). The environmental conditions of an organisation, such as their applicable industry, are recognised by Finkelstein and Hambrick to determine the leader's level of discretion in making strategic decisions. Their analysis indicates that while the exercising of choice is important, it functions as an intervening process determined, in part by certain leader characteristics. This lends support for the inclusion of not only foresight competence as a leader characteristic influencing strategic thinking but also as the independent variable, but also the inclusion of leaders' demographic proxies as interaction terms in the conceptual model. The moderator variables include education (general education level and exposure to foresight formal education), experience in the industry and position experience.

2.8.5.2 Demographic proxies' influence on the foresight competence and strategic thinking relationship

Strategic Leadership theory focuses on strategy and the influence that strategy-level leaders have on the performance and thus performance of the organisation. Section 3.5 illustrates continued the significance of the theory. The theory is modelled on the intervening processes of managerial cognition preceding strategy formulation (Donaldson 1997) which due to the difficulty of capturing these empirically, invoke and provide validated support for the predictive value of demographic proxies. Eclectically, this study seeks to focus on: the intervening cognitive processes of strategy-making in terms of the concepts of foresight competence and strategic thinking; the relationship between these as determined empirically using validated measures of cognition, and; the impact of leaders' demographic characteristics on the assumed relationship. It is asserted that this approach addresses the criticism of the theory in that it recognises the possible influence of leader demographic characteristics, tests these but does not neglect the cognitive dimensions of the theory. As such the research design seeks a parsimonious approach in not only to probing the 'black box' or cognitive dimensions of strategy making, but also investigates what the moderating effect of the proxies may be.

Based on the discussion above the following research issue will be addressed by the study:

How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?

Flowing from this question the following hypotheses emerge:

H2: The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H3: Exposure to futures thinking / foresight concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders.

H4: Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H5: Role experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H6: The position of strategy-level leaders in the organisation moderates the relationship between their foresight competence and strategic thinking.

H7: The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H8: There is no significant difference between Australian and South African strategy-level leaders in terms of their foresight competence and strategic thinking.

2.8.6 Strategic thinking and the strategy-making processes of an organisation

Different modes of strategy-making or formulation were identified in Section 2.6 above. The modes include those distinguished by the level of autonomous behaviour by strategy-level leaders and the levels of intended and emergent strategy that constitute the realised strategy. The Rational and Transactive modes are typified by high levels induced organisational behaviour and vary from greater levels of intended strategy to greater levels of emergent strategy respectively. The Symbolic and Generative modes are typified by greater levels autonomous organisational behaviour and vary from greater levels of intended strategy to greater levels of emergent strategy respectively. The dichotomy between emergent and intended strategy in the matrix are not mutually exclusive. Rather, the model acknowledges that organisations are scored exhibiting differing degrees of each.

One would expect that a strategy-level leader exhibiting high levels of strategic thinking competence is likely to influence organisation's strategy-making mode as reflected in the Generative mode of strategy (i.e. high levels of autonomy and emergent strategy). Ironically, it is proposed by the study that the strategy-making modes of an organisation do not necessarily reflect the strategic thinking exhibited by an individual with a moderate to high influence on the organisation's strategy. Rather, it is asserted that the strategy-making modes of organisations will generally resemble shifts in the mainstream paradigms of strategic practise as expounded by the literature, business schools and consultative practises. From the above the following research issue will be addressed;

Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?

The above discussion leads to the following hypothesis.

H9: Strategy-level leaders' strategic thinking is associated with the strategy-making process of the organisation.

H9a: Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.
H9b: Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.

2.8.7 Summary of conceptual framework development.

To summarise the development of this study's conceptual framework the study proposes that there are three pertinent variable constructs. The independent variable of foresight competence has been operationalised in terms of the theory of MindTime and the Foresight Styles Assessment. The intervening variable of strategic thinking, represented as a task is operationalised in terms of the Decision Styles Model. The dependent variable of organisational strategy-making modes has an already established and validated operational measure. The framework proposes that the independent and intervening variables are positively associated and that the relationship is moderated by leaders' demographic proxies as derived from the strategic leadership theory. The relationships assumed by the conceptual framework have been systematically explored in a review of the extant literature in the previous sections of this chapter.

2.9 Conclusion

This chapter presented a synthesis of the extant literature relevant to the research problem as devolving from the disciplines associated with the core concepts to be investigated. This included definitions of the core concepts and described the foundations of the conceptual framework which will guide the nature of the data to be collected and the most appropriate analysis. The conceptual framework represents a unique and eclectic approach to exploring the research problem and has been derived from a logically deductive approach to the literature. Table 2.8 summarises the emergent research issues and related hypotheses of the study. Chapter 3 will determine the research design, methodology and appropriate analysis of the study.

Table 2.8: Summary of research issues and hypotheses

Research Issues	**Research Hypotheses and sub hypotheses**
RI 1: *Is foresight competence positively associated with the strategic thinking of strategy-level leaders?*	*H1: Foresight competence is positively associated with strategic thinking in individuals.* *H1a: Strategy-level leaders' orientation to the future is positively associated with the Conceptual Decision Style propensity.* *H1b: Strategy-level leaders' Framer foresight style is positively associated with the Conceptual Decision Style propensity.* *H1c: Strategy-level leaders' Adapter foresight style is positively associated with the Analytic Decision Style propensity.* *H1d: Strategy-level leaders' orientation to the past is positively associated with the Analytic Decision Style propensity.* *H1e: Strategy-level leaders' orientation to time is positively associated with their Foresight Styles.* *H1f: Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style* *.H1g: Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style.* *H1h: Strategy-level leaders' orientation to time is positively associated with their Conceptual Decision Style.* *H1i: Strategy-level leaders' Foresight Styles are positively associated to their Analytic Decision Style.*

	H1j: Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style.
RI2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?	*H2: The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.* *H3: Exposure to futures thinking / foresight concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders.* *H4: Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.* *H5: Role experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.* *H6: The position of strategy-level leaders in the organisation moderates the relationship between their foresight competence and strategic thinking.* *H7: The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.* *H8: There is no significant difference between Australian and South African strategy-level leaders in terms of their foresight competence and strategic thinking.*
RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?	*H9: Strategy-level leaders' strategic thinking is associated with the strategy-making process of the organisation.* *H9a: Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.* *H9b: Strategy-level leaders' Conceptual Decision Style is positively associated with the strategy-making process of the organisation.*

Source: developed for this research.

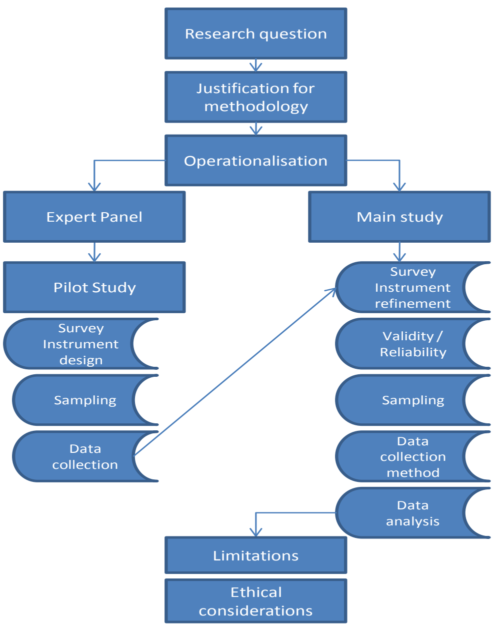
CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The previous chapter provided an outline of the literature related to the study and provided a conceptual framework upon which the research is based. This chapter details the research methodology adopted for the study, its purpose and how it was designed and implemented. The structure of the chapter is outlined in Figure 3.1. Having outlined the structure of the chapter, this section deals with the methodological issues of selecting an appropriate research design that will systematically collect relevant data to address the research question.

Figure 3.1: Chapter 3 structure



3.2 The research question

A review of the literature in chapter two related to the parent disciplines of strategy and leadership, specifically foresight competence and strategic thinking, revealed a number of research areas that are extensively covered. However, although often referred to in the literature as important concepts, the research areas addressing foresight competence and strategic thinking remain under-developed. In terms of an empirical investigation of their relationship, the literature provides little research and is addressed in terms of the research question and research issues addressed by this study.

A resultant model has been developed which seeks to establish a valid framework for empirically investigating this relationship at the level of the individual leader within the context of organisational strategy. It is therefore a study focussing on the strategist's cognitions and styles within the context of the praxis of strategy in organisations. While not specifically modelled on the strategy-as-practise (S-A-P) study of strategy (Jarzabkowski, P. 2005; Whittington 1996, 2006), the approach seeks to be a pragmatic and eclectic approach to critical elements of the practise of strategy. In this respect it can be aligned to the S-A-P approach and contribute to this emerging field.

Of particular interest is the strategy-level leader's orientation to time, their foresight style propensities and how this relates to their decision-making styles. The prior is representative of their foresight competence and the latter a reflection of their strategic thinking propensities. Of further importance is the question as to how these relate to how strategy is made in the organisational context.

Therefore, the general purpose of the research is to determine;

> To what extent is strategy-level leaders' foresight competence is associated with the elements of their strategic thinking, to what extent is the association influenced by their demographic characteristics and whether their strategic thinking is associated with the strategy-making processes in the organisation.

The following research issues are based on this purpose and emerged out of the review of relevant literature and development of the conceptual framework.

> RI 1: Is foresight competence positively associated with the strategic thinking of strategy-level leaders?

RI 2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?

RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?

3.3 Selection of research design and strategy of enquiry

Generally, the research design for this study encompasses the most appropriate methodology related to meeting the purpose of the study and answering the research questions. Choice of the operationalisation of the constructs, sample population, data collection methods, compilation of the survey instrument, its testing and choice of data analysis is covered by the research design. These choices need to meet the requirements of validity and reliability in order to facilitate replication. As such the aspects of the research design need to be justified.

3.3.1 Research design

The conceptual framework detailing the proposed variables and their relationships that the study will examine was developed in Chapter 2. Having been defined in conceptual terms the study now addresses the empirical issues that include the adoption of the most appropriate method to collect the required data. These must be justified so as to ensure that the observations and inferences made during the study can be relied upon (Kerlinger & Lee 2000). At the outset, a determination of the research paradigm will serve as a framework within which the methodology was chosen.

3.3.2 Research paradigm

Stating a paradigmatic knowledge claim means that the researcher adopts certain assumptions at the start of their study about the ontology, epistemology and methodology of their enquiry (Creswell 2009). Significant debate pervades the philosophical questions as to what constitutes knowledge and how we can know it. A pragmatic approach based on a post-positivist foundation in order to enrich further critical and interpretive studies undergirds the purpose of this study. As such it adopts a post-positivist approach, assumptions and methodology in the belief that that it is critical for meaningful interpretive and critical approaches to the social sciences.

Positivism has been criticised for its deterministic view of causal relationships and is often accused of reducing human behaviour to statistical formulas that are not reflective of the essence of human experience and nature (Neuman 2006). Despite the mounting criticism and emergence of alternative paradigms, positivism and its derivative perspectives remain dominant in contemporary research.

3.3.2.1 Dominant paradigms of researching foresight

The emerging field of field of Futures Studies is primarily concerned with the study of foresight. It is concerned with the study of foresight as an enabler of futures thinking in terms of formulating images of alternative futures (Inayatullah 2008) and is thus directly related to foresight as an individual cognitive competence. It has been described as having had research conducted in all three major research paradigms, empirical, interpretive and critical (Inayatullah 1998). All three, Inayatullah asserts, have different assumptions about what represents the nature of truth and reality in the social world, the universe and the nature of the future. Indeed he proposes that all three paradigms should be used to contextualise data (PSS), in terms of our meanings ascribed to them (ISS) in order to position them in the historical structures of knowledge and power (CSS).

The realist orientation deems social reality to have several levels of meaning where the surface level does not easily reveal the causal mechanisms of deeper levels while the constructivist approach assumes that social reality is represented by the beliefs and meanings people create and thus represent reality (Neuman 2006). While critical futures studies and increasingly integral futures have a primarily realist or constructivist orientation, this study rather than proscribe to these, agrees that there is a lack of empirical foundations necessary for meaningful interpretive and critical approaches, and theory development (Gary 2008). In order to perform a layered analysis of the deeper, often unobserved levels of meaning and causality, it is argued that empirical observations of the surface level are fundamental in order to facilitate the logics employed by the critical and interpretative orientations.

In essence it is argued along the same lines as Inayatullah (1998, 2002) that in order to meaningful conduct deeper analysis of social issues or critique existing logics, an understanding of the value free and objective observations of the empirically observable is required. As such, this study asserts that an empirically justified axiom of the relationship between foresight competence and strategic thinking, as empirically under-researched concepts, will provide a meaningful basis for further research of these concepts especially in terms of the critical and interpretive approaches to social science. This assumption adopts the logic that meaningful interpretive and critical approaches to foresight are enhanced by positivist type research. The caveat of adopting this approach however, is an agreement that that absolute causality cannot be known with certainty.

3.3.2.2 Dominant paradigms of researching strategic thinking

Similarly to the study of foresight, empirical research of strategic thinking is limited (Goldman 2007) and only a few core ideas are regarded as anchoring the field (Allio 2006). This again is due to the cognitive nature of the cognitive task of strategic thinking and the difficulty of observing and measuring this. Significantly, the work of Liedtke (1998), o'Shannasy (2005), Mintzberg (1995), Bonn (2001) and Goldman (2007) have been notable exceptions which provide important foundations for further research. The reference to strategic thinking however, as with foresight, regularly emerges in strategy and leadership literature and in terms of the interpretive and critical paradigms. It is proposed that by asserting that there is a relationship between foresight and strategic thinking in this study, the research will contribute to further research and theory development.

3.3.2.3 Post-positivism

The three major paradigmatic approaches to social sciences include various derivative perspectives. Although regarded as equivalent to positivism by Neuman (2006), Creswell (2009) suggests that postpositivism challenges the traditional positivistic notion of the absolute truth of knowledge. This approach recognises that researchers cannot be absolutely positive about their claims of knowledge when studying humans. Postpositivism as espoused by Phillips and Burbules (2000, cited in Creswell 2009) suggests that rather than absolute causation, social science research should address causes as *probably* influencing outcomes.

Based on the careful observation and measurement of behaviours that represent reality in the broader social context, laws and theories are required to be tested and refined in order to better understand the world (Creswell 2009). Postpositivism assumes that: a) knowledge is the result of conjecture and that absolute truth cannot be discovered, b) the purpose of research is to make, test and refine claims related to theory or have a basis to abandon them, c) evidence, data and rational interpretations shapes knowledge, d) research searches for true statements that can answer concerns and describe causal relationships and, e) objectivity is critical in discovering true statements and bias should be mitigated (Creswell 2009, pp. 7-8).

This study can be regarded as adopting the assumptions of the post-positivist paradigm. The purpose of adopting this perspective is according to the logic that empirical research enriches the interpretive and critical approaches. The nature of social sciences generally and the study of individual cognitions as proposed by this study are constantly evolving concepts that cannot be regarded as the absolute truth. However it provides evidence that its inferences are probable, based on empirical observation and measurement which is associated with the quantitative research approach (Creswell 2009; Neuman 2006; Perry 2008) and thus provides an empirical platform for further interpretive and critical studies of the layered natured of reality. Accordingly, the post-positivist perspective fittingly describes probable causal relationships as proposed by this study that relies on an objective approach to conducting the research.

3.3.3 Quantitative and qualitative research approaches

Creswell (2009) notes the criteria for selecting a research approach. In terms thereof a) the match between the problem and the approach, b) personal experience and c) audience need to be taken into account.

If the problem identifies variable that are seen to have an influence or provide a greater understanding of the outcome, a quantitative approach is suggested to be most fitting (Creswell 2009). This also allows for the testing of a theory and / or an explanation of the relationships inherent in the problem. The problem statement and conceptual framework of this study indicated inherent relationships between the variables of interest and thus illustrated a fit with a quantitative approach.

In terms of personal experience the researcher considered the objectives of both the qualitative and quantitative approaches. They each represented valuable pathways of enquiry that depend on the objectives of a study. Due to the relative empirical uniqueness of the core concepts of the study and the contribution they are proposed to make, it was determined that a quantitative contribution in this regard was more appropriate.

In terms of the audience that the research would be presented to, these would primarily include examiners and journal editors that are representative of the research referred to in the review of literature. The research would be of interest to a range of readers that may differ in terms of their fields and the dominant knowledge paradigms of these. However, having determined that the knowledge paradigm of this study is predominantly post-positivist, a quantitative methodological approach would be more appropriate.

Both the quantitative and qualitative approaches represented valuable outcomes depending on the purpose of the study. While qualitative research facilitates greater depth of understanding, its findings are more difficult to validate and generalise. Quantitative research on the other hand allows for greater generalisation and avoids subjectivity in terms of the analysis. Quantitative research provides sound empirical evidence of causal relationship which is more parsimonious with the underlying literature used to conceptualise and operationalise the concepts of this study. The mixed method approach is increasingly regarded as best in providing an understanding of a research problem as it both encompasses the depth of meaning and the empirical basis for claims (Creswell 2009). A comparison between qualitative, quantitative and mixed method approaches is illustrated in Table 3.1.

Table 3.1: Comparison between quantitative, qualitative and mixed methods approach to research.

Research approach	QUANTITATIVE	QUALITATIVE	MIXED METHODS
	Measures objective facts based on reduction of variables to measurable entities (reductionist)	Construction of social reality and meaning (constructivist)	Both reductionist and constructivist allowing for greater depth and triangulation
Knowledge claims	Positivist or Post-positivist knowledge paradigms	Critical Realism or Interpretive knowledge paradigms	Pragmatic knowledge paradigm
Purpose	Explanatory– tests theory, describes relationships between variables based on objective, ‘unbiased’ statistical analysis in order to generalise	Exploratory / Descriptive – examines complex situations to gain better understanding in order to develop, explore and interpret preliminary ideas	Explanatory and / or Descriptive and / or Exploratory
Interpretation and logic	Reconstructed logic - Causal and deductive	Logic in practise - Either causal or non-causal and often inductive	Both reconstructed logic and logic in practise.
Strategy of enquiry	Experimental or survey methods	Case study, grounded or action research methods	Both quantitative and qualitative methods
Analysis	Close-ended numerically based statistical analysis – objective and limited to variables measured	Open-ended narrative and content based interpretation and analysis – in depth and comprehensive	Both closed-ended and open-ended.

Source: (Adapted from Creswell 2009; Leedy & Ormrod 2005; Neuman 2006)

Qualitative and mixed method approaches are more time consuming and resource dependent (Neuman 2006). The nature of this study’s research problem, questions and purpose in addition to the operationalisation of variables made the inclusion of qualitative methods subsidiary in terms of answering the question. The scope of the study and resources available to the researcher limited broadening the enquiry so as to make a qualitative study justifiable despite the added depth such an approach would provide. However, in the development of hypothesis, conceptual framework and research instruments, a panel of experts were consulted in order to confirm the constructs, method, hypotheses and instruments. Further refinement of the research instruments and familiarisation with the data was achieved in terms of a pilot study. These methodological steps will be discussed later in this section.

3.3.4 Overview of Quantitative Methodology

Neuman (2006) notes that when concepts are in the form of distinct variables, hypotheses are formulated to start with and are based on causal models, the fitting approach to the research design is a quantitative approach. Quantitative approaches to research are usually associated with explanatory or descriptive questions (Creswell 2009).

The research was conducted as a quantitative cross-sectional research study. This implies that the research was conducted in terms of an observation at a single point in time (Neuman 2006) using quantitative methods. Cross-sectional research may be descriptive, explanatory or exploratory but is unable to encapsulate change or social processes. However, in terms of the research problem an observation at a particular point in time is adequate as there is no implied need to investigate shifts in paradigms or change in terms of processes. Quantitative approaches to research design typically include the strategy of enquiry in the form of surveys which was deemed suitable for the cross-sectional nature of the enquiry (Creswell 2009).

3.4 Research strategy of enquiry: Survey research

3.4.1 Overview

Surveys as a research strategy are recognised as having a number of fundamental characteristics including that they have a breadth of view and inclusive coverage of the phenomenon; they are aimed at determining the state of affairs at a specific point in time, and; are embedded in empirical research (Denscombe 2003). Usage of the terms of survey and questionnaire are often used interchangeably and can cause confusion (Creswell 2009; Leedy & Ormrod 2005). For the purposes of this study *survey research* is regarded as the strategy to acquire information that relates to one or more groups of people (Leedy

& Ormrod 2005). The purpose is to derive an understanding of the phenomenon related to the research question at a specific time and in terms of a large population by surveying a sample of that population.

Survey research has various advantages. These include the ability to access a large and geographically dispersed population, collecting data in an unobtrusive way, decreasing bias when not using interviews and reducing the time requirements when well designed (Sapsford 2007).

Surveys may include a number of data collection techniques or methods in order to obtain the required information from the population of interest. These include interviews, observations, and questionnaires (Leedy & Ormrod 2005). Questionnaires have also been used to refer to both self-administered questionnaires or the protocols used in interviews (Neuman 2006). In this study, the term *survey questionnaire* has been used in order to refer to a self-administered research instrument used to collect data related to the population of interest.

3.4.2 Selection of survey research strategy

The research strategy of enquiry for this study was determined to be in the form of a survey. Based on the post-positivist paradigm of the study and the quantitative approach being deemed most suitable, a research design that meets with the paradigms and needs of the study was necessary. Survey research, is regarded as an appropriate strategy in providing a quantitative description of the relationship between variables and a parsimonious basis for empirically determined knowledge claims (Creswell 2009).

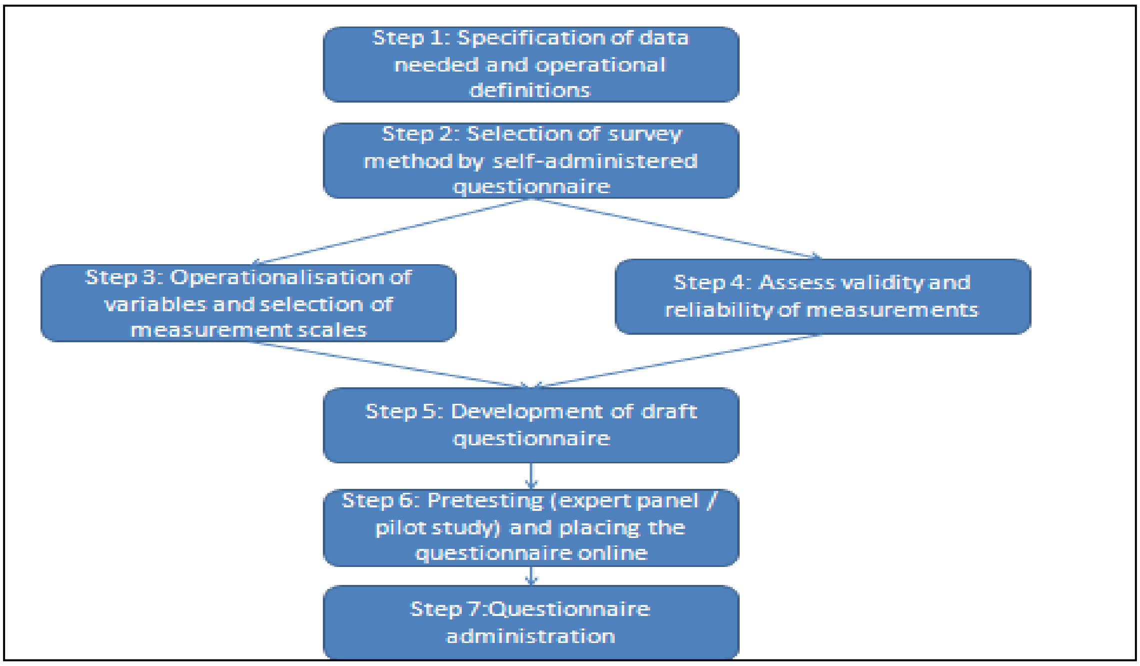
More specifically, when large numbers of standardised responses are required from a geographically diverse population and the questions are relatively straight forward and uncontroversial, questionnaires are regarded as at their most productive (Denscombe 2003; Neuman 2006). They also offer anonymity for the respondent and the opportunity to respond at their own convenience.

3.5 Questionnaire development and administration

Having justified the methodology of the study, this chapter still needs to address four areas of the research design: survey questionnaire design and administration (section 4), sampling (section 5), data analysis strategies (section 6) and ethical considerations (section 7).

Researchers that adopt a quantitative approach to their research start with an abstract idea, followed by a procedure for measurement and culminate with empirical data that represents the relevant ideas of the research (Neuman 2006). This section of the chapter describes how the questionnaire was formalised to obtain complete and accurate information in the form of empirical data as related to the research problem. The development of the questionnaire followed a seven step approach synthesised from Creswell's (2009) components of survey design and Malhotra's steps (1999) of questionnaire design as illustrated in Figure 3.2. Step one emerged out of chapter two and step two was resolved in terms of justifying the research methodology and in selecting the survey research strategy in section three of this chapter.

Figure 3.2: Questionnaire development process



Source: (Adapted from Creswell 2009; Malhotra 1999)

3.5.1 Development of the survey questionnaire

Survey questionnaires are widely regarded as an appropriate method for collecting information from a large number of sample respondents that represent the population of interest in order to make generalised claims about the population (Creswell 2009). The design of survey questionnaires is thus critical to the effective and efficient collection of data in a cross-sectional study (Denscombe 2003).

Researchers do not have the opportunity to make amendments to survey questionnaires once they are finalised and distributed and as such the careful planning of this study's questionnaire was imperative. It is therefore regarded as best practise to pilot-test the survey questionnaires prior to implementation (Neuman 2006). Accordingly, the development of the survey questionnaire for this study included a pilot-test in addition to following the guidelines for developing surveys as suggested by Leedy and Ormrod (2005):

Brevity: Only information essential to the research was included while formulating the questionnaire. This was to ensure that the respondents do not feel encumbered by the time taken to complete it and thus would increase the likelihood of a better response rate.

Keep the respondent's task simple: The questionnaire was developed with ease of use in mind. Not only were the instructions formulated as simple as possible but the method of response, being web-based, entailed the respondent to respond in terms of mouse clicks on appropriate responses only. The online survey used the Questionpro (www.questionpro.com) software that has been developed with ease of respondent use as a priority and thus the process of developing the questionnaire was aided by prompted hints in order to simplify the respondents' task.

Provide clear instructions: Instructions for completing the questionnaire were carefully worded to provide a short yet clear indication of what is expected from the respondent.

Use of simple unambiguous language: Technical and complicated language use was avoided.

Avoidance of unwarranted assumptions implicit in the questions: Questions in the scales adopted by the study were not altered. However, all the questions in the last section of the questionnaire (demographics and interaction with organisational strategy) were checked for unwarranted assumptions. Questions regarded as possibly making assumptions were amended to include an opt-out or not applicable option.

Avoidance of preferred responses: Primarily due to the questionnaire using previously validated scales and being limited to demographic questions, leading questions were avoided.

Determine in advance how responses are coded: The survey software automatically codes and files responses thus guaranteeing systematic retrieval and reference.

Check for consistency: The composition of the questionnaire included questions that allow for counter checking the consistency of responses. Verification of the consistency of responses was therefore enabled.

Conduct pilot-test: A pilot test was conducted thus facilitating the refinement of the questionnaire and in determining its validity. An expert panel was also consulted in order to improve the questionnaire and contribute to its validity.

Scrutinize the instrument again before implementation: This was done and included the perusal of colleagues.

Make the instrument attractive and professional looking: Professional formats were available from the survey software and the most appropriate presentation format was selected taking into account the assessed audience profile.

3.5.2 Construction of the survey questionnaire

The survey instrument developed for the study comprised of six sections including the introductory cover page (for a full copy of the survey questionnaire see Appendix A). Sections two to five encompassed the operationalisation of the independent, intervening and dependent variables. Section six included the demographic information of the respondents which served to constitute the moderating variables of the research design.

3.5.3 Conceptualisation and operationalisation of the variables

The measurement development process for this study included both the conceptualisation and operationalisation of the relevant concepts in order to observe the idea empirically (Neuman 2006). Conceptual definitions of the variables adopted by this study were described in chapter two and are summarised in Table 3.2. From these the variables were operationalised into valid and reliable measures also illustrated in Table 3.2. The validity and reliability of the measures as step four are discussed in the next section of this chapter.

Conceptualisation: Conceptualisation is described as the process of developing systematic and clear conceptual or theoretical definitions from abstract concepts (Neuman 2006). Diligence was exercised to avoid ambiguity and vagueness by adopting conceptual definitions of the concepts linked to the theory and conceptual framework of the study. A conceptual definition is described as an explicit definition in theoretical terms (Neuman 2006). Concepts may have several definitions depending on a researcher's knowledge paradigms or research focus. As such it is not unusual to discover disagreement in the literature related to conceptual definitions (Neuman 2006). The approach adopted by this study was to synthesise relevant definitions from the literature within the context of the purpose and paradigms of the study.

Operationalisation: Operationalisation is described as the process of linking conceptual definitions to a specific set of measures in order to allow for their empirical observation (Neuman 2006). Operational definitions are derived from this process that described specifically how the conceptual definitions will be measured (Hair, Bush & Ortinau 2000). The measures selected for this study were chosen due to their alignment with the elements of the conceptual definitions and are described in Chapter 2.

Table 3.2: Conceptual and operational definitions in terms of research issues and the corresponding survey questions

	Construct	**Conceptual Definition**	**Operational Definition**	**Survey Section**	
RI 1: Is foresight competence positively associated with strategic thinking?	Foresight competence (independent variable)	*Foresight competence is the human ability to creatively envision possible futures, understand the complexity and ambiguity of systems and provide input for the taking of provident care in detecting and avoiding hazards while envisioning desired futures*	Respondent foresight competence is measured by the extent of agreement with statements in a Likert scale about a) their **dominant orientation to future thinking and lower but significant orientation to the past** (Fortunato & Furey 2009) and b) their **propensities to adopt dominant framer and back-up adapter foresight styles** (Dian 2009; Gary 2008).	(Section 1- Q1Time, Q1-16) (Section 2- Q2FSA, Q17-42)	Interval Interval
	Strategic thinking (intervening variable)	*Strategic thinking is regarded as a synthesis of systematic analysis (rational) and creative (generative) thought processes that seek to determine the longer-term direction of the organisation.*	Respondent foresight competence is measured by the extent of agreement with statements in an interval scale about their **propensities to adopt a dominant conceptual and back-up analytic decision styles** (Rowe & Boulgarides 1994).	(Section 3- Q3a-Q3t, Q43-62)	Interval
RI 2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?	Demographic proxies (moderating variables)	*Demographic proxies are valid representations of underlying cognitions and behaviour of strategic leaders.*	Respondent demographic proxies are measured in terms of the statements in nominal scales related to the **demographic characteristics of age, gender, education, experience and industry**.	(Section 5- Q5GEN – Q5STRATWHO, Q80-93)	Nominal
RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?	Strategy-making modes (dependent variable)	*Strategy-making modes are the most pervasive mode of making strategy in an organisation and reflect the strategy-level leaders' strategy-making styles.*	Respondents' organisational strategy-making mode is measured by the extent of agreement with statements in a Likert scale about the **organisation's dominant mode of making strategy**.	(Section 4- Q4SMP, Q63-79)	Interval

Source: developed for this research.

Table 3.2 illustrates the research issues from which the conceptual definitions were derived. It also indicates the operational definitions resulting from the process of operationalising the conceptual definitions, the measures selected to empirically describe them and the relevant section in the questionnaire describing each.

The survey questionnaire comprises of introductory page and five sections. Section five collects data related to the demographic characteristics of the strategy-level leaders in terms of their gender, age, education, industry and experience. In terms of education, both the general levels of education and formal education related to foresight concepts and methods are assessed. In terms of experience, both industry and position experience is assessed. Section five also includes questions related to strategy formulation in the organisation and the level of influence the strategy-level leader has on the formulation of strategy. The former allowing for the triangulation of section four's responses and the latter allowing for the delimitation of the sample in terms of the definition of what constitutes being classified as a strategy-level leader.

Sections one and two measure strategy-level leader foresight competence as determined from the related conceptual definition and integrate two established scales in terms of operationalisation, the TimeStyle Inventory (Fortunato & Furey 2009) with sixteen questions and Foresight Styles Assessment (Dian 2009; Gary 2008) with twenty-six questions. Section three measures strategy-level leader strategic thinking as determined from the related conceptual definition and is operationalised in terms of the Decision Styles Inventory (Rowe & Boulgarides 1994) which includes twenty rank order questions. Section four measures the strategy-making modes of the organisations within which the strategy-level leaders influence strategy and is operationalised in terms of the Strategy Making Processes scale (White 1998) which includes 17 questions. Each of the scales that have been integrated into the survey questionnaire was selected due to previous studies that confirm their validity and reliability. No amendments to the original scales were made. Written permissions to use the TimeStyle Inventory, Foresight Style Assessment and Strategy Making Process scales were received from the respective originators of the scales. The selection of the scales in terms of the study's research issues and hypotheses were generally judged as being appropriate by a panel of experts (Appendix B). None of the experts rejected the operational measures of the concepts. This contributed to the face validity already established in terms of the scales.

3.5.4 Assessing the validity and reliability of the survey questionnaire

A requirement for developing a good survey questionnaire is that it accurately and consistently measures the constructs of interest, that is, it is a valid and reliable research instrument. Reliability and validity are central issues of all measurement and both concern connecting measurement to constructs (Neuman 2006). Accordingly, the next step in term of the questionnaire development was to assess its validity and reliability. This section will briefly define the different forms of validity and reliability and describe the steps taken in the design of the survey questionnaire to test for and ensure high levels of validity and reliability in the study.

All the scales integrated in the survey questionnaire had previously been assessed as valid and reliable and were discussed in the chapter two. Table 3.3 illustrates the conclusions related to validity and reliability testing reported in previously published peer-reviewed articles.

Table 3.3: Summary of validity and reliability testing of incorporated measurement scales in prior research.

Questionnaire Scales	Previous Research Conclusions	Reference
TimeStyle Inventory	64% of variance explained. Factor loadings (α) of 0.84, 0.91 and 0.80 respectively (Fortunato & Furey 2009). Reliability and construct validity evidence presented.	(Fortunato & Furey 2009, 2010)
Foresight Styles Assesment (26 item)	41.72% of variance explained. Factor loadings (α) of 0.89, 0.78, 0.77 and 0.66 respectively (Gary 2009). Reliability and validity evidence presented	(Gary 2008, 2009)
Decision Styles Inventory	Significant reliability and validity evidence presented across numerous studies.	(Fox & Spence 2005; Jacoby 2006; Leonard, Nancy H, Scholl & Kowalski 1999a; Martinsons & Davison 2007; Park 1996; Pennino 2002; Rowe & Boulgarides 1994; Rowe & Mason 1987b)
Strategy Making Processes scale	55.1% of variance explained. Factor loadings (α) of 0.91, 0.83, 0.82 and 0.78 respectively. Cronbach's α of 0.85 Reliability and content, discriminant and convergent validity evidenced.	(White 1998)

Source: developed for this research.

In terms of the gap between the conceptual and operational definitions adopted by this study, further tests for reliability and validity were required and various strategies were adopted. These included identifying peer-reviewed research in relevant journals related to the study's operationalising of the concepts, their elements and their alignment with the measures not specifically addressed in previous validity and reliability testing. Also included was feedback received from an expert panel, a pilot study and data analysis techniques, the latter specifically in terms of confirmatory factor analysis and structural equation modelling.

3.5.4.1 Face and content validity

Face validity is the degree to which others judge the measurements to actually measure the concepts and content validity is the extent to which the measure captures the full meaning of the conceptual definition (Leedy & Ormrod 2005; Neuman 2006). The assessment of the face and content validity of the questionnaire was conducted in parallel. That is , a) the face validity established in prior studies related to the scales incorporated in the questionnaire were examined in addition to prior research supporting the operationalisation of the concepts as noted in sections 5.5, 6.7, 7.6 and 7.7 of chapter 2, b) feedback from a panel of experts related to the operational definitions, measures and hypotheses and c) pre-testing in terms of a pilot study were conducted. All three strategies yielded additional support for the measurement validity of the study. No amendments to the draft questionnaire were made after these steps were conducted thus finalising the development of the questionnaire. Further face validity is established in terms of the confirmatory factor analysis is reported in section … of chapter four.

3.5.4.2 Discriminant validity

Dicriminant validity is especially important in this study as it illustrates how two conceptually similar concepts are distinct (Hair et al. 2006). In terms of determining the discriminant validity the summated scales are correlated with similar but conceptually unique measures. In this case it was the important of distinguishing foresight competence from strategic thinking as they are, at times, used inter-changeably (Voros 2003). In this study, the data analysis techniques took into account the need to establish discriminant validity in that the correlations are ideally low between the summated scales measuring the foresight competence and strategic thinking concepts illustrating sufficient difference (Hair et al. 2006). This is further analysed and reported in section … of chapter four.

3.5.4.3 Convergent validity

Convergent validity illustrates to what degree scales correlate with other scales (Hair et al. 2006). This study has argued that foresight competence and strategic thinking are overlapping yet distinct concepts. It was therefore expected that the scales used to operationalise these concepts would correlate in terms of the theory linking them. Convergent validity is thus established when the data statistically indicates high correlations indicating that the scales are measuring their intended concepts (Hair et al. 2006). This analysis and reported results are described in Chapter 4.

3.5.4.4 Reliability

As noted, the reliability of a scale is determined by the consistency of the items of the scale. This is commonly determined in terms of the internal consistency of the scales based on how well the items of the scale correlate (Hair et al. 2006). Another form of reliability assessment is the test-retest approach (Neuman 2006). However, this study will primarily be concerned with the internal consistency of the scales as determined in terms of the reliability coefficient. The most widely used reliability coefficient measure is Cronbach's alpha (Hair et al. 2006). The Cronbach's alpha (α) scores of the scales included in the survey questionnaire as established in earlier studies was noted in Table 3.3 and all indicate the reliability of the scales. Thus reliability featured as an important consideration in the design of the questionnaire. This study further adopted a more detailed assessment of reliability in terms of the reliability measures derived from confirmatory factor analysis namely, composite reliability and average variance extracted (Hair et al. 2006). These are addressed in more detail in Chapter 4.

3.5.5 Development of the draft questionnaire

This step in the development of the survey questionnaire was based on the operationalisation of the concepts as described in Section 4.2.1. Existing scales aligned with the operational definitions were arranged in the questionnaire according to the conceptual model of the study. Namely, sections one and two made up of the TimeStyles inventory and Foresight Style Assessment scales respectively, measure foresight competence as the independent variable. Section three made up of the Decision Styles Inventory measures strategic thinking as the intervening variable. Section four, made up of the Strategy Making Processes scale determines the strategy making propensity of the organisation within which the strategy-level leader operates. Section five contains the demographic information related to the strategy-level leader's profile in addition to questions related to their role in the organisation's strategy making and perceived influence on it.

The survey questionnaire was first developed as a pen and paper self-administered questionnaire. This draft questionnaire was then circulated to colleagues and other post-graduate students for their feedback and revisions if necessary.

3.5.5.1 Panel of experts

A panel of experts were invited to evaluate the conceptual model, instrumentation, hypotheses of the study and the survey questionnaire during April and May 2009. These included experts in the fields of foresight and strategic thinking in Australia, South Africa, Taiwan and the United States of America. The details of their positions, institutions and relevant feedback are attached as Appendix B which was finalised at the end of May 2009.

There was general acceptance for the rationale and inclusion of the chosen instruments and support for the study. Three panel members were unable to respond due to pressing schedules but had previously interacted with the researcher prior to the development of the questionnaire. Concerns included possible collinearity (Prof. KH Chen), clarity of hypotheses (Dr. J Voros, Prof. P Bishop), the length of the questionnaire (Dr. P Hayward, Prof. P Bishop), possible need for log-linear analysis (Prof. E Smit), and possible use of an alternative measure for time orientation (Dr. J Gary). Each of these concerns was addressed by the researcher and supervision team. The conceptual framework and hypotheses were adjusted to provide greater clarity. The questionnaire length was reduced. The use of the TimeStyles Inventory was determined to be adequate and the issues of collinearity and log-linear analysis were addressed in the data analysis of the research (see Chapter 4). In addition to making minor adjustments to the questionnaire, the questionnaire was converted to a digital format in order to facilitate the online administration thereof. This added to the user-friendliness of completing the questionnaire and reduced the time required to complete it. The average time to complete the survey as determined in the pilot study was 28 minutes.

3.5.5.2 Pilot study

After the refinements based on input from the expert panel a pilot study using the refined draft questionnaire was administered online and in collaboration with the Institute of Futures Research of the University of Stellenbosch Business School. It was conducted utilising the online survey administrators, Questionpro (URL http://www.questionpro.com/) who also provide the software to convert the questionnaire into a digital format.

The questionnaire was administered to master's degree graduates of the Institute who were invited by the Institute to participate. Eighty-eight participants viewed the questionnaire and 37 completed responses were received representing a 42% response rate. Participants were requested to provide feedback relating to the ease of completing the questionnaire, clarity of the questions and perceived understanding of the instrument. These elicited no negative responses requiring amendments to the questionnaire.

The pilot study provided sufficient support for added validity and reliability of the measures. It further illustrated that the questionnaire was easy to understand requiring an average of 28 minutes to complete. The data retrieved from the online administrators (Questionpro) was not corrupted in any way. The data was converted from a Microsoft Excel spreadsheet to a SPSS data file and was checked for missing data, and possible format problems. There was no missing data due to the exception messages generated by the survey software when questions are not answered. No formatting or other issues were discovered.

It should be noted that a sample size of 37 precludes many of the statistical analysis methods that will be used in the main study. However, an analysis of the factorability of the pilot sample data in relation to the instruments used was possible. Factorability is concerned with the extent to which the data is suitable for the development of a set of factors. The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy illustrates this adequacy and measures the extent to which intercorrelations among variables exist (Hair et al. 2006). The Bartlett's Test of Sphericity measures the probability that the correlation matrix will exhibit significant correlations (Hair et al. 2006). The analysis indicated that the data illustrated good fit and produced data adequate for analysis. Both tests illustrated that the items in the questionnaire were able to be subjected to factor analysis. A comprehensive pilot study report was formulated. An executive summary thereof is attached as Appendix C.

3.6 Sampling

This study was concerned with the foresight competence and strategic thinking of strategy-level leaders within the context of organisational strategy. Of primary interest were those strategy-level leaders from Australian and South African organisations.

The definition of what constitutes being a strategy-level leader was determined in Section 3.2 of Chapter Two. *Strategy-level leaders are those that exert a moderate to high influence on the strategy formulation and formation of the organisation.* Organisations differ significantly in terms of those that influence the strategy of the organisation. These may be limited to the dominant coalition of the organisation typically determined as the CEO and senior managers or the directors and CEO in terms of a traditional perspective of strategy (Whittington 2001) or could include those at all levels of the organisation in terms of the dynamic model of organisational strategy (Section 2.2). It could also include those from outside of the organisation such as shareholders or consultants, the latter often influencing strategy significantly (Pellegrinelli 2002).

3.6.1 Sampling strategy

Sampling is critical in survey research (Leedy & Ormrod 2005). Probability sampling is regarded as academically most rigorous in terms of quantitative methods as it can rely upon the rationale of probability theory (Neuman 2006) and thus has . Of importance to probability sampling is to i) determine the population parameters for the sample population, ii) derive a sampling frame and iii) select a randomised sample (Malhotra 2007; Neuman 2006).

Developing accurate population parameters and a sampling frame in terms of defined lists was however not feasible. This was due to the variability of strategy-making in organisations and determining its agents. This was especially difficult in terms of the geographically widespread area of interest in the study, the generally lack of willingness of directors and executives to respond (Cycyota & Harrison 2006) and the potential high cost of extracting a random sample (Watters & Biernacki 1989).

Quantitative methods have been used in the study of difficult to reach populations using non-probability sampling (Neuman 2006; Watters & Biernacki 1989). The possibility that non-probability sampling may yield valuable estimates of the population characteristics is not discounted in the literature but a statistical projection of the population is not possible (Malhotra 2007). This is a limitation of the study and is discussed later in the chapter.

3.6.2 Steps of the sampling process

The steps adopted in terms of the sampling process and its application in relation to this study are illustrated in Table 3.4.

Table 3.4: Steps of sampling process applicable to this research

Steps	**Description**	**Application in this research**
1) Define the target population	The collection of elements, sampling units, extent and time that define the population related to the research problem.	*Elements:* Male or female strategy level leaders. *Sampling unit:* Private Organisations *Extent:* South Africa and Australia *Time:* April 2009 - December 2009
2) Determine the sampling frame	Representation of the elements of the population in terms of a list or set of directions.	Compilation of sampling frame list not feasible. *Directions for identifying population:* Role involved in strategy making, in and for private organisations, medium to high influence on strategy making
3) Select sampling technique	Method by which the sample is selected; either in terms of probability or non-probability techniques	Non-probability, purposive or judgemental sampling
4) Determine sample size	The selection of the number of elements from the population to be investigated	300 respondents

Source: (Synthesised from Burns, A. C. & Bush 2000; Creswell 2009; Malhotra 2007; Zikmund 2003)

The population of this study is defined as all strategy-level leaders, male and female, in private organisations in South Africa and Australia that have a role involved in, and medium to high influence on, the strategy-making of that or another organisation.

3.6.2.1 Sampling frame

Not only was an attempt to compile a sampling frame list for the target population of this study considered not feasible but it was anticipated that the discrepancy between a possible list and the population would be considerable and would lead to significant sampling frame error (Malhotra 2007). In the event of compiling a sampling list not being feasible or possible, directions for identifying the population should be specified (Malhotra 2007).

The directions for identifying the population for the study were:

a) Individuals in private organisations that,
b) Have a role involved in strategy-making in the organisation or,
c) Advise other organisations in terms of strategy-making, and,
d) Have a medium to high influence on an organisation's strategy-making.

Babbie (2004) suggests that when the determination of an entire population is considered unfeasible or impossible, such as in terms of student leadership, studying a sub-set of the population in terms of identifiable characteristics may suffice for general comparative purposes. Screening respondents for the characteristics in terms of these directions during data collection was a technique used by the study to reduce sampling frame error (Malhotra 2007) and specify a subset of the population.

3.6.2.2 Selection of sampling technique

When probability sampling is not feasible, non-probability sampling is commonly used and in many circumstances is the preferred sampling method (Babbie 2004; Kaye & Johnson 1999). Indeed non-probability sampling is regarded as more suitable when using an online survey (Kaye & Johnson 1999). Because respondents are self-selecting regarding online surveys, they are defined as volunteer sampling (Kaye & Johnson 1999). In order to avoid pitfalls commonly associated with sampling error due to the lack of feasibility and practicality to pursue probabilistic sampling, in addition to the inability to determine a sampling frame in terms of a list, the study adopted a non-probability, purposive sampling approach (Leedy & Ormrod 2005; Neuman 2006). This study has taken steps to convert the online survey responses into purposive sampling (Kaye & Johnson 1999). These are described below in this section.

In the case of this study purposive sampling was determined to be most appropriate due to the nature of strategy-level leaders and the characteristics defining them in addition to the purpose of investigating the abstract and minimally researched concepts of foresight and strategic thinking. Purposive sampling is regarded as "a valuable kind of sampling for special situations” (Neuman 2006, p. 222) and appropriate for certain research problems (Leedy & Ormrod 2005). It is regarded as especially valuable when individuals are chosen as ‘typically’ representing a group (Leedy & Ormrod 2005) or target responses that are especially informative (Neuman 2006).

This study argues that strategy-level leaders are not defined by position only but are determined by their difficult to observe influence on an organisation’s strategy. This varies significantly from organisation to organisation and position to position (see section 3.4 in chapter 2). Strategy-level leaders may encompass those that are specifically employed to engage strategy or serve in advisory functions often from externally. They are thus regarded as rare or ‘hidden’ in the sense that their activities are often concealed and difficult to locate (Watters & Biernacki 1989).

The survey questionnaire included an assessment of the individual’s a) level of influence on the organisation’s strategy, b) role in the strategy-making of the organisation or for an organisation, c) their position, and d) how they perceive strategy to be formulated in the organisation. These variables allowed for the selection from the respondents of those who exert a moderate to high influence on the organisation’s strategy. This also allowed for the triangulation of this selection.

3.6.2.3 Sample size

The sample size refers to the estimated number of elements the researcher plans to be included in the study (Malhotra 2007). A number of considerations are taken into account related to determining sample size. These include the purpose and nature of the research. Of primary importance is the nature of the analysis, sample sizes in similar studies and resource constraints (Malhotra 2007). This study will adopt a structural equation modelling (SEM) statistical analysis approach to analysing the data. Hair et al. (2006, p. 741) note in terms of sample size as related to SEM that “previous guidelines such as always maximise your sample size and sample sizes of 300 are required, are no longer appropriate”. Sample size should rather be based on a number of factors, missing data and the normality of the data. Taking these criteria into account, this study nevertheless determined that a minimum sample size of 300 should be aimed for. The implications of selecting SEM data analysis and aspects of the study related to sample size will be discussed below.

It has also been noted before in this chapter that resource constraints are a limiting factor in research studies. The implied cost of gaining a very large sample was restrictive especially in the light of the reported low response rates of senior executives and directors. However, in order to ensure trustworthy results a review of opinions in this regard was collated from the literature and experts. Table 3.5 illustrates that the main considerations related to sample size in terms of structural equation modelling (SEM) and are; the subjects-to-variables (STV) approach, data analysis technique requirements, factor loadings in the case of confirmatory factor analysis, distribution and missing data.

Table 3.5: Considerations related to sample size for SEM

EXPERT	SAMPLE SIZE
Dr. M Lane (University of Southern Queensland)	Sample size for EFA. There is no scientific answer to this question, and methodologists differ. Alternative arbitrary "rules of thumb," in descending order of popularity, include those below. These are not mutually exclusive: Bryant and Yarnold, for instance, endorse both subjects-to-variables (STV) approach and the Rule of 200. There is near universal agreement that factor analysis is inappropriate when sample size is below 50. STV ratio. The STV ratio should be no lower than 5 (Bryant and Yarnold, 1995) Rule of 100: The number of subjects should be the larger of 5 times the number of variables, or 100. Even more subjects are needed when communalities are low and/or few variables load on each factor. (Hatcher, 1994) Rule of 150: Hutcheson and Sofroniou (1999) recommends at least 150 - 300 cases, more toward the 150 end when there are a few highly correlated variables, as would be the case when collapsing highly multicollinear variables. Rule of 200. There should be at least 200 cases, regardless of STV (Gorsuch, 1983) Rule of 300. There should be at least 300 cases (Norušis, 2005). Significance rule. There should be 51 more cases than the number of variables, to support chi-square testing (Lawley and Maxwell, 1971)
Perry, C 2008	Sample size of 200-300 is adequate for PhD study using SEM
Muthen & Muthen 2002	150 if normally distributed and no missing data 175 if normally distributed with missing data 265 for non normal complete data
Kline, RB 2004 (3512 citations)	Sample sizes that exceed 200 can be considered “large” which is acceptable for most analysis models. Factor loadings must be greater than α 0.6
Hair et al. 2006	In terms of SEM five or fewer constructs (instruments), each containing more than three factors and with high factor loadings (higher than α 0.6) can be adequately estimated with a sample size as small as 100-150

Source: Developed for this research.

An important factor related to sample size is the determination of model fit. Considerable disagreement in the literature surrounds the different measures of model fit required for SEM analysis and the confounding effect of sample size (Fan, Thompson & Wang 1999). Fan et al. (1999) that sample sizes above 200 have the same non-convergence statistics in their study as samples of 500 and 1000 (0.00 convergence failure). The percentage of improper solutions decrease from 22.92% in terms of a sample size of 50, to 0% in terms of a sample size of 1000. A sample size of 200 had a 2.58% rate of improper solutions. Fan et al. (1999) conclude that a sample size of 200 is reasonably large and displays comparable information regarding model fit across fit indices.

This questionnaire considered 15 higher and lower order factorial variables being; future thinking, present thinking, past thinking, framer foresight style, adapter foresight style, tester foresight style, reactor foresight style, conceptual decision style, analytic decision style, directive decision style, behavioural decision style, rational mode, symbolic mode, transactive mode and generative mode of strategy making as well as demographic proxies. Given these variables and taking into account the recommended guidelines, the reasonably large sample of 298 responses used in the sample represents a ratio of approximately 19:1 which is more than adequate for further analysis.

3.6.3 Limitations of sampling strategy

It is noted that less than one in five strategic management studies rely on probability sampling and that researchers "offer little apriori acknowledgement of sample limitations" (Short, Ketchen & Palmer 2002, p. 363). Representativeness of a research study's sample contributes significantly to the generalisability of the results extracted from the sample. It is regarded as important to address the limitations of the representativeness of the sample (Short, Ketchen & Palmer 2002).

The limitations of this study include;

a) *Generalisability of the results.* Online surveys are conducive to purposeful sampling if carefully directed (Malhotra 2007) and while the results cannot be generalised to the whole population, they can be generalised to a specific subset of the population (Babbie 2004; Kaye & Johnson 1999).
b) *Accessibility to a representative sample of strategy-level leaders.* It was anticipated apriori that to gain a representative sample of the population was not

feasible; steps have been taken to specify a subset of the population. It was noted above that valid comparative results can be drawn from such a sample and that representativeness of such subsets can be established in terms of purposive sampling (Kaye & Johnson 1999; Malhotra 2007).

c) *Director, executive and senior management's low response to surveys.* Executives are regarded as key sources of information related to research in terms of decision-making and the crafting of strategies (Cycyota & Harrison 2006). It is noted that in terms of organisational processes such as strategy, the upper echelons or dominant coalition of the organisation may be the only source of information related to certain variables (Cycyota & Harrison 2006). It has long been asserted that there is a growing trend of decreasing executive response rates to research enquiries (Cycyota & Harrison 2006; Hambrick, Geletkanycz & Fredrickson 1993).

3.7 Survey administration

3.7.1 Web-based survey questionnaire

The administration of the survey questionnaire was determined to be web-based. Web-based surveys are noted to be the cheapest, fastest form of surveying methods yielding moderate response rates and excluding researcher bias (Neuman 2006). Web-based surveys were assessed to yield greater response rates than those using land mail and comparable to the quality of data gained from face-to-face contact (Gosling et al. 2004). It is noted that in terms of response rates, these improve if the target population are generally well educated or have a strong interest in the topic (Neuman 2006). Gosling, Vazire, Srivastava and John (2004) further affirm that web-based surveys also tend to have greater geographic, gender and socio-economic diversity in the sampling. Critically to this study, they also conclude that web-based methods are also suited to studies in many areas of psychology. In view of the psychological measures included in the questionnaire, this is particularly relevant in terms of its validity. In terms of researching the upper echelons or dominant coalitions of organisations the primary source of information is in their executives and was critical in terms of this study. However, despite the trend of upper echelon executives having low response rates to research (Cycyota & Harrison 2006) the study adopted strategies that was able to extract moderate to good responses from senior executives.

Due to i) the lack of resources available to the researcher, ii) time constraints of the research, iii) geographic diversity of the population, iv) reluctance of executives in the population to participate, v) broad nature of the research problem, vi) suitability of web-based surveys, and vii) purpose of the study to propose an empirical basis for further research in the area of interest, web-based survey research was deemed to be the most effective and efficient strategy to utilise in terms of collecting the data necessary for the study.

3.7.1.1 Email and web-based administration of the survey

This study adopted the approach of distributing an email to the members of participating institutes and the brokered list. The email briefly describes the research being undertaken and invites the recipient to click on a web-link to access the online survey. The full contact details of the researcher were clearly indicated and the voluntary participation and their anonymity were assured. A full copy of the email invitation is attached as Appendix D. Upon completion the respondent was thanked for their participation and was provided with a response ID (the response code in the database). Participants were also invited by the researcher to request the results of the study if required.

The online survey was constructed using and linked to the online survey service, Questionpro. This service provides a software and database service for the administration of surveys. Responses are automatically coded and data stored by the service and includes descriptive reports including details of surveys viewed, drop outs and completions in addition to a data storage and export service. The researcher utilised an entry level package service which also limited some data services. This did not impact negatively on the collection, storage and export needs of the research.

3.7.1.2 Strategies for administration of survey

In a review of studies surveying executives specifically in terms of response rates Cycyota and Harrison (2006) conclude that traditional techniques of increasing data-collection responses in survey research were found to be less successful in the case of executives. There was also further evidence that expensive techniques of collecting data from executives made no significant difference to the response rates (Cycyota & Harrison 2006).

What was determined as increasing the response rate was if the researcher is endorsed by an industry partner or supported by existing social networks such as industry, professional groups, university contacts and personal contacts (Cycyota & Harrison 2006). The researcher of this study recognised this strategy and approached a number of professional institutes and industry groupings to facilitate their support and increase the possible response rates. This included approaches to the Australian Institute of Company Directors and Australian Institute of Management in Australia and the Stellenbosch University based Institute for Futures Research in South Africa.

Due to preference for in-house research and a concern that increased surveys among members would lead to member dissatisfaction, the Australian based groups declined support for this study. However a high level of interest in the results was expressed. In order to address this, usage of a brokered list provided by Accountable List Brokers was utilised in Australia. This approach had previously been used by the researcher's university for research purposes. Criteria utilised for generating the list of 2000 email contacts were: Executive decision makers including CEOs, Chairpersons, Directors, Senior managers and consultants across all private industries in Australia.

The Institute for Futures Studies, the researcher's Masters Degree alumni, however did agree to support the data collection efforts in South Africa which resulted in good response rates given the difficulties faced. This support included an endorsement of the study and agreement to distribute the email invitation among its part-time Master's degree graduates in industry and among its associate members which constitutes 110 high profile organisations including a majority listed on the Johannesburg Stock Exchange (JSE). The contact persons in the list of associates were either the CEO or the executive responsible for strategy. A list of these organisations is included in Appendix E. The results of these strategies for collecting data are discussed below.

3.7.2 Survey results

As noted, the survey was administered online using email invitations and providing a web link to a dedicated Questionpro survey URL per participating group. The Institute for Futures Research in South Africa endorsed and supported the study and a brokered list was utilised in Australia. The survey responses are summarised in Table 3.6 and illustrate the estimated responses and actual responses for the study.

Table 3.6: Web-based survey responses of the study.

IFR (South Africa)	Total elements =	n = 38 (43% response rate)

Part-time Master's Degree Graduates	Distributed to 88 30% response rate = 27 anticipated	
IFR (South Africa) Associate members	Units of elements = 110 Elements = 440 (4 per element) 25% response rate = 110	n = 97 (22% response rate)
Accountable List Brokers	Elements = 2000 Email bounce backs = 10% response rate = 150	n= 64 (4.3% response rate)

Source: developed for this research.

The response rates lend support to Cycyota and Harrison's (2006) conclusions that the response rates of executives using traditional methods is declining. However, it also provides support for Cycyota and Harrison's estimation that executives are more likely to respond to studies endorsed by groups to which they are affiliated. The difference in national groupings may also impact on the observation but it is assumed by the researcher that the groupings show homogeneity. This assumption will be tested in the analysis in chapter four.

3.8 Data Analysis Strategy

The primary purpose of the study was to identify the relationships between the concepts and how they are moderated by strategy-level leader demographics. The statistical analysis software SPSS and AMOS were used in the process of statistically analysing the data. This section therefore discusses the steps taken in first identifying missing and inconsistent data, then developing summary statistics, followed by the methodological and statistical justification for using structural equation modelling (SEM).

3.8.1 Extracting the data

By using the Questionpro ™ online survey data software and data administration, all data was collected electronically and could be downloaded as intact SPSS / AMOS files. No further manipulation of the data was required other than merging the files as they were separately administered per group. Once loaded, the first step was to investigate any inconsistencies in the data and examine the database for any missing data (Creswell 2009). The surveying software used, significantly reduced the time needed to do this as it had automatic default settings that would remind the respondent of incomplete or inconsistent fields. However, any responses that were incomplete were coded as missing results and reported. Any inconsistent responses were automatically matched with the respondent code in order to facilitate remedial action or deletion from the usable database.

3.8.2 Summary statistics

The descriptive statistics such as those summarising the demographic characteristics of the respondents in terms of percentages and frequencies were extracted and collated first in the pilot study and then as part of the main study. This was primarily in order to identify trends or tendencies in the data (Sekaran 2002) and to provide direction in terms of conducting further multivariate analysis (Hair et al. 2006; Malhotra 2007). Part of this process was to determine the database of respondents that meet the predetermined directions related to identifying strategy-level leaders (see section 4.5.2.2) and thus the unit of analysis for the study. Also included in the summary statistics were the calculations of the correlations between variables to determine whether there were indications of the expected relationships in the proposed models. This served primarily as a precursor to the SEM analysis. This statistical analysis used SPSS statistical analysis software. The results are described in Chapter 4.

This stage provided for an initial overview of the nature of the data, possible indications of findings and a closer familiarity with the data by the researcher. Certain obvious indicators of trends or questions arose in this phase which were previously not anticipated yet yielded important indications for further analysis. These are further explored and analysed in Chapter 4.

3.8.3 Statistical analysis strategy: structural equation modelling (SEM)

Also known as analysis of covariance structures, latent variable analysis, linear structural relationships, analysis of moment modelling and causal modelling, structural equation modelling (SEM) has become a widely used umbrella term covering a broad range of statistical concepts. Not only is SEM regarded as an advanced statistical analysis technique (Hair et al. 2006; Leedy & Ormrod 2005), it is noted to encompass relatively new statistical techniques as well as conventional techniques such as the testing of correlations, regression analysis, covariance testing and factor analysis (Cunningham 2008). Indeed, the principles of multiple regression and factor analysis undergird the basis for understanding SEM (Hair et al. 2006). SEM encompasses techniques such as path analysis and confirmatory factor analysis that determine to what degree variables inter-related (Leedy & Ormrod 2005), one of the primary purposes of this study. SEM is able to identify and include mediating and moderating variables in its analysis (Leedy & Ormrod 2005), both of which are included in this study's model.

The primary limitation of other multi-variate techniques is that they are only able to examine one relationship at a time (Hair et al. 2006). SEM presents methods for testing hypotheses associated with relationships between latent and observed variables by simultaneously estimating a set of multiple regression equations (Hair et al. 2006). This study is faced with a number of interrelated and simultaneous questions and as such the SEM technique of statistical analysis was deemed appropriate.

SEM is regarded as a comprehensive technique that is able to determine the closeness of data fit utilising fit indices, confirm the factor structures of the scales used to measure the variables and examine the series of dependence relationships of multiple variables proposed by the study's conceptual model taking into account the effects of mediating constructs (Cunningham 2008). The latent, or unobserved factors proposed by the study's constructs as represented by its hypotheses, are represented by the structural equations evaluated by the technique. SEM further explains how much of the dependent variable variance of the proposed model is accounted for by the independent variables, how reliable the measured variables are and what the relative importance of the relational paths are in addition to evaluating the difference between groups (Hair et al. 2006).

A further reason for adopting SEM is that it allows for the capturing of systematic and random measurement error (Hair et al. 2006). Systematic and random measurement error can effect all observations and thus influence findings (Malhotra 2007). Although neither error can be completely eliminated (Malhotra 2007), SEM is able detect significant errors in terms of providing measurement models that specifies the level of reliability (Hair et al. 2006).

The hypotheses of the study assert relationships between the variables and are described as 'associations'. Explanations of the inter-relationships of the constructs when analysing the cross-sectional data of the study was required utilising SEM. Establishing absolute causality in social sciences is regarded by this study as impossible as assumed from its post-positivist approach. Similarly, due to being primarily based on correlational data (Baumgartner & Homburg 1996), SEM results are best interpreted as referring to differing degrees of association between variables rather than as causal conclusions (Baumgartner & Homburg 1996). Therefore, the hypotheses of this study were presented not as "X causes Y" but rather that "X is associated with Y".

Based on existing theory and the research objectives, this study proposed that there were relationships between the independent, intervening and dependent variables as influenced by the moderating variables. These are illustrated in terms of the conceptual model specified in Chapter Two. In terms of SEM, the first step required of the researcher is to define a structural equation model based on the framework, underpinned by these considerations and theory (Hair et al. 2006). *Theory,* in SEM, is described as the "systematic set of relationships providing a consistent and comprehensive explanation of the phenomena" (Hair et al. 2006, p. 713). The structural equation model derived in this study thus represents such theory and its constructs, as represented by the hypotheses. These were defined in terms of visual model portraying these constructs or structural relationships. SEM was then utilised to test the dependence relationships (structural relationships) intimated by the hypotheses of the model in addition to the correlational relationships between the constructs.

The Amos SEM software was chosen to analyse the data. The justification for the selection of this statistical software is primarily due to its user friendliness, interface with the SPSS software and its broad application in contemporary research publications. The researcher attended a five day intensive course hosted by the Australian Consortium for Social and Political research Incorporated (ACSPRI). The statistical analysis results as derived from the data analysis of this research are described in Chapter 5.

3.9 Limitations

The study offers a number of significant findings to the literature. However, following the above discussion regarding the methodological rigour of the research, this section discusses the limitations of the research design and strategy. It also shows how these limitations were partly overcome. In addition to the limitations noted in Section 4.5.3 regarding the sampling strategy, the study has identified limitations of the study related to the research strategies adopted.

Yin (2003) indicates that each research strategy has its advantages and disadvantages. As noted above, one of the purposes of this study is to present quantitative findings as an empirical foundation for further interpretive and critical work. A deeper analysis of the problem that may uncover underlying causes for the respondent's perceptions is however desirable but does not fall within the scope of this study.

Cross-sectional studies, as opposed to longitudinal studies, do not allow the researcher to assert causality (Leedy & Ormrod 2005). Cross sectional studies also limit generalisability of the findings to other populations. This can be addressed by including longitudinal data into the SEM model proposed by this study and collecting data from the populations in different contexts. However, due to the limited scope and resources of the study, this was not possible. It is proposed that based on the findings of this research, the conceptual framework will provide a valid framework for the inclusion of longitudinal data thus allowing for statements of causality and generalisability.

A further limitation is related to theory development. While this study contributes to theory development it is not sufficient to develop theory using only one methodological approach (Parkhe 1993). This weakness is addressed in that the recommendations for further research in the thesis suggests specific aspects of further research that can further develop the theory proposed in this study. Therefore, idiosyncrasies and narrowness can be addressed in further research applying the findings of this study.

It is anticipated that the sample has a high level of homogeneity despite being drawn from two populations (strategy level leaders in South Africa and Australia). Despite the obvious socio-economic and political differences, no significant differences among the ethical considerations of managers in the two populations have been found (Abratt, Nel & Higgs 1992). The sample was drawn from predominantly Western style organisations, in English medium environments functioning in resource-based economies that illustrate similar modes of managing despite the geographic diversity of the sample. The populations are therefore assumed to be discretely different groups rather than largely divergent. This study will test this assumption in detecting any significantly divergent results.

The degree homogeneity further limits the generalisability of the findings to other populations (Leedy & Ormrod 2005). For this reason, and within the limitations of the scope of the study and available resources, it was decided that the inclusion of two similar populations would strengthen the study's findings and overcome this problem to an extent. It will also provide an insight as to whether there are any significant similarities or differences between the populations in both countries.

A further limitation to the study is the lack of response from organisational leaders. This limitation was discussed in section 4.5.2.3. The sample size however, can still be regarded as ‘large’ in terms of SEM analysis (Kline, Rex B 2004). In formulating the research strategy of the study it was determined that a sample size of 300 would be ideal. Despite not having achieved this, the sample size gained is adequate for the reliable statistical analysis of the data. The nature of low response rates generally among organisational leaders generally indicates that the findings are still important.

The study relies on self report data only. Self-report data is laden with potential problems derived from response bias and social desirability bias (Zikmund 2003). These are the slants adopted and the over-reporting of desirable social characteristics from respondents respectively, that may have occurred in the study. For this reason, the survey design included questions that allowed the researcher to triangulate the responses and indicate obvious anomalies. However, the full impact of this bias resulting from self reported data only, cannot be totally eliminated (Leedy & Ormrod 2005). Qualitative methods and 360° feedback questionnaires would provide better ways of controlling this limitation.

3.10 Ethical considerations

The final section of this chapter deals with the ethical considerations taken into account by the researcher prior to and while conducting this study. It is generally acknowledged that researchers should anticipate ethical issues that may arise during their study (Creswell 2009). Ethical standards are required to preserve the integrity of the research, the researcher and the participants in the study (Neuman 2006). To ensure the standards of ethical research were maintained, a number of institutional and academically prescribed precautionary measures were taken.

Firstly, ethical guidelines as set out in the university regulations and policies as monitored by the Human Research Ethics Committee (HREC) of the University of Southern Queensland (USQ 2010) were incorporated into the research design at the onset of the project. Human Ethics Clearance was applied for and granted by the HREC on 13 February 2009 and was valid until 13 February 2010 (see Appendix F for a copy of Ethical Clearance Notice). Researchers are expected to; adhere to the standards as set out in the regulations and policies, ensure that their conduct does not jeopardise the rights and interests of participants and should submit a report subsequent to the completion of the project. Therefore ethical considerations related to voluntary participation, anonymity, confidentiality, deception and accuracy of reporting (Zikmund 2003) were addressed by the researcher prior to commencement and continued throughout the project.

The purpose of the research, anonymity (and measures taken to assure this), opportunity to withdraw at any time, confidentiality of responses and opportunity to express concerns were explained in detail both in terms of the invitation to participate and in the survey instrument's introduction. The researcher's contact details were clearly indicated on all forms of communication. No concerns were received throughout the duration of the project.

Ethical surveying requires that respondents, while encouraged to respond, are protected from misrepresentation and exploitation, and are in no way pressured to do so (Sapsford 2007). Data was collected, managed and presented in a manner that protects the privacy and confidentiality of the respondents strictly according to ethical survey guidelines (Neuman 2006). Respondents were assured that their responses would be automatically coded by the online data administrator (Questionpro) and that their identity would remain anonymous even to the researcher. Only by disclosing the response ID generated online, voluntarily to the researcher, would the response be able to be linked to the respondent. Moreover, respondents were assured that research results would be used for academic knowledge and advancement only (Neuman 2006). This ensured ethics were considered as well as ensuring that the data was not corrupted in any way. Respondents were also offered the option of having a copy of findings.

3.11 Conclusion

In brief, this chapter described the research design, paradigm and strategy adopted for this study. Specifically, it described the research methodology and stages used to collect the data, the method of statistical analysis, its limitations and the ethical considerations ascribed to throughout the study.

The research design and research strategy included the ontological and epistemological justifications for adopting a post-positivist research paradigm. In particular, it was argued that a purpose of the study was to establish an empirical basis for further interpretive and critical research of the relatively under investigated concepts of the study. The research strategy was determined to use an online administered survey to collect data from among strategy-level leaders.

The data analysis technique of SEM was described and its selection justified within the context of the study's objectives. This expanded on issues of validity and reliability anticipated for the study discussed earlier in the chapter. This allowed the reader to track how measures of research validity and reliability were addressed during data collection and analysis. Triangulation of the results utilising aspects of the literature review, pilot study and descriptive statistics will contribute to the validity of the findings.

The next chapter presents the findings of the data collected and proposes interpretations in relation to the research objectives.

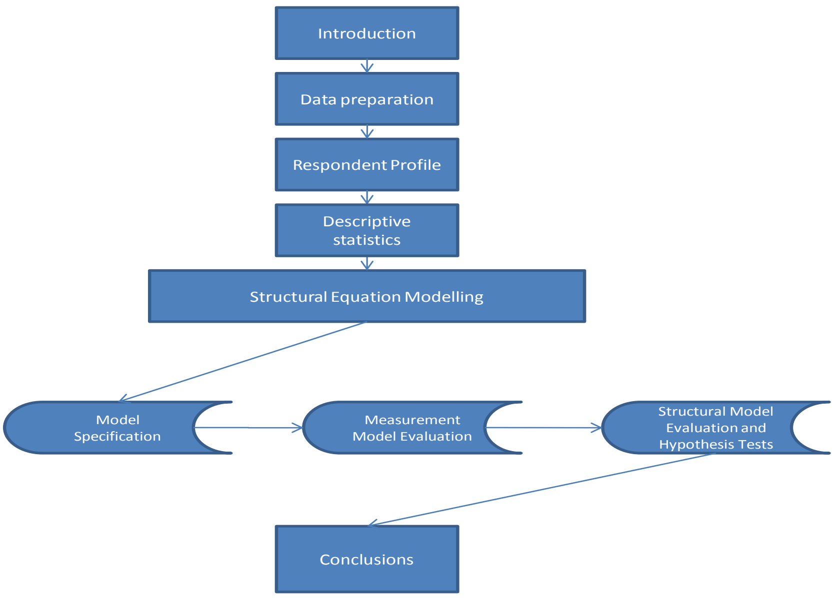
Chapter 4

Data Analysis and Interpretation

4.1 Introduction

Chapter Three described the research design and strategy adopted by this study to collect data. It also described the adopted statistical data analysis technique and its justification. This chapter describes how the data was prepared and analysed to address the study's research issues. The results reported in this chapter are then discussed in relation to the research problem and extant literature in Chapter 5. The chapter structure is outlined in Figure 4.1.

Figure 4.1: Chapter 4 structure



Source: Developed for this research.

4.2 Data Preparation

The data of the study required processing and editing in order to convert the data collected into a format that would be suitable in answering the study's questions (Zikmund 2003). This process ensured that the primary data array was suitable for further analysis in terms of being accurately coded, downloaded into the computer data base, cleaned and screened (Malhotra 2007).

4.2.1 Response rates

Due to the population parameters being unknown, the survey questionnaire was administered according to the method discussed in Chapter 3 and was not distributed in terms of an accurate sampling frame (Section 4.5.1). The number of potential respondents could therefore not be determined. However, email invitations purposefully targeting organisational leaders (Chapter 3, Section 4.5.2) and including a hyperlink to the online survey questionnaire yielded **431** respondents who had started the questionnaire. Of these, **305** (71%) responses were retained. The balance of **126** (29%) were either incomplete or contained inconsistent data and were determined as unsuitable for inclusion in the primary data set.

In the instance of questionnaires that were incomplete it was determined that responses with more than 25% missing data should be excluded (Sekaran 2002). It was assumed that in these cases, respondents had either lost interest or were not serious in the first instance. It was also determined that with an average completion time of 21 minutes, the questionnaire was not an great imposition from the point of view of the respondents' available time. Those responses with minor item non-response primarily in the demographic information section of the questionnaire were retained as it was assumed that the respondents were unsure as to how to answer the question. Treatment of such missing data is detailed in section 2.3 of this chapter.

4.2.2 Data coding

Coding was fulfilled by assigning a code to each response as aligned to each question in the survey (Malhotra 2007). The survey questionnaire consisted of pre-coded questions without any open ended questions or responses and thus did not require the respondents' written response (Chapter 3, Section 3.4.1) or subsequent coding of the items. Case responses were automatically coded by the online survey software and respondents were issued with a response ID. Variable coding in the AMOS programme corresponded to the nature of the data and the pre-coding of responses.

The raw data was edited after the responses were collected. The editing functioned as a quality screen that ensured that all data was complete, free of inconsistencies, accurate and completed by eligible respondents (Malhotra 2007; Neuman 2006).

As part of the editing process the parameters of what was defined as 'strategy level leaders' (Section 2.3.2), was utilised to filter the cases in order to determine eligible respondents. Strategy-level leaders are defined as those *who exert a moderate to high influence on the strategy formulation and formation of the organisation*. It was noted that these may include directors, senior managers, middle managers, professionals and consultants. The survey requires respondents to identify their positions, their role in the organisation's strategy and their perceived influence on the formulation of strategy. It further requires respondents to indicate aspects related to strategy in their organisation particularly in terms of participation. The questions related to participation not only serve to triangulate the results related to the strategy making mode scale of the survey but also illustrate how a leader's perception of their influence on strategy is moderated by conflict related to strategy and the level of participation of employees. As such the editing of the response data not only ensured the quality and accuracy of the imputed data but also determined which cases qualified in terms of the population parameters. Of the 305 valid responses, it was determined that seven cases did not qualify in terms of the population parameters and were omitted from the main analysis. A further five cases which indicated minimal influence on strategy were retained because: a) they had senior positions in the organisation and the organisation had a high level of participation in the development of strategy thus diluting the estimation of influence (two cases), b) they had senior positions but indicated that conflict exists in terms of strategy formulation thus possibly giving the strategy-level leader a feeling of being alienated from the strategy development (two cases), or, they were a strategy consultant who despite high involvement in the organisation's strategy development, rated their influence to be minimal (one case).

4.2.3 Cleaning and screening

The purpose of following the cleaning and screening process is to ensure that the data has been transcribed correctly by identifying outliers, missing data and inconsistent responses (Malhotra 2007).

An advantage of the online administration of survey questionnaires is that data inputting errors are largely avoided (Creswell 2009). Respondents' answers were automatically assigned and recorded in the online data base according to the coded variables. The data was then downloaded from the online data base into a MS Excel file format. The Excel files containing all the primary data were then exported into a SPSS sav. file format for further processing.

Two categories of problems were considered: case-related problems such as missing values and outliers, and problems related to distribution such as normality, linearity and homoscedasticity (Hair et al. 2006). In terms of case related problems, data was checked for accuracy and to ensure that missing values were treated appropriately. The data was checked onscreen by the researcher with frequencies run in SPSS for every variable, checking outlying data and missing values. In terms of problems related to distribution, descriptive statistics techniques and frequency distributions of each variable were used.

4.2.3.1 Missing data

The online survey questionnaire included the feature of returning respondents to incorrectly or non-completed questions. As such, the occurrence of missing data was minimal. However, SPSS data analysis software was used to check for missing values. A missing values analysis was conducting illustrating that less than 0.015% missing values (seven values) for the whole dataset was detected occurring for one value only in seven of the 305 cases. Imputation of the missing values is the most logical remedy to be applied in the event of missing data in excess of 10% (Hair et al. 2006). There is no need to model the missing data in terms of ignorable missing data as part of the evaluation process (Allison, 2002). However, values were imputed utilising series means in order to ensure that the study would retain these cases for the analysis. See Appendix G for details of the analysis and imputation.

4.2.3.2 Outliers

SPSS data analysis software was used to identify any outliers in the data. Outliers are defined as observations that are distinctly different from other observations in the data set

(Hair et al. 2006). The impact of outliers can be negative or positive and should be viewed within the context of the analysis. The information they provide may be of benefit or are not representative of the population presenting the possibility of distorting the statistical analysis (Hair et al. 2006). Some cases of this study showed the presence of outliers.

All items that will be included in the structural model analysis were screened for univariate outliers, which were defined as responses greater than 3.29 standard deviations from the mean (Tabachnick & Fidell 2007). Univariate outliers were identified for 6 of the variables (TSI1, TSI2, TSI3, TSI11, TSI14, and TSI17). These values were deleted from the data set, creating missing values in their respective cases.

A further multivariate check using the AMOS software producing Mahalanobis distance was carried out as suggested by Cunningham (2008). All variables to be included in the structural model analysis were thus screened for multivariate influential outliers. For TSI, with 18 variables to be included in the multivariate analysis, the critical χ^2 = 42.31 (p=0.001) (Tabachnick & Fidell 2007). Thus, multivariate outliers were operationalized as cases with Mahalanobis Distance Values greater than 42.31. Using this method, three multivariate outliers were detected. These cases were eliminated from the analysis due to their potential negative effect on model fit.

For FSA, with 26 variables to be included in the regression analysis, the critical χ^2 = 54.05 (p=0.001). Thus, multivariate outliers were operationalised as cases with Mahalanobis Distance Values greater than 54.05. Using this method, thirteen multivariate outliers were detected. These cases were eliminated from the analysis.

For DSI, with 26 variables to be included in the regression analysis, the critical χ^2 = 100.88 (p=0.001). Thus, multivariate outliers were operationalised as cases with Mahalanobis Distance Values greater than 100.88. Using this method, two multivariate outliers were detected. These cases were eliminated from the analysis.

For SMP, with 17 variables to be included in the regression analysis, the critical χ^2 = 40.79 (p=0.001). Thus, multivariate outliers were operationalised as cases with Mahalanobis Distance Values greater than 40.79. Using this method, two multivariate outliers were detected. These cases were eliminated from the analysis.

4.2.3.3 Normality

Many inferential statistical techniques require an assumption of the normality of the data (Coakes, Steed & Price 2008). This was an important consideration as normality of the data determines the choice of estimation method used in structural equation modelling (Hair et al. 2006). Testing the data for normality was conducted and included consideration of graphical depictions (box-plots, stem and leaf plots, histograms), frequencies and statistical tests (Kolmogorov-Smirnov, Shapiro-Wilks tests).

Kline (2005) recommends examining and correcting for violations of univariate normality before screening for multivariate normality. The criteria for univariate normality utilized in this study were Skewness between -2.0 and 2.0 and Kurtosis between -7.0 and 7.0 (Kline, R. B. 2005). According to these standard criteria, all items, subscales, and composite measures were sufficiently normally distributed.

On the basis of the univariate and multivariate tests of normality discussed, most of the variables used in the model were moderately non-normal (Finch, West & MacKinnon 1997). Within structural equation modelling, previous studies (Anderson & Gerbing 1988; Raykov, Tomer & Nesselroade 1991; Schermelleh-Engel, Moosbrugger & Müller 2003) have confirmed that maximum likelihood estimation is robust to moderate violations of the normality assumption with estimates of parameters generally unaffected by the non-normality. Therefore, it was decided to use the maximum likelihood estimation method and not to transform the variables.

4.2.3.4 Summary

The process of data cleaning ensured that the data was accurately represented in terms of the observations. It further applied the population parameters to ensure that the data retained was reflective of the population being studied.

Data screening identified and addressed aspects of missing data, outliers and non-normality related to the data. Due to the online survey submission and administration, missing data was negligible. Outlier and non-normality violations were examined and addressed within the context of accepted criteria. Having explained the data cleaning and screening procedures, the next section considers descriptive statistics.

4.2.4 Descriptive statistics

Evaluation of the descriptive statistics of the data allows the researcher to become familiar with the data set before proceeding with bivariate and multivariate analysis (Hair et al. 2006). Descriptive statistics (means and standard deviations) for the variables to be considered in each of the constructs are reported in Appendix H.

In summary, the means and standard deviations reported in Appendix H show no unexpected results based on the findings and discussion of the earlier studies in the literature. The next stage of the research was to describe the respondent profiles represented by the sample.

4.3 Respondent profiles

Section 5 of the survey questionnaire gathered data about the demographic characteristics of the respondents. These included information related to their age, gender, education, experience, position in the organisation and their perceived level of influence on the strategy formulation of their organisation. This section also collected information related to the respondent's perception of who formulates the organisational strategy and how this is done.

Age, gender, nationality. The sampling unit of analysis was the strategy level leader of organisations in Australia and South Africa. In summary, the sample consisted of **298** qualifying respondents. The Australian sample accounted for 52.3% of the total while 47.7% were from South Africa. There were 75.2% males and 24.8% females. The study did not purposefully target gender and was random. This may support the observation that there is gender inequality at the strategic level of organisations in both countries.

The majority of respondents (51.3%) were between the ages 45-59 years old with those aged between 35-44 years old accounting for a further 26.5%. The sample was therefore predominantly (77.8%) in their middle to advanced stages of their careers and corresponds with the senior levels represented by the sample (82.5% of the total being Directors / CEOs / Senior Managers / Professionals). It is significant to note that the sample includes 101 CEOs / directors and 120 senior managers. In terms of the study's definition of strategy level leaders is important to note that these translate, in the vast majority, to individuals holding these positions. However, it also illustrates that despite constituting the majority composition of organisation's dominant coalitions, the role played by middle managers (14.8%), professionals (10.7%) and consultants / strategists (3.7%) in terms of influencing strategy is significant.

Table 4.1: Frequencies of respondent profiles: Gender, nationality, age

	Frequency Total:		**Frequency Aus: %**		**Frequency SA: %**	
Gender	**n = 298**		n=156		n=142	
• Male	**224**	**75.2%**	123	78.8%	101	71.1%
• Female	**74**	**24.8%**	33	21.2%	41	28.9%
Nationality	**n = 298**		n=156		n=142	
• Australian	**156**	**52.3%**				
• South African	**142**	**47.7%**				
Age	**n = 298**		n=156		n=142	
• 20-24 years	**3**	**1%**	1	.6%	2	1.4%
• 25-34 years	**42**	**14.1%**	20	12.8%	22	15.5%
• 35-44 years	**79**	**26.5%**	36	23.1%	43	30.3%
• 45-59 years	**153**	**51.3%**	85	54.5%	68	47.9%
• 60+ years	**21**	**7%**	14	9%	7	4.9%

Source: Developed for this research

Education. Respondents with post-graduate qualifications accounted for the majority of the sample (62.4%). The sample primarily consisted of persons with tertiary level degrees (87.6%). The South African sample had a higher level of post graduate respondents (73.9% of South African respondents) while the Australian sample had a higher proportion of bachelor degreed respondents (30.8% of Australian respondents). With 8.1% of respondents having high school level education, the sample can be regarded as predominantly having a tertiary level education.

Respondents that have been exposed to foresight concepts and methods (67.9%) varied between the two countries with the South African sample indicating that 85.9% of respondents had this exposure (52.6% in Australia). The study's a priori assumption is that the moderating effect of foresight formal education would be significant in terms of a strategy level leader's orientation to time, their style of engaging the future and how this translates in terms of their strategic thinking as reflected in their decision styles. This assumption will be tested later in this chapter. It is of importance to note that of particular interest in the study is the exposure to foresight education at a post graduate level (32.2% of the total sample) and the effect this may have due to the advanced nature of the concepts and methods contained in such interventions.

Table 4.2: Frequencies of respondent profiles: Education

	Frequency Total:		Frequency Aus: %		Frequency SA: %	
Level of Education	**n = 298**		n=156		n=142	
• High School	**24**	**8.1%**	20	12.8%	4	2.8%
• Diploma	**13**	**4.4%**	7	4.5%	6	4.2%
• Bachelor Degree	**75**	**25.2%**	48	30.8%	27	19%
• Post Graduate Degree	**186**	**62.4%**	81	51.9%	105	73.9%
Exposure to Foresight Education	**n = 298**		n=156		n=142	
• Yes	**204**	**67.9%**	82	52.6%	122	85.9%
• No	**94**	**32.1%**	74	47.4%	20	14.1%
Level of Exposure to Foresight Education	**n = 208**	**69.8%**	n=84	(of Aus sample)	n=124	(of SA sample)
• Short Course	**18**	**6%**	5	3.2%	13	9.2%
• Diploma	**5**	**1.7%**	4	2.6%	1	.7%
• Executive education	**52**	**17.4%**	24	15.4%	28	19.7%
• Own Reading	**17**	**5.7%**	7	4.5%	10	7%
• Bachelor Degree	**6**	**2%**	1	.6%	5	43.5%
• Post-Graduate Degree	**96**	**32.2%**	38	24.4%	58	40.8%
• Other	**14**	**4.7%**	5	3.2%	9	6.3%

Source: Developed for this research

Experience. The sample drew upon strategy level leaders from predominantly the financial services, retail, manufacturing and mining / resources sectors. While it is acknowledged by the study that the industry context largely determines an organisation's emphasis on strategy (Collis & Montgomery 1999; Hambrick 2007), the study is primarily concerned with the strategic cognitions of the leaders. Industry type, while identified, was not of primary concern. However, industry experience is regarded as an important demographic proxy in predicting leaders' strategic orientations and decisions (Finkelstein & Hambrick 1996). Industry experience is further significant in terms of the development of strategy thinking with experience in excess of ten years being determined as an important benchmark (Goldman 2007). Goldman further asserts that experience in a senior position is an important facet of experience. A majority of the sample (61.8%) indicate industry experience, including experience in their current positions, which exceeds 10 years. The study will determine if there is any significant variation in the strategic thinking according to experience.

Table 4.3: Frequencies of respondent profiles: Industry, position and experience

	Frequency Total:		**Frequency Aus: %**		**Frequency SA: %**	
Industry	**n = 298**		n=156		n=142	
• Financial Services	**60**	**20.1%**	26	16.7%	34	23.9%
• Manufacturing	**45**	**15.1%**	22	14.1%	23	16.2%
• Retail	**28**	**9.4%**	18	11.5%	10	7%
• Resources / Mining	**34**	**11.4%**	20	12.8%5	14	9.9%
• Education	**23**	**7.7%**	18	11.5%	5	3.5%
• Government	**14**	**4.7%**	6	3.8%	8	5.6%
• Not-for-Profit	**6**	**2%**	4	2.6%	2	1.4%
• Health	**12**	**4%**	2	1.3%	10	7%
• Other	**76**	**25.5%**	40	25.6%	36	25.4%
Industry Experience	**n = 298**		n=156		n=142	
• 1–5yrs	**38**	**12.8%**	18	11.5%	20	14.1%
• 6–10yrs	**76**	**25.5%**	41	26.3%	35	24.6%
• 11–15yrs	**39**	**13.1%**	16	10.3%	23	16.2%
• 16–20yrs	**56**	**18.8%**	27	17.3%	29	20.4%
• Over 20 years	**89**	**29.9%**	54	34.6%	35	24.6%
Position	**n = 298**		n=156		n=142	
• CEO/ Director	**101**	**33.9%**	64	41%	37	26.1%
• Senior Manager	**110**	**36.9%**	51	32.7%	59	41.5%
• Middle Manager	**44**	**14.8%**	25	16%	19	13.4%
• Professional	**32**	**10.7%**	13	8.3%	19	13.4%
• Strategist	**5**	**1.7%**	2	1.3%	3	2.1%
• Other	**6**	**2%**	1	.6%	5	3.5%
Position Experience	**n = 297**		n=156		n=142	
• 1–5yrs	**150**	**50.3%**	70	44.9%	80	56.7%
• 6–10yrs	**73**	**24.5%**	42	26.9%	31	22%
• 11–15yrs	**45**	**15.1%**	23	14.7%	22	15.6%
• 16–20yrs	**2**	**6.7%**	15	9.6%	5	3.5%
• Over 20yrs	**9**	**3%**	6	3.8%	3	2.1%

Source: Developed for this research

Organisational strategy formulation. The survey also collected information related to the respondents' perception of who formulates strategy and aspects of how it is formulated in the organisation. Responses confirm that the strategy is still predominantly formulated by the directors and CEO (25.2%) and the CEO and senior managers (59.4%), cumulatively (84.6%) lending support for the conclusion that the dominant coalition firmly controls the strategic direction of an organisation (Pearce 1995). It further supports the assumption that the study of TMTs within the context of strategic leadership theory (Hambrick 2007) best describes the current practise of strategy in organisations and provides a legitimate basis for further research.

It is important to note that strategists and consultants largely accounted for the 11.4% of respondents that indicated that they contribute to strategy through line management and were thus retained in the sample as their level of influence is regarded as falling within the parameters of 'strategy level leaders'. It is further noted that the 54 respondents who indicated that their influence on strategy was minimal or none, were retained because they either had a very participatory mode of strategy in the organisation or they relied solely on emergent strategy. This was determined from the answers related to how they perceive strategy to be formulated in the organisation and their predominantly senior positions. It also corresponds to the "It is a team effort by all employees" item in the questionnaire.

The respondents (50%) further confirmed that strategy is primarily formulated from "the top / down". This is higher among Australian organisations (56.4%) with Australian firms also indicating that the main actors involved in strategy have a common understanding of the function and content of strategy (46.8%). Also apparent is that 26.5% of the sample indicated that there is conflict between the main actors involved in strategy. Together with confirmation that the dominant coalition controls strategy in organisations, it is apparent that the dominant paradigm of engaging strategy is as "a rational process of deliberate planning and actions" (Nerur, Rasheed & Natarajan 2008). This confirms Whittington's (2001) conclusion that the classical approach to strategy as represented by Ansoff and Porter (see section 2.2.2.1) remains the most influential in practise. This paradigm is based on the deliberate intent of senior managers and is aimed at profit maximisation and economic advantage as the primary objective and outcome. Given the understanding that effective strategy should not only be deliberate but accommodate emergent strategy, and is dependent on the organisation's strategic thinking capability (see section 2.2.7), it is apparent that practise may be lagging behind this insight. Especially in terms of the current emphasis on sustainable development, a dominant classical approach to strategy based on profit maximisation and economic advantage as determined by the 'rational economic man', seems maligned.

The evolutionary approach to strategy (Whittington 2001) is also apparent in the sample responses with 10.4%, or roughly one out of ten responses indicating that there is no clear strategy formulation in the organisation. These either represent organisations that choose not to engage with strategy due to uncertainty or are unable to adopt a strategic approach.

Also apparent is that approximately almost a quarter (23.8%) of respondents considers strategy as being a team effort involving all employees. This is aligned with the processual and core-competence approaches to strategy.

Table 4.4: **Frequencies of respondents' interaction with organisational strategy formulation**

	Frequency Total:		Frequency Aus: %		Frequency SA: %	
Role in Strategy Formulation	**n = 298**		n=156		n=142	
• Active / influential	**189**	**63.4%**	107	68.6%	82	57.7%
• Advisor to / am consulted by senior management	**46**	**15.4%**	23	14.7%	23	16.2%
• Member of employee strategy group	**27**	**9.1%**	8	5.1%	19	13.4%
• Contribute informally through line management	**34**	**11.4%**	17	10.9%	17	12%
• None	**2**	**0.7%**	1	.6%	1	.7%
Level of Influence on Strategy	**n = 298**		n=156		n=142	
• High	**133**	**44.6%**	77	49.4%	56	39.4%
• Medium	**111**	**37.2%**	54	34.6%	57	40.1%
• Minimal	**47**	**15.8%**	24	15.4%	23	16.2%
• None	**7**	**2.3%**	1	.6%	6	4.2%
In terms of strategy formulation in my organisation;	**(optional)**					
• The main actors understand strategy in the same way	**138**	**26.2%**	73	46.8%	65	45.8%
• There is conflict between the main actors	**79**	**26.5%**	41	26.3%	38	26.8%
• It is very much 'top / down'	**149**	**50%**	88	56.4%	61	43%
• It is a 'team effort' by all employees	**71**	**23.8%**	39	25%	32	22.5%
• There is no clear strategy	**31**	**10.4%**	16	10.3%	15	10.6%

formulation						
Strategy Formulated by: • The CEO / Directors • The CEO / Senior managers • Senior / middle managers • All employees • There is no clear strategy formulation	**n = 298** **75** **177** **23** **20** **3**	 **25.2%** **59.4%** **7.7%** **6.7%** **1%**	n=156 51 86 6 13 0	 32.7% 55.1% 3.8% 8.3% 0%	n=142 24 91 17 7 3	 16.9% 64.1% 12% 4.9% 2.1%

Source: Developed for this research.

The profile and responses of the respondents provide meaningful insights as to the main actors involved in strategy as represented by this sample. This is especially pertinent to their representativeness of the sample and the organisations they work in. It further provides apriori insights related to the research question in addition to the potential moderating effects of the demographic proxies. The next stage of the research was to validate the measures that were used to operationalise the constructs in the conceptual framework and develop the structural model that tests the study's hypotheses.

4.4 Structural Equation Modelling and hypothesis testing

Structural equation modelling (SEM) is regarded as an umbrella term that covers a number of new and widely used statistical analysis techniques in quantitative studies (Cunningham 2008). It is particularly relevant when investigating the plausibility of theoretical models explaining the relationships between a set of variables simultaneously (Hair et al. 2006). It further provides the researcher with statistical evidence that allows for the modelling of hypothesised relationships between variables after accounting for measurement error while estimating the degree of support that the data provides such models (Cunningham 2008). The latter is termed tests of goodness-of-fit and is determined in a number of ways that will be discussed later in this chapter.

Kline (2005) advises that researchers should utilise a twostep approach to SEM. First the researcher is urged to rigorously test the measurement model that underlies the full structural model proposed by the study in terms of; a) its fit as related to the data, and b) assessing the level of measurement error in the model and by validating the factorial structure of the measures. Based on the acceptability of the first step, researchers then proceed to the second step which entails testing the structural model and its alternatives.

4.4.1 Model conceptualisation

The initial development of a structural model sought to include the relations between the study's main constructs of interest (Bollen 1989; Hair et al. 2006; Kline, R. B. 2005). The variables in the structural model representing these constructs were based on the conceptual framework developed from a review of the literature in Chapter 2.

Formative or reflective models? Measurement models are either formative or reflective. The distinction arises out of the direction of causation between the latent variables and their indicators. While formative models illustrate that indicators are observed variables that cause a latent variable, reflective models illustrate that latent variables cause the observed variables and are thus measurable. This distinction is not always easily determined but the randomness with which items related to the construct of interest are chosen, is an indication of reflective measurement models (DeVellis 1991). This study determined that the observed indicators are reflective measurement models of all the latent variables adopted by the model and cannot be regarded as arising from a definitive set of items.

Mediational models. The conceptual framework hypothesises the effect of strategic thinking as an intervening variable on the relationship between foresight competence and the strategy making modes of the organisation. The model conceptualisation takes into account the need to test for the potential effect of the intervening variable on this relationship. It is noted that there is confusion related to the terms mediating, direct and indirect effects (Cunningham 2008). Cunningham (2008) provides guidelines for testing and interpreting the results of these tests in the determination of the nature of the effect.

Latent variables. Latent variables cannot be observed directly but are rather measured by multiple items depending on their reliability and construct validity (Baumgartner & Homburg 1996). Of importance in model conceptualisation is to select and justify the operationalised variables in order to sufficiently describe the causal priority of the model (Bollen 1989).

In the case of this study the measurement model is conceptualised to include seven latent variables depending on the preceding regression analysis of composite variables. Associated with the infinite number of possible indicators of latent variables (Yang, Nay & Hoyle 2009) is the consideration of how many indicators for latent variables are practical. These range from three to ten items per latent variable (Tabachnick & Fidell 2007). Smaller numbers of indicators may exhibit better model fit but may lack diagnostic strength while larger numbers of indicators may be better diagnostically but lack in terms of fit (Mulaik & Millsap 2000). In this research, this guideline was adhered to.

The structural model included three composite scales (the TSI, FSA and SMP scales) represented as single indicator latent variables. A further four, one-factor congeneric models of variables representing each decision style was hypothesised to function as intervening variables. The affect of the factorial structures of the two independent variables (TSI and FSA) on each decision style preceded the structural model specification in order to determine which predictor variables had statistically significant affects on the intervening variables. Apriori hypotheses of these relationships were therefore tested by the regression analysis and provided statistical support complimenting the theoretical framework in determining the structural model.

This approach was determined in order to address the potential problems associated with high model complexity and the ordinal nature of response items. The processes of justifying and validating such measures as proposed by Cunningham (2008) were followed. Munck's process for specifying single indicator latent variable models was utilised. Based on Cronbach's alpha and the standard deviation of the scale being known, Munck's formulas provide estimates of the regression coefficient and measurement error variances needed to be specified as fixed parameters of the latent variables (Cunningham 2008). They are as follows:

$$\text{Regression coefficient } (\lambda) = SD\sqrt{\alpha}$$

$$\text{Measurement error variance} = SD^2(1-\alpha)$$

One factor congeneric models were utilised to address problems associated with the DSI scale. The scale comprised of a four ordered categorical response format, and contained 80 items. The problem of lengthy ordinal scales in SEM are not unique (Yang, Nay & Hoyle 2009) and a number of ways to deal with such scales have been suggested. These include shortening the scales and devolving one factor congeneric models of the constructs of interest. This study recognised the theoretical value of the scale as described in Chapter two and conducted CFAs in order to establish a valid and reliable measure of each of the Decision Styles as contained in the scale.

Thus the measurement models and full models were conceptualised for the study to include such considerations as related to model parsimony, fit and accuracy while retaining the underlying theoretical rationale as set out in the conceptual framework.

4.4.2 Measurement model specification and evaluation

Confirmatory factor analysis (CFA) is of primary concern in following Kline's (2005) two step approach. Not only does CFA analyse the measurement models proposed by the research (Cunningham 2008) but it also establishes whether there is discriminant and convergent validity for the measures (Anderson & Gerbing 1988). Mulaik and Millsap (2000) suggest conducting exploratory factor (EFA) analysis prior to proceeding with confirmatory factor analysis in order to improve measurement parsimony and to account for variability in the nature of the data.

This study adopted four previously developed and validated scales. It was determined that an EFA would precede the CFA for each of the scales in terms of evaluating the measurement model. The process undertaken is described next.

4.4.2.1 Preparation for model evaluation

In order to proceed with the evaluation of the measurement and structural models, certain preparatory steps need to be conducted. These include examining the nature and sample size of the data. Also of importance is determining the steps of model evaluation and specification.

Nature of the data. The nature of the data relates to missing data, normality, outliers and linearity. These were discussed in section 2.3 and the steps were adopted by the study to address any concerns. Of particular importance was the identification of influential outliers as these may significantly effect model fit in SEM (Cunningham 2008). Based on this process 17 cases were deleted from the study.

Sample size. Sample size has been the subject of a great deal of investigation in the SEM literature (Tabachnick & Fidell 2007). This is not surprising as sample size confounds model fit (Fan, Thompson & Wang 1999) and is thus of great importance in terms of the functionality of the SEM analysis technique. An enduring rule of thumb for multivariate techniques is that there should be 10 cases for each measured variable. This is however not applicable for SEM (Kline, R. B. 2005). Rather it is deemed appropriate to rather consider the ratio of objects to the number of parameters being estimated (Chou 1995). Muthen and Muthen (2002) indicate that a sample size of 150 is adequate if the data is normally distributed and has no missing data. Kline (2005) suggests that Sample sizes that exceed 200 can be considered “large” which are acceptable for most models. Hair et al. (2006) agree that a sample size of 200 can be regarded as large for five or fewer constructs with each containing more than three factors.

In essence, the statistical theory underlying parameter estimation in SEM exhibits the tendency to increase the accuracy thereof as the sample size increases. As such the sample size should be large enough to gain stable results and meaningful parameter estimates. The greater the number of parameters, the greater the imperative of larger sample sizes (Kline, R. B. 2005). It follows that the more parsimonious the model is, the lower the required sample size needs to be. Baumgartner and Homburg (1996) suggest that a ratio of five cases to each parameter should be sufficient to achieve required significance tests. This study did not violate this rule. However, it did suggest that a full model that included higher order factor structures as originally envisaged showed significantly greater complexity than was appropriate for the sample size.

One or two step approach. The conventional way of approaching SEM analysis is to evaluate the measurement and structural models simultaneously with the resultant strength of this being that it is closely aligned with the principles of causal modelling and lacks estimating bias (Hulland, Chow & Lam 1996). However, alternatives to this one-step approach are regarded as more pragmatic (Jackson, Gillaspy & Purc-Stephenson 2009). These include Kline’s (2005) two-step approach and Mulaik and Millsap’s (2000) four step approach. A one-step approach is most appropriate when the theoretical rationale is strong and the measures are highly reliable (Hair et al. 2006).

As this study was partly exploratory and the measures did not all contain high construct reliability, *it was decided to conduct EFA and CFA analysis of the measurement models prior to estimating the structural model*. In this first step, the study first conducted EFAs on all of the scales in order to confirm the factor structures and measures of the scales.

Thereafter CFAs were conducted in order to evaluate three of the scales (TSI, FSA and SMP) while one factor congeneric models were used to evaluate the DSI styles separately. These steps allowed for reducing the items of the scale based on less than ideal measurement properties thus potentially leading to the rejection of a plausible model (Yang, Nay & Hoyle 2009).

Model identification. The last preparatory step required is model identification. Conventionally there are three levels of model identification: underidentified, overidentified and just identified models (Schumacker & Lomax 1996). Models with more parameters than observations are overidentified. Models that have fewer parameters than observations are overidentified and may lead to a lack of model fit due to discrepancies between the data and the model (Kline, R. B. 2005).

The models may also be just identified or 'saturated'. This indicates that the number of parameters perfectly reproduce the sample covariance matrix, the chi-square and the degrees of freedom (Mulaik & Millsap 2000). This latter form of identification makes the testing of hypotheses related to the specific paths hypothesised by the model, testable (Tabachnick & Fidell 2007). The basic conditions for identification for measurement and structural models include that at least the number of parameters must equal the number of observations, and that every latent variable must have a scale (Kline, R. B. 2005). In the event of a model not being identified, the AMOS software used in the analysis produces a warning. Every model tested in this analysis underwent this check.

4.4.2.2 Measurement model evaluation and specification

The primary purpose of the data analysis in this study is to investigate whether there are significant relationships between a) the variables as described in the hypothesised conceptual framework as determined by the theoretical rationale described in Chapter two, and b) the hypothesised factor structures of foresight competence and strategic thinking. The analysis will therefore first test the measurement models of the variables representing the hypothesised constructs. This will include specifying the single indicator latent variables used to test the structural model and modelling the factors that are hypothesised to represent the relationship between foresight competence and strategic thinking.

Reduction of items. As the study contains four measurement scales comprising 141 items that measure the constructs of interest (see Chapter 3, Section 2). The testing of the measurement model followed Mulaik and Millsap's (2000) suggestion that EFAs precede conducting CFAs of the measurement models. It was determined that this procedure would not only affirm the framework for the analysis but also facilitate the reduction of items of the lengthy ordinal scales and justify the elimination of items that have low measurement properties (Yang, Nay & Hoyle 2009). It was determined that this approach would provide justification for the construction of single indicator latent variables in the event of scales yielding a low internal consistency (Cunningham 2008; Little et al. 2002) and when not in violation of the theoretical framework of the study.

However, it should be noted that reducing a large number of indicator variables into more manageable measurement models has a disadvantage. Following the process could lead to potential loss of information in the measurement of the constructs (Little et al. 2002). In response to this criticism, it is argued that item level analysis has a number of disadvantages including lower reliability, lower communality and a higher possibility of distributional violations related to the intervals between scale points (Hau & Marsh 2001). The debate is an extensive one and resolutions seem unlikely. On a balance, it was determined that the advantages, and continued prevailing practise of congeneric modelling in the social sciences outweigh the disadvantages.

In summary, this research used EFA followed by CFA to refine the initial measures of the constructs and test the measurement models to be used in the regression and SEM analysis. Eleven constructs were derived from the adopted scales and tested in terms of EFAs and CFAs. These constructs were used to conduct multiple regression analysis in order to test the hypotheses of the study at the lower order factorial structures of the measures. Seven composite variables also derived from the EFAs, CFAs and reliability analyses were used to test the proposed structural model representing the main higher order constructs of interest in terms of the conceptual model of the study. The tests of the measurement models and use of congeneric and composite measures in the analysis is illustrated in Table 4.5. Hair et al. (2006, p. 797) suggest that dropping a number of items from a large set of items is "less consequential and the confirmatory test may not be jeopardised". This approach is thus regarded as justified in its strategy to reduce the complexity of the structural model while isolating valid and reliable measurements of both the lower order and higher order measures required to answer the research question and issues.

Table 4.5: **Conceptual model constructs, relevant lower order factors and data analysis applications in the study**

		TEST OF MEASURMENT MODELS		ANALYSIS APPLICATION	
		EFA	**CFA**	**Multiple Regression**	**SEM**
SCALES	TSI (TimeStyle Scale: 3 factors – future / present / past)	X	X		X
	FSA (Foresight Styles Assessment: 4 factors – Tester / Adapter / Framer / Reactor)	X	X		X
	SMP (Strategy Making Processes scale)	X	X		X
FACTORS	DSI Directive Decision Style	X	X	X	X
	DSI Analytical Decision Style	X	X	X	X
	DSI Conceptual Decision Style	X	X	X	X
	DSI Behavioural Decision Style	X	X	X	X
	Future	X	X	X	
	Present	X	X	X	
	Past	X	X	X	
	Tester	X	X	X	
	Adapter	X	X	X	
	Framer	X	X	X	
	Reactor	X	X	X	

Source: Developed for this research

Exploratory Factor Analysis (EFA). The primary objective of EFA is to define the underlying structure of the variables of the analysis (Hair et al. 2006) and to determine the smallest number of factors that reproduce the correlations within a larger set of measured variables (Cunningham 2008). Each of the observed items are expressed as weighted linear measures of the composite measures or factors which in turn collectively represent the main latent variable of interest (Hair et al. 2006). The factors are hypothesised by previous studies to correspond to concepts that cannot adequately be described by a single measure. In addition, the factor analysis presents different ways of representing these groups of variables for further analysis.

In this study two structures within the set of measured variables are of interest, the latent variables represented in the conceptual model and the factorial structures of the TimesStyle Inventory, Foresight Styles Assessment and Decision Style Inventory. The former two measurement scales are hypothesised to reflect an individual's foresight competence and the latter is hypothesised to represent the strategy-level leader's strategic thinking as reflected in his / her decision making style. As such an EFA will be conducted to explain the correlations between measured variables, their communality estimates and the proportion of shared variance between items (Cunningham 2008) as compared to their previously validated structures.

The method of extraction used for the EFA analysis in this research is the maximum likelihood (ML) method due to the chi-square statistic that it can generate which determines whether the covariances generated by the parameter estimates are significantly different to the empirical sample variances and covariances (Cunningham 2008). As noted the data was screened for univariate and multi-variate normality and as such meet the assumption required for ML. Eigenvalues greater than one (Hair et al. 2006) and scree plots were used to determine the number of extracted factors. An oblique rotation method, oblimin rotation was adopted in order due to the assumed correlation that is inherent in the factorial structures chosen. This was conducted in order to maximise high loadings and minimise low loadings on identified factors despite the presence of non-zero correlations between factors which is expected in business or social science research (Cunningham 2008). Based on the chi-square statistic generated by the ML estimation the most parsimonious model was retained for further CFA.

Confirmatory factor analysis (CFA). The purpose for conducting EFA before the CFA is to enhance the analytical rigour of the study. The primary difference between EFA and CFA is that CFA requires the factorial model to be specified prior to analysis (Cunningham 2008). However, EFA still allows for the possibility that models presented in previous studies may be inaccurately specified or do not fit the data well. As noted by Mulaik and Millsap (2000) this approach is stringent and provides for a more thorough evaluation of the measurements. Keeping within the stringency requirements of this approach, the introduction of covariance terms between two error variances to improve model fit was avoided unless justified on substantive grounds as a last option (Cunningham 2008).

The following criteria were applied in determining which items should be retained in the factor structures:

- The items should load on the same factor subsequent to both exploratory and confirmatory analysis (Mulaik & Millsap 2000).
- The item loadings should exceed 0.6 as accepted in exploratory studies (Hair et al. 2006)

- Each factor is required to have at least three measurement items to enable the development of congeneric factors (Byrne 2008)

Next it is required to determining the goodness of fit criteria, standardised estimates used for congeneric measurement models and criteria used for specifying single indicator latent variables of the complex latent variables.

Goodness of fit criteria. In evaluating measurement and structural models two primary goals are considered; their unidimensionality and the extent to which the data fits the model. In order to test for unidimensionality, both the standardised regression weights of items and the Cronbach's coefficient alpha were used for testing for unidimensionality. In order to test for goodness-of-fit, a range of indices were used in this study as it is commonly accepted that no single statistical test of significance identifies model fit (Schumacker & Lomax 1996). It is important to note that considerable debate surrounds the question of model fit indices (Cunningham 2008). As a point of departure therefore, this study primarily adopts Joreskog's position (in Cunningham 2008) that the chi-square test and accompanying significance test are the primary statistics needed to assess model fit in SEM. This statistic should always be reported (Hooper, Coughlan & Mullen 2008; Kline, R. B. 2005). However, the chi-square test is sensitive to sample size and deviations from normality (Kline, R. B. 2005) and as a result a range of practical fit indices have also evolved (Cunningham 2008).

The Analysis of Moment Structures (AMOS) software used by this study can generate in excess of twenty statistics and as noted it is a matter of debate as to which should be reported. It is not necessary to include every index in the software's output (Hooper, Coughlan & Mullen 2008). This study will report the Chi-square statistic and accompanying significance test, the normed Chi-square, the RMSEA, the SRMR, the CFI, the CFi and TLI as developed from the recommendations of prominent commentators (Cunningham 2008; Hair et al. 2006; Hooper, Coughlan & Mullen 2008; Hu & Bentler 1999; Hulland, Chow & Lam 1996; Kline, R. B. 2005; Schumacker & Lomax 1996). It is noted that Hu and Bentler (1998) have suggested that the GFI and AGFI indices should not be used due to the inconsistent sensitivity to model misspecification and sensitivity to sample size. They are however, one of the most cited fit indices in the literature (Cunningham 2008) and are therefore included in this study's reporting of results. The indices reported in this study are summarised in Table 4.6.

Table 4.6: Goodness-of-fit criteria adopted for this study

Name	Abbreviation	Type of test	Acceptable level
Coefficient alpha Standardised regression weight	α Beta	Unidimensionality	α>0.70 (α>0.60 acceptable for exploratory) Beta>0.40
Chi-square with accompanying significance test	x^2 (df, p)	Model Fit	p>0.05 (at the α equals to 0.05 level)
Normed chi-sqaure	x^2/df	Absolute Fit and Model Parsimony	1< x^2/df<3
Root Mean-Square Error of Approximation	RMSEA	Absolute Fit	RMSEA<0.05 (values between 0.05 and 0.08 may also indicate satisfactory fit)
Goodness-of-fit Index	GFI	Absolute Fit	GFI>0.95 (values between 0.90 and 0.95 may also indicate satisfactory fit)
Adjusted Goodness-of-Fit Index	AGFI	Absolute Fit	AGFI>0.95 (values between 0.90 and 0.95 may also indicate satisfactory fit)
Tucker-Lewis Index	TLI	Incremental Fit	TLI>0.95 (values between 0.90 and 0.95 may also indicate satisfactory fit)
Comparative Fit Index	CFI	Incremental Fit	CFI>0.95 (values between 0.90 and 0.95 may also indicate satisfactory fit)

Source: (Developed from Cunningham 2008; Hair et al. 2006; Hooper, Coughlan & Mullen 2008; Hu & Bentler 1999; Kline, R. B. 2005)

4.4.3 Testing the measurement models

The previous section of the chapter considered the criteria applicable to the study before testing the measurement model could commence. Following Mulaik and Millsap's (2000) recommendations, EFAs were conducted using SPSS software for all the adopted scales included in the conceptual model. Thereafter, CFAs were conducted using AMOS software for each scale and the one-factor congeneric models used in the multiple regression and SEM analysis. Reliability analysis and descriptives were run using SPSS in order to establish the Cronbach's alpha and Standard Deviation (SD) of all the measures. It was determined that these three steps would not only more stringently test the measurement model but also provide statistical support for the modelling of single indicator latent variables in the testing of the structural model and in conducting the regression analysis of factors underlying the constructs of foresight competence and strategic thinking. As such, each scale was evaluated and the statistical results for the EFA, CFA and one factor congeneric models reported in Section 4.4.

4.4.3.1 TimeStyle Inventory (TSI)

The TimeStyle Inventory (Fortunato & Furey 2010) was regarded as an important measure of individual's orientation to time (Section 2.5.5.3) that influences the dominant style of strategy-level leaders' foresight competence. It is an eighteen item scale measuring three factorial structures (future, present and past) of the latent variable, an individual's orientation to time.

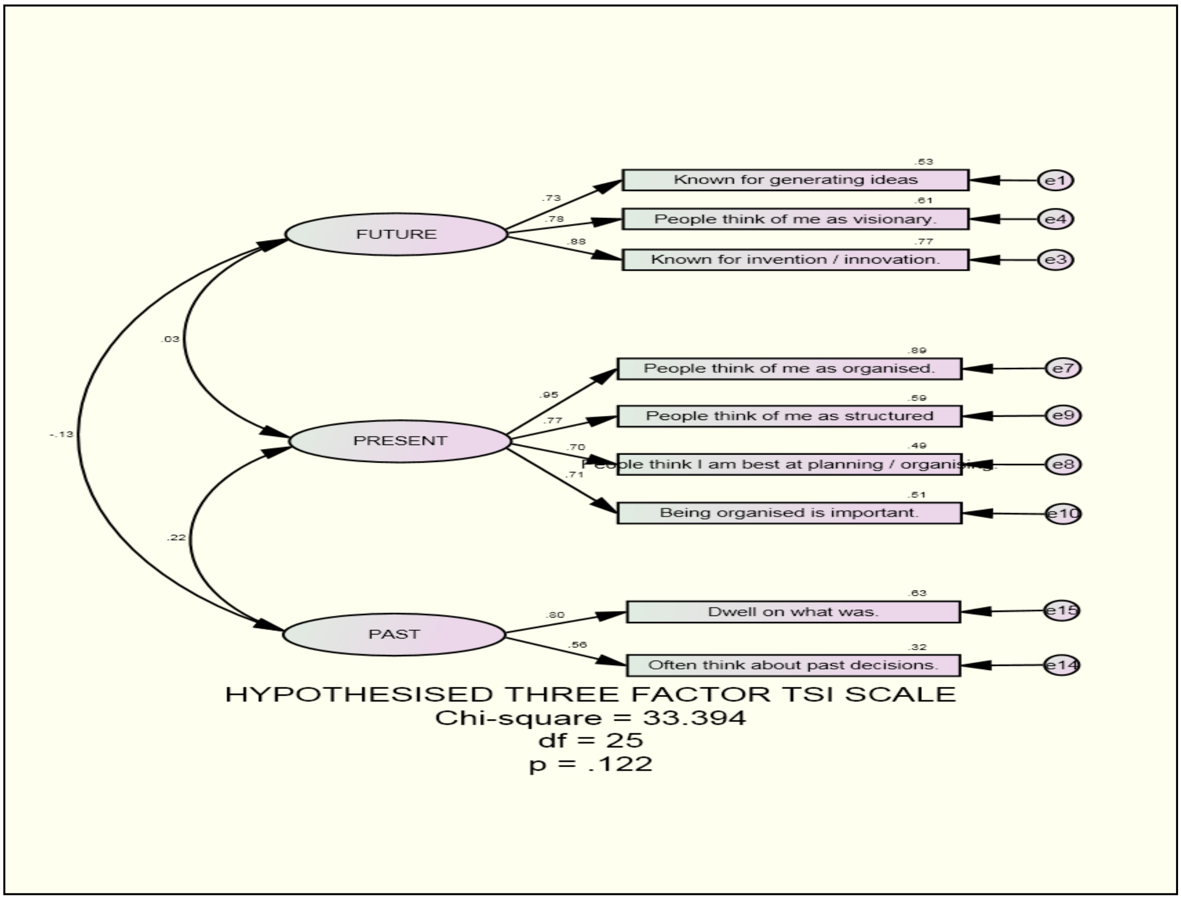
EFA. The EFA of the adopted TSI scale extracted three factors and was consistent with the original measure. Items were reduced from eighteen to nine items yielding a Cronbach's alpha of 0.719. Item loadings ranged from 0.660 to 0.975. The four items with high loadings on the first factor captured the latent variable, 'Present' orientation. Three items with high loadings on the second factor captured the latent variable, 'Future' orientation. The two items loading on to the third factor captured the latent variable, 'Past' orientation. It should be noted that the other items of the adopted scale that were determined to measure the 'Past' latent variable yielded very low factor loadings. It was concluded that a) the high number of respondents that held very senior positions in organisations (71%) and b) the high number of respondents with exposure to formal education in foresight (68%), influenced the measure of the latent variable, 'Past'. Previous studies illustrate high factor loadings on the items hypothesised to measure 'past' orientation. Further research could explore whether senior organisational leaders have a predominant disposition of "not looking back" and how this is influenced by being exposed to foresight education.

The total variance explained by the measure using the rotation sums of square loadings results was 61% by the three factors. There were two non-redundant residuals (0.052 and 0.058) and required careful consideration in terms of how the parameter estimates reproduce the data. These were found to be marginal and not affecting the data significantly. The scree plot confirmed the factor structure and the goodness-of-fit test indicated a Chi-square of 23.330 and p=0.178. Hence the data fit the model well.

An EFA using ML extraction and oblimin oblique rotation confirmed the three factor structure of the original scale. The solution was an adequate representation of the data yielding good data fit. The results of the EFA are comprehensively reported in Appendix I and summarised in Table 4.7.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data was an excellent fit to the hypothesised three-factor model with a x^2/df of 1.34, p=0.122. Acceptable factor loadings ranged from 0.70 to 0.95 for eight of the nine items. One item loading onto the 'Past' latent variable was 0.56. It was determined that the item; *"Often think about past decisions"* should be retained as there was no theoretical justification for its omission. The other item loading onto the 'Past' latent variable; *"Dwell on what was"* had a factor loading of 0.80. It was further determined that there was theoretical support for the inclusion of the 'Past' latent variable as the scale measured individuals' orientation to time. Therefore no further items were omitted as there was no theoretical justification for making this decision. The results of the CFA are reported in Appendix I and summarised in Table 4.7. Figure 4.2 illustrates the AMOS output of the CFA of the complete TSI factor structure.

Figure 4.2: CFA model and AMOS output of TimeStyle Scale (TSI)



Source: developed for this research.

Table 4.7: Standardised and fit estimates for TimeStyle Scale (TSI)

Reliability – Cronbach's alpha			**0.719**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
TSI1 Known for generating ideas	←	Future	.730	0.000	.533
TSI4 People think of me as visionary.	←	Future	.782	0.000	.612
TSI9 Known for invention / innovation.	←	Future	.876	0.000	.768
TSI2 Being organised is important.	←	Present	.712	0.000	.506
TSI5 People think of me as organised.	←	Present	.782	0.000	.893
TSI8 People think of me as structured	←	Present	.945	0.000	.594
TSI10 People think I am best at planning / organising.	←	Present	.771	0.000	.490
TSI6 Dwell on what was.	←	Past	.795	0.000	.633
TSI12 Often think about past decisions.	←	Past	.564	0.000	.318
p					.122
Chi-square (x^2)					33.394
Degree of freedom (df)					25
Normed chi-square (x^2/df)					1.336
Root Mean-Square of Error of Approximation (RMSEA)					0.035
Tucker-Lewis Index (TLI)					0.987
Comparative Fit Index (CFI)					0.991

Source: ML estimation with AMOS 18

The Cronbach's alpha for the TimeStyle scale is 0.719 indicating that the variables indicate a reasonable measure a strategy level leader's orientation to time. Variable reliabilities are all acceptable indicating that the items all reflect a reasonably good measurement of the underlying structures of the construct and provided evidence of convergent validity. Goodness of fit indices all indicated very good model fit as determined by the criteria set out in Table 4.7.

4.4.3.2 Foresight Styles Assessment (FSA)

The Foresight Styles Assessment (Dian 2009; Gary 2008, 2009) was regarded as an important measure of a strategy level leader's dominant and back-up styles of engaging with matters related to anticipating the future (see Chapter 2 Section 5.5.4). These are hypothesised to consist of four styles by previous studies (Gary 2009). This study sought to confirm the factor structures of the measure and hypothesised that the styles a) are influenced by the leader's orientation to time, b) are an indicator of the leader's level of foresight competence c) are related to their decision-making styles which reflects their strategic thinking, and consequently d) influence the strategy-making mode of the organisation. It is a twenty six item scale measuring four factorial structures (Tester, Adapter, Framer and Reactor) of the latent variable. Theoretical concerns could be raised regarding whether the Reactor factor describes a foresight style. By definition, foresight competence cannot be described as reactionary resistant to change (Section 2.5.5.4). The analysis of the data confirmed this view and is discussed below.

EFA. The EFA of the adopted FSA scale using SPSS software and the ML extraction method extracted four factors and was moderately consistent with the original measure. Items were reduced from twenty six to thirteen items yielding a Cronbach's alpha of 0.82 (see Table 4.8). All items that were omitted either had very low factor loadings and / or the omission was theoretically justifiable. Item loadings ranged from 0.531 to 0.935. Five items (0.709, 0.714, 0.808, 0.923 and 0.935) with high loadings on the first factor captured the latent variable, 'Framer' foresight style. The three items (0.518, 0.676 and 0.688) loading on to the second factor captured the latent variable, 'Adapter' foresight style. Three items (0.531, 0.740 and 0.741) with high loadings on the third factor captured the latent variable, 'Reactor' foresight style. Four items (0.518, 0.638, 0.811 and 0.864) loaded on the fourth factor which captured the latent variable, 'Tester' foresight style.

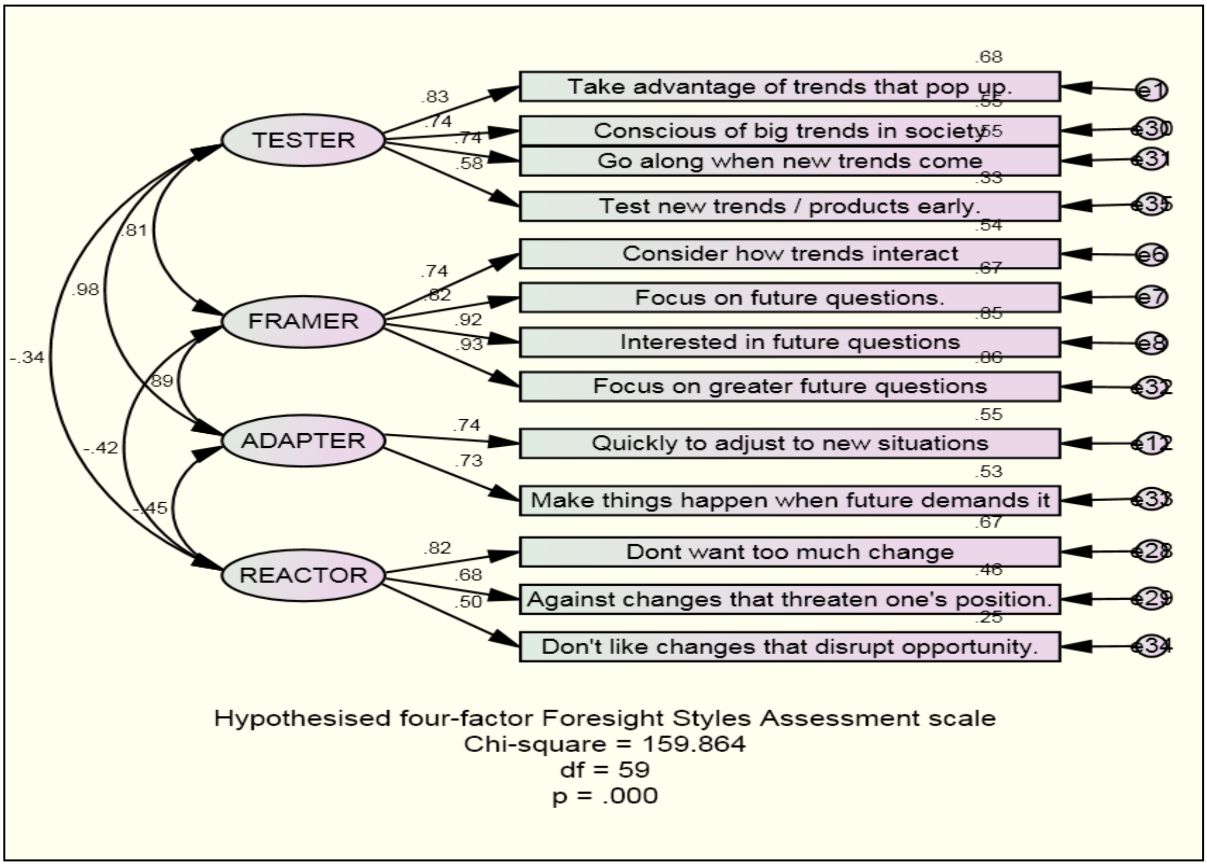
The total variance explained by the measure was 74% by the four factors. There were no non-redundant residuals. The scree plot confirmed the factor structure and the goodness-of-fit test indicated a Chi-square of 34.430 and p=0.352. Hence the data fit the model well.

An EFA using ML extraction and oblimin oblique rotation confirmed the three factor structure of the original scale. The solution was an adequate representation of the data yielding good data fit. The results of the EFA are comprehensively reported in Appendix I and summarised in Table 4.8.

CFA. The CFA using the AMOS software was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix did not yield acceptable model fit (CMIN) statistics. The x^2/df fell within the acceptable range of 2.71. Other model fit indices also indicated poor to moderate model fit (RMR=0.86, GFI=0.922, TLI=9.35, RMSEA=0.78 and CFI=951). Eleven of the thirteen standardised regression weights ranged from 0.678 to 0.929. Two items yielded regression weights of 0.498 (FSA3) and

0.578 (FSA1) yet were retained due to theoretical considerations underlying the original measure. These items were material in terms of retaining the factor structure of the original measure. It was determined that two of the low regression weights, FSA3 item (‘Don’t like changes that disrupt opportunity’) and FSA 11 (‘Against changes that threaten one’s position’), represented a construct (Reactor) that was not theoretically aligned with the concept of foresight competence. However, it was decided to retain these items in the measure to determine, in terms of prospective regression analysis and SEM, whether there would be justifiable grounds for concluding that the FSA measure is misrepresented by the Reactor construct. The results of the CFA are reported in Appendix I and summarised in Table 4.8. Figure 4.4 illustrates the AMOS output of the CFA.

Figure 4.3: CFA of Foresight Styles Assessment (FSA)



Source: Developed for this research

Table 4.8: **Standardised and fit estimates for the Foresight Styles Assessment (FSA)**

Reliability – Cronbach's alpha			**0.820**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
FSA1 Test new trends / products early.	←	TESTER	0.578	0.000	0.334
FSA16 Conscious of big trends in society	←	TESTER	0.741	0.000	0.549
FSA17 Go along when new trends come	←	TESTER	0.744	0.000	0.553
FSA24 Take advantage of trends that pop up.	←	TESTER	0.827	0.000	0.685
FSA10 Consider how trends interact	←	FRAMER	0.738	0.000	0.545
FSA14 Focus on future questions.	←	FRAMER	0.818	0.000	0.669
FSA20 Interested in future questions	←	FRAMER	0.920	0.000	0.845
FSA21 Focus on greater future questions	←	FRAMER	0.929	0.000	0.862
FSA5 Quickly to adjust to new situations	←	ADAPTER	0.740	0.000	0.547
FSA22 Make things happen when future demands it	←	ADAPTER	0.730	0.000	0.533
FSA3 Don't like changes that disrupt opportunity.	←	REACTOR	0.578	0.000	0.248
FSA9 Dont want too much change	←	REACTOR	0.816	0.000	0.665
FSA11 Against changes that threaten one's position.	←	REACTOR	0.678	0.000	0.460
p					0.00
Chi-square (x^2)					159.864
Degree of freedom (df)					59
Normed chi-square (x^2/df)					2.710
Root Mean-Square of Error of Approximation (RMSEA)					0.78
Tucker-Lewis Index (TLI)					0.935
Comparative Fit Index (CFI)					0.951
Goodness-of-fit Index (GFI)					0.922
Adjusted Goodness-of-Fit Index (AGFI)					0.879

Source: ML estimation of AMOS 18

In terms of the criteria for fit indices set for this study, the model achieved the minimum requirements with the CFI indicating good fit, some indices indicating satisfactory fit (TLI, GFI, RMSEA) and two indices showing poor fit (AGFI, Chi-square).

4.4.3.3 Decision Style Inventory (DSI)

The Decision Style Inventory (Rowe & Boulgarides 1994; Rowe & Mason 1987a) was developed in order to describe the decision-making styles of managers (See Section 2.4). Based on Myers-Brigg type measurement, the inventory consists of 80 ordinal items aligned with four ordered responses categories (Directive, Analytic, Conceptual and Behavioural). Each category consists of 20 items and constitutes a unidimensional measure of each of the four styles (Leonard, Nancy H., Scholl & Kowalski 1999b).

The DSI categories are a function of the respondent's predilection to favour certain decision-making styles. They are however, not mutually exclusive with the scores indicating dominant, back-up and least preferred styles depending on the decision-maker's situation. This is affirmed by Rowe and Mason (1983) and supports the view that each category is unidimensional and independent of each other. Treated as a whole in terms of statistical analysis, the categories negatively covary and are unable to converge into a meaningful higher order factorial structure. As such, the study treated *each category of the of the DSI scale as an independent construct measuring the four decision style dimensions independently.* When each factor structure is treated as a latent variable, the reliability and factor loadings are good supporting the notion that each factor does measure the styles proposed by Rowe and Mason (1987) and that each should be treated as an independent construct.

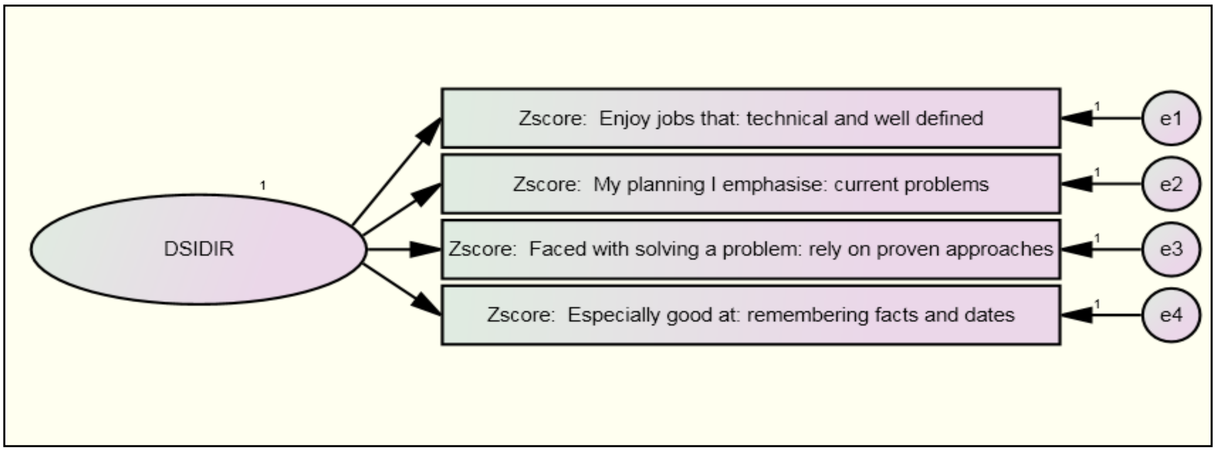
One-factor congeneric models were developed based on EFAs conducted separately for each style whereafter CFAs were conducted to confirm the measurement validity and reliability of the measurement models. This process also facilitated the reduction of items in a lengthy ordinal scale that has substantial theoretical merit but presents particular challenges to SEM (Yang, Nay & Hoyle 2009).

4.4.3.4 One-factor congeneric model of Directive Decision Style (DSIA)

EFA. An EFA using ML extraction was conducted in order to determine which of the original 20 indicators of the DSIA construct should be retained (See Appendix I) for full details). The KMO sampling adequacy was 0.713 with the items explaining 51.9% of the variance. Four items were retained with α values ranging from 0.52 to 0.79. There were no non-redundant residuals and the Chi-square was 2.885 (df=2) and p=0.236. A summary of CFA results is illustrated in Table 4.9.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data fitted the model well with a x^2/df of 1.45, p=0.233. It was determined that there was theoretical support for retaining three indicators with regression weights of 0.52, 0.522 and 0.562 respectively. The items ask different questions that are theoretically relevant to a Rowe and Boulgarides' (1994) description of a Directive Style. As illustrated by the model fit indices and percentage of variance explained by the model, no further items were omitted as there was no theoretical justification for making this decision. The results of the CFA are reported in Appendix I and summarised in Table 4.9. Figure 4.5 illustrates the DSIA one-factor congeneric model.

Figure 4.4: One-factor congeneric model of Directive Decision Style (DSIA)



Source: Developed for this research.

Table 4.9: Standardised and fit estimates of the Directive Decision Style (DSIA) one-factor congeneric model

Reliability – Cronbach's alpha		**0.689**			
Standardised regression weights				***p* value**	**Item Reliability SMC**
DSI2A Enjoy jobs that: technical and well defined	←	DSIDIR	.790	0.000	.317
DSI6A My planning I emphasise: current problems	←	DSIDIR	.521	0.000	.274
DSI7A Faced with solving a problem: rely on proven approaches	←	DSIDIR	.523	0.000	.272
DSI11A Especially good at: remembering facts and dates	←	DSIDIR	.563	0.000	.625
p				.233	
Chi-square (x^2)				2.915	
Degree of freedom (df)				8	
Normed chi-square (x^2/df)				1.457	
Root Mean-Square of Error of Approximation (RMSEA)				0.040	
Goodness-of-fit Index (GFI)				0.995	
Adjusted Goodness-of-Fit Index (AGFI)				0.973	
Tucker-Lewis Index (TLI)				0.984	
Comparative Fit Index (CFI)				0.995	

Source: ML estimation of AMOS18

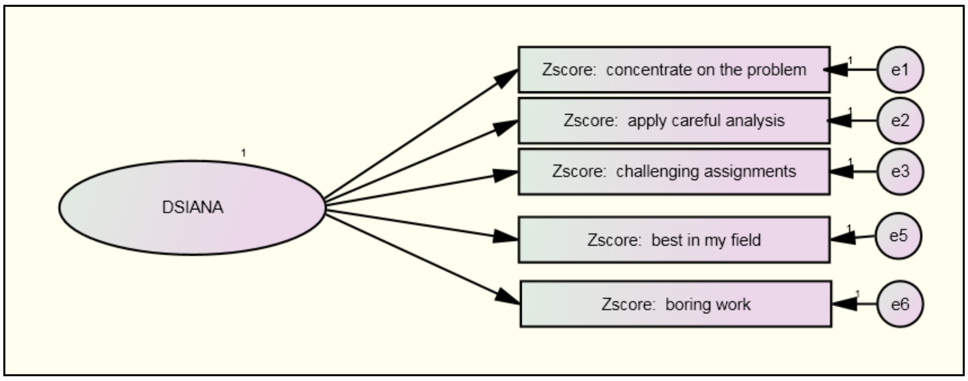
Cronbach's alpha for the measurement model was 0.689 and falls within the criteria established for this study. The model fit indices were all within the established criteria with all values indicatingthat the data fit the model well (Hooper, Coughlan & Mullen 2008).

4.4.3.5 One-factor congeneric model of Analytic Decision Style (DSIA)

EFA. An EFA using ML extraction was conducted in order to determine which of the original 20 indicators of the DSIB construct should be retained (See Appendix I) for full details). The KMO sampling adequacy was 0.758 with the items explaining 45.9% of the variance. Five items were retained with α values ranging from 0.44 to 0.72. There were no non-redundant residuals and the Chi-square was 9.151 (df=5) and *p*=0.103. A summary of CFA results is illustrated in Table 4.10.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data fitted the model well with a x^2/df of 1.85, *p*=0.099. It was determined that there was theoretical support for retaining three indicators with low regression weights of 0.442, 0.455 and 0.576 respectively. The items ask different questions that are theoretically relevant to a Rowe and Boulgarides' (1994) description of an Analytic Style. As illustrated by the model fit indices and percentage of variance explained by the model, no further items were omitted as there was no theoretical justification for making this decision. The results of the CFA are reported in Appendix I and summarised in Table 4.10. Figure 4.6 illustrates the DSIA one-factor congeneric model.

Figure 4.5: One-factor congeneric model for Analytic Decision Style (DSIB)



Source: Developed for this research.

Table 4.10: Standardised and fit estimates of the Analytic Decision Style (DSIA) one-factor congeneric model

Reliability – Cronbach's alpha			**0.702**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
DSI1B best in my field	←	DSIANA	.629	0.000	.396
DSI7B apply careful analysis	←	DSIANA	.455	0.000	.207
DSI15B challenging assignments	←	DSIANA	.576	0.000	.332
DSI17B concentrate on the problem	←	DSIANA	.728	0.000	.530
DSI20B boring work	←	DSIANA	.442	0.000	.195
p					.099
Chi-square (x^2)					9.256
Degree of freedom (df)					5
Normed chi-square (x^2/df)					1.851
Root Mean-Square of Error of Approximation (RMSEA)					0.055
Goodness-of-fit Index (GFI)					0.986
Adjusted Goodness-of-Fit Index (AGFI)					0.959
Tucker-Lewis Index (TLI)					0.961
Comparative Fit Index (CFI)					0.980

Source: ML estimate of AMOS 18

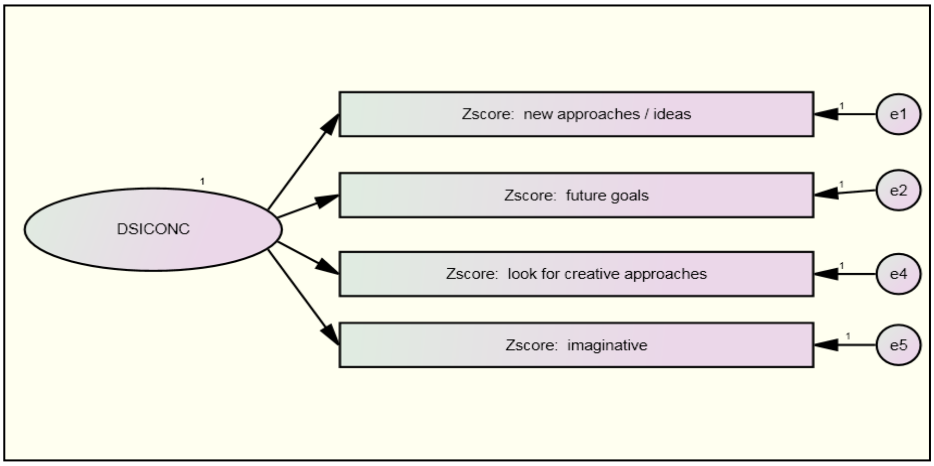
Cronbach's alpha for the measurement model was 0.702 and meets the criteria established for this study. The model fit indices were all within the established criteria with all values indicating that the data fit the model well (Hooper, Coughlan & Mullen 2008).

4.4.3.6 One-factor congeneric model of Conceptual Decision Style (DSIC)

EFA. An EFA using ML extraction was conducted in order to determine which of the original 20 indicators of the DSIC construct should be retained (See Appendix I) for full details). The KMO sampling adequacy was 0.830 with the items explaining 54.83% of the variance. Five items were retained with α values ranging from 0.59 to 0.72. There were no non-redundant residuals and the Chi-square was 4.747 (df=5) and p=0.448. A summary of CFA results is illustrated in Table 4.11.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data fitted the model well with a x^2/df of 1.529, p=0.217. The items retained were all theoretically relevant to a Rowe and Boulgarides' (1994) description of an Conceptual Style. As illustrated by the model fit indices and percentage of variance explained by the model, no further items were omitted. The results of the CFA are reported in Appendix I and summarised in Table 4.11. Figure 4.7 illustrates the DSIA one-factor congeneric model.

Figure 4.6: One-factor congeneric model of Conceptual Decision Style (DSIC)



Source: Developed for this research.

Table 4.11: Standardised and fit estimates of the Conceptual Decision Style (DSIC) one-factor congeneric model

Reliability – Cronbach's alpha			**0.793**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
DSI4C new approaches / ideas	←	DSICONC	.703	0.000	.350
DSI6C future goals	←	DSICONC	.685	0.000	.523
DSI7C look for creative approaches	←	DSICONC	.723	0.000	.470
DSI18C imaginative	←	DSICONC	.592	0.000	.494
p				.217	
Chi-square (x^2)				3.059	
Degree of freedom (df)				2	
Normed chi-square (x^2/df)				1.529	
Root Mean-Square of Error of Approximation (RMSEA)				0.044	
Goodness-of-fit Index (GFI)				0.994	
Adjusted Goodness-of-Fit Index (AGFI)				0.972	
Tucker-Lewis Index (TLI)				0.988	
Comparative Fit Index (CFI)				0.996	

Source: ML estimates of AMOS 18

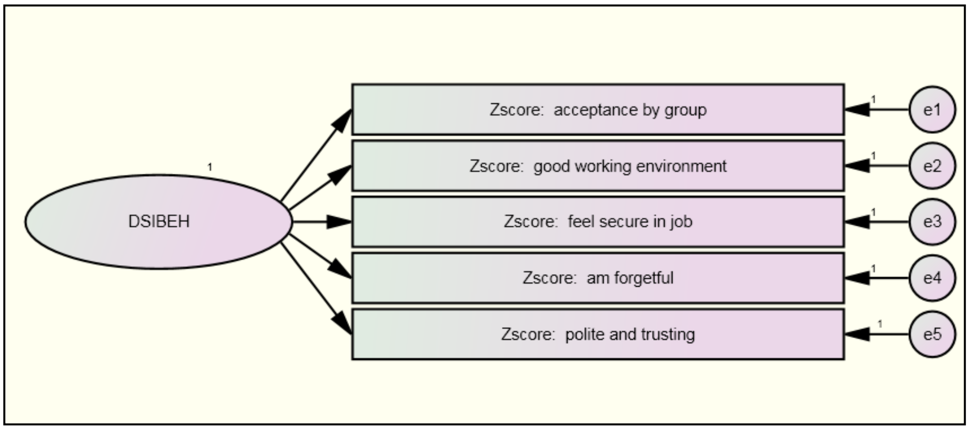
Cronbach's alpha for the measurement model was 0.793 and falls within the criteria established for this study. The model fit indices were all within the established criteria with all values indicating that the data fit the model well (Hooper, Coughlan & Mullen 2008).

4.4.3.7 One-factor congeneric model of Behavioral Decision Style (DSID)

EFA. An EFA using ML extraction was conducted in order to determine which of the original 20 indicators of the DSID construct should be retained (See Appendix I) for full details). The KMO sampling adequacy was 0.818 with the items explaining 55.206% of the variance. Five items were retained with α values ranging from 0.582 to 0.824. There were no non-redundant residuals and the Chi-square was 5.962 (df=5) and p=0.310. A summary of CFA results is illustrated in Table 4.12.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data fitted the model well with a x^2/df of 1.206, p=0.303. The items asked questions relevant to the style and were theoretically relevant to a Rowe and Boulgarides' (1994) description of a Behavioural Style. As illustrated by the model fit indices and percentage of variance explained by the model, no further items were omitted as there was no theoretical or statistical justification for making this decision. The results of the CFA are reported in Appendix I and summarised in Table 4.12. Figure 4.8 illustrates the DSIA one-factor congeneric model.

Figure 4.7: One-factor congeneric model of Behavioural Decision Style (DSID)



Source: Developed for this research.

Table 4.12: Standardised and fit estimates of the Behavioural Decision Style (DSID) one-factor congeneric model

Reliability – Cronbach's alpha			**0.795**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
DSI1D feel secure in job	←	DSIBEH	.612	0.000	.375
DSI4D good working environment	←	DSIBEH	.582	0.000	.338
DSI15D acceptance by group	←	DSIBEH	.824	0.000	.679
DSI16D polite and trusting	←	DSIBEH	.695	0.000	.483
DSI17D am forgetful	←	DSIBEH	.597	0.000	.357
p					.303
Chi-square (x^2)					6.031
Degree of freedom (df)					5
Normed chi-square (x^2/df)					1.206
Root Mean-Square of Error of Approximation (RMSEA)					0.027
Goodness-of-fit Index (GFI)					0.992
Adjusted Goodness-of-Fit Index (AGFI)					0.975
Tucker-Lewis Index (TLI)					0.995
Comparative Fit Index (CFI)					0.997

Source: ML estimates of AMOS 18

Cronbach's alpha for the measurement model was 0.795 and falls within the criteria established for this study. The model fit indices were all within the established criteria with all values indicating that the data fit the model well (Hooper, Coughlan & Mullen 2008).

4.4.3.8 One-factor congeneric model of Strategy Making Processes (SMP)

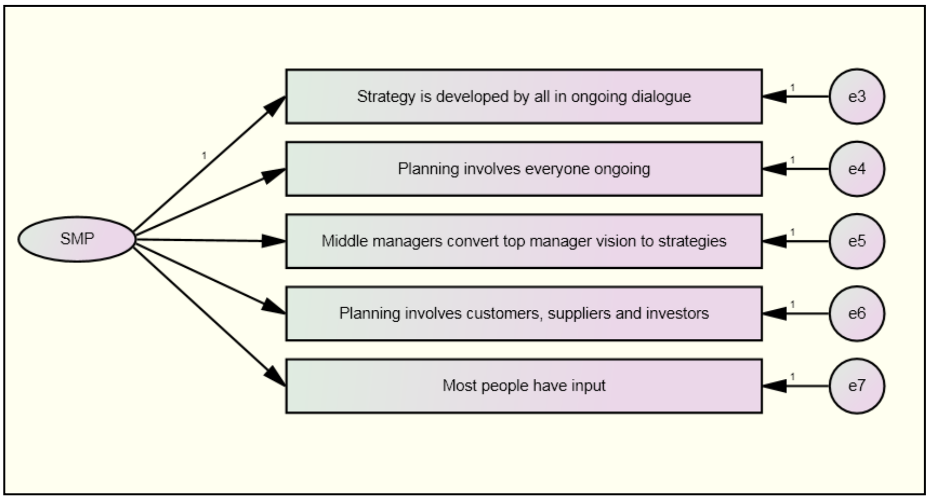
The Strategy-Making Processes measure (White 1998) was developed to measure strategy level leaders' mode of strategy-making. Of interest to this study was whether there was any significant relationship between a) the operationalised measures of foresight competence and the strategy-making mode in an organisation, and b) the decision making styles of strategy level leaders and the strategy-making process of the organisation.

EFA. An EFA using ML extraction of the of the original 17-item scale was modelled in terms of a one-factor congeneric model of the SMP. The purpose of the study was to determine whether there was any significant relationship between the strategy-making mode of an organisation and the foresight competence and strategic thinking constructs. As such, reducing the number of items into a one factor congeneric model was appropriate (Little et al. 2002; Yang, Nay & Hoyle 2009). The EFA yielded a Kaiser-Meyer-Olkin (KMO) sampling adequacy of 0.816. Items were reduced from seventeen to five items yielding a Cronbach's alpha of 0.774. Item loadings ranged from 0.539 to 0.757. There were two items (SMP7 'Middle managers convert top manager vision to strategies' and SMP8 'Planning involves customers, suppliers and investors') with factor loadings below 0.6. Both items were retained as they were theoretically relevant and there was no justification for their omission.

The total variance explained by the items was 52.786%. There were no non-redundant residuals. The goodness-of-fit test indicated a Chi-square of 8.084 and p=0.152. Hence the data fit the model well. The solution was an adequate representation of the data yielding good data fit. The results of the EFA are comprehensively reported in Appendix I and summarised in Table 4.13.

CFA. The CFA was conducted based on the results of the EFA analysis. ML estimation on the covariance matrix found that the data was an excellent fit to the hypothesised one-factor congeneric model with a x^2/df of 1.635, p=0.147. Factor loadings ranged from 0.539 to 0.757. The items were sound measures of the construct, Strategy-Making Processes as described by White (1998). As illustrated by the model fit indices and percentage of variance explained by the model, no further items were omitted as there was no theoretical or statistical justification for making this decision. The results of the CFA are reported in Appendix I and summarised in Table 4.13. Figure 4.9 illustrates the DSIA one-factor congeneric model.

Figure 4.8: One-factor congeneric model for Strategy Making Process (SMP)



Source: Developed for this research.

Table 4.13: Standardised and fit estimates of the Strategy-Making Processes (SMP) one-factor congeneric model

Reliability – Cronbach's alpha			**0.774**		
Standardised regression weights				***p* value**	**Item Reliability SMC**
SMP5 Strategy is developed by all in ongoing dialogue	←	SMP	.747	0.000	.558
SMP6 Planning involves everyone ongoing	←	SMP	.757	0.000	.573
SMP7 Middle managers convert top manager vision to strategies	←	SMP	.539	0.000	.290
SMP8 Planning involves customers, suppliers and investors	←	SMP	.546	0.000	.298
SMP 9Most people have input	←	SMP	.600	0.000	.360

p	.147
Chi-square (x^2)	8.177
Degree of freedom (df)	5
Normed chi-square (x^2/df)	1.635
Root Mean-Square of Error of Approximation (RMSEA)	0.048
Goodness-of-fit Index (GFI)	0.988
Adjusted Goodness-of-Fit Index (AGFI)	0.965
Tucker-Lewis Index (TLI)	0.987
Comparative Fit Index (CFI)	0.991

Source: ML estimates of AMOS 18

The Cronbach's alpha for the one-factor congeneric model of strategy-making process (SMP) is 0.774 indicating that the variables indicate a reasonable measure a strategy level leader's orientation to time. Variable reliabilities are all above moderate indicating that the items all reflect a reasonably good measurement of the underlying structures of the construct and provided evidence of convergent validity. Goodness of fit indices all indicated very good model fit (Hooper, Coughlan & Mullen 2008) as determined by the criteria set out in Table 4.13.

4.5 Multiple Regression Analysis

The purpose of multiple regression analysis is to examine the relationship between a single dependent variable and a set of independent variables (Hair et al. 2006). This is achieved by determining how much variation in the dependent variable can be explained by two or more independent variables (Gerber & Finn 2005). This research seeks to examine whether significant relationships exist between the individual's different orientations time (future, present, past as lower order factorial structures of the TSI scale) and foresight styles (tester, adapter, framer, reactor as the lower order factorial structures of the FSA scale) as independent variables, and their decision making styles (Directive, Analytic, Conceptual, Behavioural as lower order factorial structures of the DSI scale) as independent variables.

As noted in section 4.2.2, the research was interested in the relationships between both the lower order factorial structures and the higher order constructs as represented in the conceptual model. In the latter case it was determined that SEM would best describe the relationships. However, due to the increased complexity that would result in a highly complex SEM seeking to describe the lower order relationships (measured by 141 items and eleven lower order constructs), multiple regression analysis was deemed appropriate to test these. It was further determined that the sample size was restrictive in terms of conducting group analysis in SEM testing for the moderating effect of the demographic variables (Hair et al. 2006). As such, the second part of the regression analysis was to test for the moderating (interaction) effects of the demographic variable on the hypothesised lower order factorial relationships (Gerber & Finn 2005).

4.5.1 Multiple regression analysis: Assumptions

Having determined that multiple regression analysis was appropriate in terms of the objectives of the study, sample size, statistical power, reliability and validity of the measures (Hair et al. 2006), it was appropriate to address the assumptions of multiple regression. A number of assumptions were addressed earlier in this chapter and reviewed prior to commencing the analysis primarily by examining graphical analyses (see Appendix J for details).

Linearity. Hair et al. (2006) recommend examining residual plots to determine the linearity of the relationship between the variables. The plots showed normal distribution of the data and no violations of linearity in the residuals.

Constant variance of the error term. Diagnosis using residual plots was used as recommended by Hair et al. (2006). Homoescedasticity (equality of variance) was exhibited by the variables thus meeting this assumption.

Independence of the error term. As suggested by Hair et al. (2006) multiple regression assumes that each predicted value suggested by the model should be independent. There was no consistent pattern in the residual plots indicating that there were no violations.

Normality of the error term distribution. Hair et al. (2006) suggest graphical analysis in terms of normal probability plots in determining the normality of the error term distribution. All plots indicated normal distribution and as such the assumption was met.

4.5.2 Multiple regression analysis: results

Having established the assumptions, the multiple regression analysis was conducted using SPSS software. The order of entry for this stage of the analysis was determined taking the conceptual framework of the study and hypothesised relationships into account. The SPSS 'Enter' function was used to manually select the independent variables.

The data were analysed using as regressors the future, present, past, tester, adapter, framer and reactor lower order constructs for each of the decision styles (Directive, Analytic, Conceptual and Behavioural). The results are reported in Appendix J and summarised in Table 4.14.

Table 4.14: Multiple regression estimates of TimeStyles, Foresight Styles as regressed on Decision Styles

	DSIA Directive				DSIB Analytic				DSIC Conceptual				DSID Behavioural			
R^2_{adj}	R^2_{adj}=0.137				R^2_{adj}=0.093				R^2_{adj}=0.31				R^2_{adj}=0.101			
Sig.	p=0.001				p=0.001				p=0.001				p=0.001			
F	$F_{(7,272)}$ =7.337				$F_{(7,272)}$ =5.071				$F_{(7,272)}$ =18.891				$F_{(7,272)}$ =5.488			
	Significance	Beta	t	Correlation	Significance	Beta	t	Correlation	Significance	Beta	t	Correlation	Significance	Beta	t	Correlation
Future	*0.004*	*-.223*	*-2.931*	*-.324*	0.504	-.052	-0.669	0.155	0.001	.377	5.535	0.506	0.225	-.095	-1.216	-0.227
Present	0.073	-.104	-1.800	-0.072	0.001	.219	3.701	0.214	0.427	-.041	-0.796	-0.065	*0.004*	*-.170*	*-2.898*	*-0.138*
Past	0.194	.081	1.302	0.138	0.574	.036	0.564	-0.020	0.087	-.096	-1.716	-0.191	0.083	.111	1.740	0.133
Tester	0.414	.076	0.818	-0.191	0.961	-.005	-0.48	0.200	0.123	-.128	-1.546	0.313	0.848	.018	0.192	-0.200
Adapter	0.093	-.163	-1.684	-0.266	0.115	.157	1.581	0.222	0.598	-.048	-0.528	0.372	0.259	.118	1.1132	-0.196
Framer	0.801	.026	0.252	-0.223	0.247	.121	1.160	0.223	0.001	.342	3.954	0.472	*0.003*	*-.294*	*-2.974*	*-0.281*
Reactor	*0.004*	*.175*	*2.895*	*0.257*	0.034	-.131	-2.126	-.125	0.306	.055	-1.026	-0.211	0.289	.065	1.063	0.125

Source: ML regression analysis estimates of SPSS 18

For the regressed Directive Decision Style (DSIA), the independent variables only explained 13.7% of the variance (R^2_{adj} = 0.137). However, the overall relationship was significant (F=7.337, p<0.05). With other variables held constant, Directive Decision Style (DSIA) was negatively related to a future orientation (B= -.149, t=-2.931, p<0.05) and positively related to a Reactor Foresight Style (B=.142, t=2.895, p<0.05) with both variables being significant predictors (at $p<0.05$) of this style. The 95% confidence interval's for the population parameters for future orientation and Reactor Foresight Style ranged from -0.25 to -0.49 and 0.046 to 0.24 respectively. However, at the p=0.001 (0.1%) level, there was no statistically significant relationships.

For the regressed Analytic Decision Style (DSIB), the independent variables only explained 9.3% of the variance (R^2_{adj} = 0.093). However, the overall relationship was significant (F=5.071, p<0.05). With other variables held constant, Analytic Decision Style (DSIB) was negatively related to the Reactor Foresight Style (B= -.131, t=-2.126, p<0.05) and positively related to a present orientation (B=.219, t=3.701, p<0.05) with both variables being significant predictors (at $p<0.05$) of this style. The 95% confidence interval's for the population parameters for future orientation and Reactor Foresight Style ranged from -0.13 to 0.064 and -0.194 to -0.007 respectively. However, at the p=0.001

(0.1%) level only the present orientation to time significantly predicted the Analytic Decision Style (DSIB).

For the regressed Conceptual Decision Style (DSIC), the independent variables explained 31% of the variance (R^2_{adj} = 0.31) and could therefore be regarded as a moderate to good model. The overall relationship was also significant (F=18.891, p<0.05). With other variables held constant, Conceptual Decision Style (DSIC) was positively related to future orientation (B=.377, t=5.535, p<0.05) and the Framer Foresight Style (B= .342, t=3.954, p<0.05) with both variables being significant predictors of this style. The 95% Confidence Interval's for the population parameters for future orientation and Reactor Foresight Style ranged from 0.174 to 0.366 and 0.118 to 0.352 respectively. Both the future orientation to time and the Framer Foresight Style were statistically significant at the p=0.001 (0.1%).

For the regressed Behavioural Decision Style (DSID), the independent variables only explained 10.1% of the variance (R^2_{adj} = 0.101). However, the overall relationship was significant (F=5.488, p<0.05). With other variables held constant, Behavioural Decision Style (DSID) was negatively related to present orientation (B= -.17, t=-2.898, p<0.05) and the Framer Foresight Style (B= -.294, t=-2.974, p<0.05) with both variables being significant predictors of this style. The 95% Confidence Interval's for the population parameters for future orientation and Reactor Foresight Style ranged from -0.193 to -0.037 and -0.047 to 0.157 respectively. However, at the p=0.001 (0.1%) level, there was no statistically significant relationships.

The regression models considered the influence of orientation to time and Foresight Styles on the Decision Styles of strategy-level leaders. The models provide support for the assertion that individuals that have a predominant future orientation are likely to have a Conceptual Decision Style and less likely to have a Behavioural and Directive Decision Style. It further asserts that those with a predominant Framer Foresight Style are more likely to have a Conceptual decision Style and less likely to have a Behavioural Decision Style. Strategy-level leaders having a predominant orientation to the present are less likely to have Behavioural Foresight Style and more likely to adopt an Analytic Decision Style. An orientation to the past and the Foresight Styles of Tester and Adapter had no significant effects on the Decision Styles.

4.5.3 Multiple regression analysis: hypothesis testing

The study hypothesised that an orientation to the future and Framer Foresight style would predict a predominant Conceptual Decision Style. It further asserted that a back-up orientation to the past and back-up Adapter Foresight Style would predict an Analytic Decision Style. The study hypothesised that these predictor variables, as indicators of foresight competence, would give an indication of the strategic thinking ability of strategy-level leaders.

The analysis results (Table 4.14) provided support for the following hypotheses:

> *H1a: Strategy-level leaders' orientation to the future is positively associated with the conceptual decision style propensity.*
> *H1e: Strategy-level leaders' Framer foresight style is positively associated with the conceptual decision style propensity.*

The analysis did not provide support for the following hypotheses:

> *H1c: Strategy-level leaders' Adapter foresight style is positively associated with the Analytic Decision Style propensity.*
> *H1d: Strategy-level leaders' orientation to the past is positively associated with the Analytic Decision Style propensity.*

The Adapter Foresight style did not significantly predict any Decision Styles with the Framer Foresight and future orientation in the models. An EFA, CFA and factor analysis confirmed that the Adapter Foresight Style was a valid and reliable construct. Of importance in assessing the analysis is that the Adapter Foresight Style is noted to function as a back-up style to the Framer Foresight Style. It is assumed that the regression analysis was unable to detect the relevance and direction of this hypothesised relationship due to the high explanation of variance of 31% (R^2=0.31).

The study further hypothesised that an individual's back-up orientation to the past would be positively associated with a back-up Analytic Decision Style. This was based on the theory that foresight is not only typified by a dominant orientation to the future (as supported by the analysis) but requires an understanding of the past as hypothesised. The regression analysis does not support this hypothesis indicating no significance in the relationship. As such the hypothesis was rejected.

The other sub-hypotheses required to support *H1: Foresight competence is positively associated with strategic thinking in strategy-level leaders* were tested in the SEM evaluation.

For the purposes of evaluating the structural equation models and testing of hypothesis, it was determined that only indicators that explained the variance highly significantly at the 0.1% level (Future → DSIC, Framer → DSIC and Present → DSIB) were retained for structural equation modelling and that these provided more rigorous statistical support for the hypothesised model.

4.6 Structural model evaluation and tests of hypotheses

The CFA and development of one factor congeneric models in section 4.2 reduced the data and determined a manageable number of valid and reliable composite variables which could be used in the testing of the structural model (Kline 2005). This section reports the results of the estimation of the full structural model and the possible modification of the model in line with the Model Development Strategy proposed by Hair et al. (2006). The reason that a Competing Model Strategy, which may be regarded as preferable, was not followed is that no alternative hypothetical models were identified in the literature (Hair et al. 2006). As noted, the study is partly exploratory and the constructs proposed by the study have not been previously hypothesised. Four aspects are considered during this process: composite score development, estimation of the structural model and if applicable, the modification of the model.

4.6.1 Composite single-indicator latent variable parameter specification

Having determined that the measurements of the constructs have been validated as being good estimates of the underlying latent constructs, it was required to calculate the composite score of the single indicator latent variables to be used in the structural model (Cunningham 2008). The composite reliabilities were calculated using SPSS software which yielded Cronbach's alphas and standard deviations of the confirmed variable indicators. According to the method described in Section 4.1 the single indicator latent variable models were specified. The values of the regression coefficients (λ) and measurement error variances (δ) were specified according to Munck's formulae as listed in Table 4.15. Once these were calculated for each of the constructs of interest, the values are specified as part of the structural model determined in the AMOS programme (Cunningham 2008).

Table 4.15: Summary of EFA, CFA results and specification of regression coefficients and measurement error variances for single-indicator latent variables

	CFA (maximum likelihood)		EFA (maximum likelihood)				Cronbach's α and Standard Deviation (SD)					
	CFA CMIN	CFA normed chi²	KMO	CMIN	Normed chi²	Non-redundant residuals	α	1- α	SD	Variance (SD²)	λ=SD√α Regression coefficient	SD²(1-α) Measurement error variance
TSI	p=0.122	1.34	0.773	p=0.178	1.29	2 (0.52, 0.58)	0.719	0.281	0.55516	0.3082	0.47	0.0866
FSA	p=0.00 RMR=0.54 GFI=0.929 TLI=.932 CFI=.953 RMSEA	2.87	0.853	p=0.121	1.34	0	0.822	0.178	0.71927	0.5173	0.65	0.0921
DSIA	p=0.233	1.45	0.713	p=0.236	1.44	0	0.689	0.311	0.71903	0.5170	0.59	0.1608
DSIB	p=0.677	0.39	0.717	p=0.679	0.39	0	0.702	0.298	0.67567	0.4565	0.57	0.1360
DSIC	p=0.441	0.96	0.83	p=0.448	0.95	0	0.793	0.207	0.73981	0.5473	0.66	0.1133
DSID	p=0.303	1.21	0.818	p=0.310	1.19	0	0.795	0.205	0.74143	0.5497	0.66	0.1127
SMP	p=0.147	1.64	0.816	p=0.152	1.62	0	0.774	0.226	0.72479	0.5253	0.64	0.1187

Source: Developed for this research

The measures of scale reliability in terms of Cronbach's alpha were all acceptable, ranging from 0.69 to 0.82 suggesting that all seven sets of indicator variables were reliable measures of the latent constructs. The table also indicates the calculated regression coefficients and the measurement error variances. These values were then used as fixed parameters in the measurement part of the structural models. As noted in Section 4.1, using composite scales reduces the number of parameters in the model and thereby increases the parsimony of the model (Holmes-Smith & Rowe 1994).

4.6.2 Estimation of the structural model

A main structural model proposed that *strategy level leaders' foresight competence, namely orientation to time (TSI) and foresight styles (FSA), was hypothesised to have an effect on the strategy-making processes of the organisation (SMP) as influenced by strategy-level leaders strategic thinking, namely their conceptual decision style (DSIC) and analytic decision style (DSIB)*. Based on the regression analysis preceding this stage of the analysis (section 4.3) it was determined that the orientation to time (TSI) significantly predicted the analytical (DSIB) and conceptual (DSIC) decision styles (strategic thinking construct). It was further determined that foresight styles significantly predicted the conceptual (DSIC) decision style and was negatively correlated to the analytic (DSIB) decision style. A full structural equation model reflecting these hypotheses is illustrated in Figure 4.10. As indicated, the regression coefficients and measurement error variances associated with each latent variable were specified in the model. Fitness measures of this model are shown in Table 4.16 as derived from the AMOS output of the model estimation (see Appendix K).

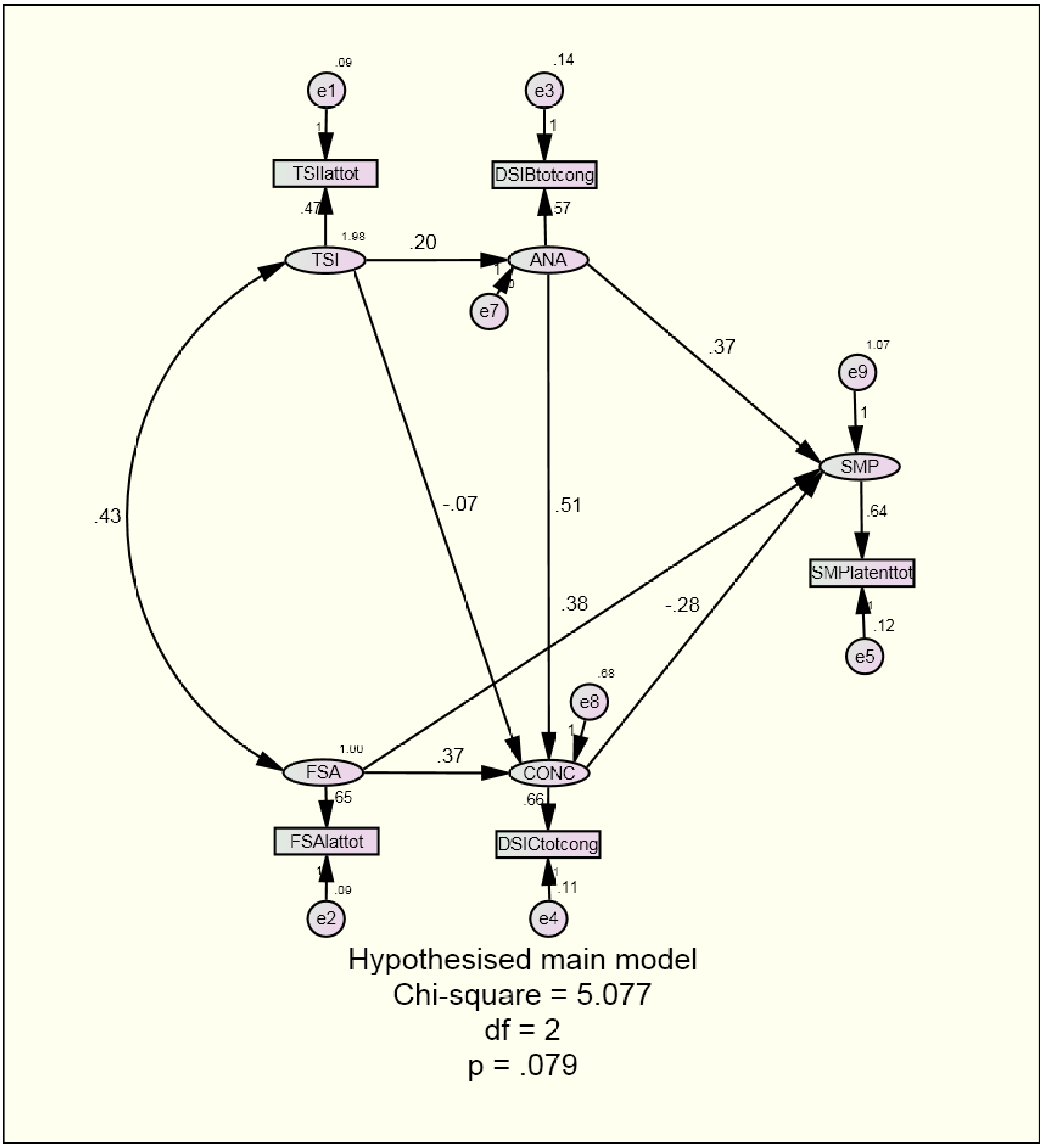
Table 4.16: Model fit indices of main structural model

Model Fit Indices		**Goodness-of-fit**
Chi-square (x^2)	5.077	Good
Degree of freedom (df)	2	Good
p	0.79	Good
Normed chi-square (x^2/df)	2.538	Good
SRMR	.0352	Good
Root Mean-Square of Error of Approximation (RMSEA) RMSEA confidence interval	.074 .000, 0.158	Satisfactory
Goodness-of-fit Index (GFI)	.993	Good
Adjusted Goodness-of-Fit Index (AGFI)	.946	Satisfactory
Tucker-Lewis Index (TLI)	.880	Unsatisfactory
Comparative Fit Index (CFI)	.976	Good

Source: Model fit summary of AMOS 18

The fitness indices of the main structural model indicate that the data fit the model reasonably well ($x^2_{(3)}$=5.077, p=.079). This result was supported by most of the values of the other model fit indices which show that the data fit the model well with the RMSEA (.074) and AGFI (.946) indicating satisfactory fit and the TLI (.880) showing unsatisfactory fit.

Figure 4.9: AMOS output of main structural model



Source: developed for this research.

Having assessed the model, modification of the model was considered (Hair et al. 2006). Any modifications need to be driven by theory rather than only based on the data (Tabachnick & Fidell 2007).

4.6.3 Modifying the structural model

After estimating the full model, the next step includes to consider possible modifications aligned with the theory that may improve the model (Hair et al. 2006; Kline, R. B. 2005; Tabachnick & Fidell 2007). As the study is partly exploratory and no previous models related to the constructs existed, this approach was considered appropriate as there was no alternative theoretical rationale from prior studies supporting a competing model.

In considering which modifications, if any, were appropriate the following was considered: a) examination of AMOS results output (see Appendix K) identification of possible modifications and c) alignment with theory to determine suitability of the modification (Cunningham 2008). The modification indices (MI) suggested by AMOS indicated one possible modification to the model. This modification was inconsistent with the theoretical assumptions underlying the model and as such was rejected.

An examination of the regression weights indicate that all the structural paths are significant except for the regression coefficient representing the influence of TSI on CONC (Conceptual Decision Style) path with p=.212. The standardised regression coefficients confirm the insignificance of this relationship with a value of -.092. As such it was not regarded as a significant reflective indicator of the Conceptual Decision Style latent construct and it was decided to delete the TSI → CONC path in the modified structural model. This was not inconsistent with the theoretical underpinnings of the study.

4.6.4 Estimating the modified structural model

The main structural model was based on the approach that all the constructs and paths should be included in the model as determined by theory and the results of the regression analysis (Section 4.3.3). As an alternative to this model, a modified model was developed that could be tested as an alternative, thus ensuring that the model with the best explanatory power was accepted (Bollen 1989; Hair et al. 2006). The modified model is illustrated in Figure 4.11.

The modified structural model of the study included the modification of deleting the structural path between TSI and CONC as suggested by the main model. This was consistent with the conceptual framework of the study. The modified structural model is illustrated in Figure 4.9. The modified structural model suggested that the association between the TSI (orientation to time) and FSA (Foresight Styles) adequately explained the effect on the intervening variables and dependent variable (SMP). The results of the modified model are shown in Table 4.17 (see Appendix L) and discussed next.

Table 4.17: Model fit indices of modified structural model

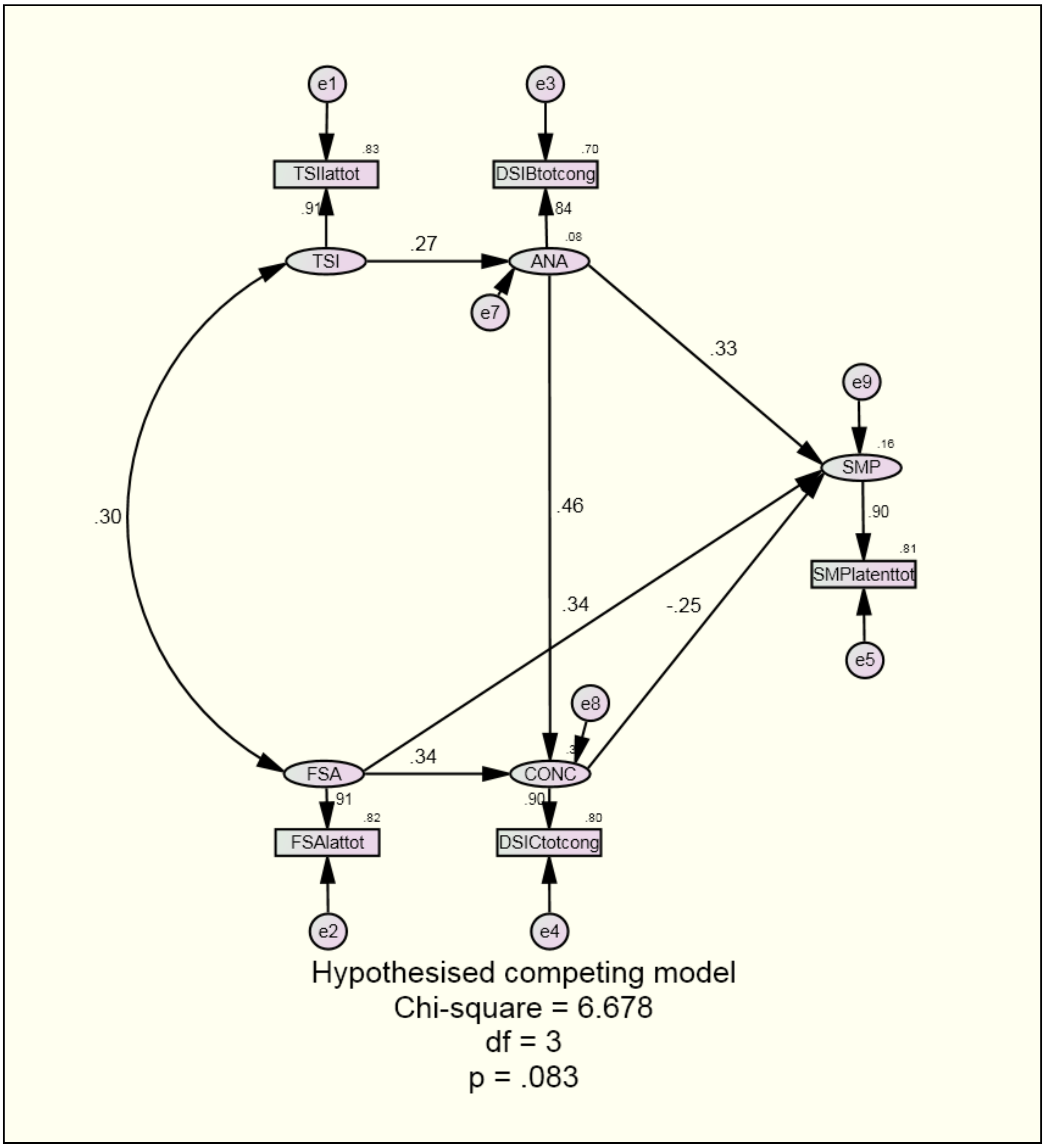
Model Fit Indices		**Goodness-of-fit**
Chi-square (x^2)	6.678	Good
Degree of freedom (df)	3	Good
p	.083	Good
Normed chi-square (x^2/df)	2.226	Good
SRMR	.0404	Good
Root Mean-Square of Error of Approximation (RMSEA)	.066	Satisfactory
Goodness-of-fit Index (GFI)	.991	Good
Adjusted Goodness-of-Fit Index (AGFI)	.953	Good
Tucker-Lewis Index (TLI)	.905	Satisfactory
Comparative Fit Index (CFI)	.971	Good

Source: Model fit summary of AMOS 18

The fitness indices of the modified structural model indicate that the data fit the model well ($x^2_{(3)}$=6.678, p=.083). This result was supported by the values of the other model fit indices which show that the data fit the model well with the RMSEA (.066) and TLI (.905) showing satisfactory fit rather than good fit. The results suggest that the main structural model can be assessed as supporting the hypothesised model.

The modified structural model AMOS output was also examined in terms of the Standardised Residual Covariance (SRC) matrix (Appendix L). The results indicate acceptable standardised residuals with only one above the value of 2 (2.105 for the FSAlattot and DSIBtotcong item pair). Hair et al. (2006, p. 797) indicates that “typically, standardised residuals less than [2.5] do not suggest a problem”. However, Cunningham (2008) indicates that values that exceed 2 may suggest that the model is not accounting for associations in the data. The modification indices suggested that if the analysis was repeated using DSIBtotcong (Directive Decision Style) to predict FSAlattot (Foresight Style) as a free parameter, the discrepancy would have fallen by 4.018. This was regarded as representing an insubstantial drop in the chi-square, would be inconsistent with the theory and lead to model overfit. Following Hair et al.’s guidelines it was deemed that the standardised residual did not suggest a considerable problem and the model was retained as modified.

Figure 4.10: AMOS output of modified structural model



Source: Model output of AMOS 18

4.6.5 Hypothesis testing

Although there are opinions in the literature indicate that the stating of hypotheses (null and alternative) in SEM should be avoided (Chin 1998), this study determined that the stating of alternative hypotheses would not only be an indication of the statistically significant relationships proposed by the model but would guide the reader through the exploratory logic guiding the research. As such, stating whether a statistically significant relationship exists in terms of the paths of the modified model was reported.

Estimating the modified structural model revealed that all of the hypothesised pathways were statistically significant. These results are shown in Table 4.18.

Table 4.18: AMOS estimates of modified structural model

REGRESSION WEIGHTS			STD.	UN-STD	S.E.	C.R.	P	Related Hypoth
ANA (Analytic Decision Style)	<---	TSI (Orientation to time)	.274	.193	.053	3.634	***	H1g
CONC (Conceptual Decision Style)	<---	FSA (Foresight Styles)	.336	.347	.068	5.090	***	H1j
CONC (Conceptual Decision Style)	<---	ANA (Analytic Decision Style)	.459	.477	.076	6.310	***	H1f
SMP (Strategy-Making Process)	<---	ANA (Analytic Decision Style)	.325	.370	.109	3.385	***	H6a
SMP (Strategy-Making Process)	<---	CONC (Conceptual Decision Style)	-.249	-.273	.109	-2.494	.013	H6b
SMP (Strategy-Making Process)	<---	FSA (Foresight Styles)	.335	.379	.091	4.174	***	
			CORRELATION	COVARIANCE				
TSI (Orientation to time)	<--	FSA (Foresight Styles)	.297	.418	.105	4.003	***	H1e

Source: Model estimates of AMOS 18

The following five hypotheses were supported by the model:

H1e: Strategy-level leaders' orientation to time is positively associated with their Foresight Styles.
H1f: Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style.
H1g: Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style.
H1j: Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style.

H9a: Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.

The following hypotheses were not supported by the estimations of the modified structural model:

H1h: Strategy-level leaders' orientation to time is positively associated with their Conceptual Decision Style.
H1i: Strategy-level leaders' Foresight Styles are positively associated with their Analytic Decision Style.
H9b: Strategy-level leaders' Conceptual Decision Style is positively associated with the strategy-making process of the organisation.

H1h and H1i which hypothesised statistically significant associations between Foresight Styles and an Analytic Decision Style, and orientation to time and a Conceptual Decision

Style respectively, were not supported. However the SEM results indicate a very significant relationship between an Analytic Decision Style and the Conceptual Decision Style (*p*=***, C.R.=6.310, *regression weight* = 0.46). The Analytic Decision Style further had a direct effect of 0.47 on the Conceptual Style. Further, the covariance between orientation to time and Foresight styles is significant (*p*=***, C.R.=4.003, .418).

The following section examines the hypothesised moderating effects of education (level and futures) and experience (industry and positional) on the relationship between strategy-level leaders' foresight competence and strategic thinking.

4.6.6 Moderating Variables

Also known in the literature as interaction terms (Cunningham 2008), moderator effect occurs when a second independent variable or moderator variable, changes the form of the relationship between another independent variable and the dependent variable (Hair et al. 2006). The analysis of interaction terms in SEM have been the source of confusion and frustration for users of SEM programmes (Kline, T. J. B. & Dunn 2000). Indeed a number of different approaches have been explored when dealing with interaction terms (Cunningham 2008). These approaches are largely dependent on whether the moderating hypothesis comprises of continuous, categorical or a mixture of both kinds of variables. When a continuous latent variable and categorical variable interact, it is suggested that testing structural paths across multiple groups is appropriate (Cunningham 2008; Hair et al. 2006). However, when only continuous variables are used different methods can be applied but differ in their usability (Cunningham 2008).

The research acknowledged that the demographic characteristics of strategy-level leaders may influence the relationship between foresight competence and strategic thinking (Section 2.8.5). For this reason the testing for moderating effects in the analysis was deemed important. The limited sample size, mixture of continuous / categorical variables and disproportionate distribution of certain items such as the high response rate from highly educated individuals which also had senior positions, made multi-group multi-model analysis impractical and threatened to increase the complexity of the model and lose model parsimony. Alternative approaches (Joreskog & Yang 1996; Kenny & Judd 1984; Kline, T. J. B. & Dunn 2000; Ping 1996) include constrained approaches (estimating parameter estimates, fixing parameter values) and unconstrained approaches (Marsh, Wen & Hau 2004). As noted, a large number of indicator variables relative to the sample size can result in unstable observations (Cunningham 2008). This combined with the advanced nature of the techniques and lack of user friendliness, provided justifiable grounds to test for moderation in terms of multiple regression models.

The relationship of interest in terms of moderating effects was between the independent variables, orientation to time (TSI) and Foresight Styles (FSA) (foresight competence construct), and the intervening variables, Analytic Decision Style (DSIB) and Conceptual Decision Style (DSIC) (strategic thinking). The SEM estimation (Section 4.4) provides support for the regression models used to test whether the interaction term's influence is statistically significant.

There is general agreement that the use of raw values when testing interaction effects may cause collinearity problems and linear dependency in the variables (Aiken & West 1991; Harris 1985). Indeed, it is generally accepted that in order to avoid these identification problems, the conversion of the variables to deviation scores is appropriate (Aiken & West 1991). The centring of the dependent variable is not necessary (Aiken & West 1991). The estimation of the deviation scores, or 'centring' of the original variables, prior to calculating the cross-product of the original variables required for testing interaction effects was adopted by this study. This approach is also acknowledged to be appropriate in SEM testing of interaction effects (Cunningham 2008; Kline, T. J. B. & Dunn 2000). The testing of interaction terms using the multiple regression technique and SPSS data analysis programme are reported in detail (see Appendix M*)*. Table 4.19 summarises the results.

Table 4.19: SPSS multiple regression estimates of hypothesised interaction terms

Variable Description			DSIB ANALYTIC DECISION STYLE					DSIC CONCEPTUAL DECISION STYLE				
Hypothesised moderating variable	**Variable label and description of cross-product interaction terms**		**Sig. F CHANGE**	**R^2 CHANGE**	**Beta In**	**t**	**Partial Correlation**	**Sig. F CHANGE**	**R^2 CHANGE**	**Beta In**	**t**	**Partial Correlation**
Level of Education	TSI / Education Level	TSIEDULEV	.002	.001	.070	1.185	.071	.689	.001	.024	.400	.024
	FSA / Education Level	FSAEDULEV	.320	.003	.060	.995	.060	.875	.000	.009	.157	.009
Exposure to Futures Thinking / Foresight Concepts and Methods	TSI / Futures Education	TSIEDUFUT	.169	.006	-.082	-1.378	-.83	.176	.006	.076	1.356	.081
	FSA / Futures Education	FSAEDUFUT	.551	.001	-.038	-.598	-.36	.045	.011	.115	2.013	.120
Industry Experience	TSI / Industry Experience	TSIINDEXP	.215	.006	.075	1.271	.076	.073	.011	.106	1.797	.108
	FSA / Industry Experience	FSAINDEXP	.040	.015	.122	2.068	.124	.033	.014	.120	2.148	.128
Role Experience	TSI / Role Experience	TSIPOSEXP	.462	.002	-.043	-.737	-.044	.807	.000	.015	.244	.015
	FSA / Role Experience	FSAPOSEXP	.783	.000	.016	.276	.017	.604	.001	.029	.519	.031
Position	TSI / Position	TSIPOS	.061	.012	-.111	-1.882	-.113	.100	.010	-.100	-1.650	-.099
	FSA / Position	FSAPOS	.835	.000	.012	.209	.835	.437	.002	-.045	-.778	-.047
Age	TSI / Age	TSIAGE	.197	.006	.076	1.292	.078	.035	.006	.078	1.302	.078
	FSA / Age	FSAAGE	.129	.008	.089	1.522	.091	.160	.016	.079	1.408	.084
Nationality	TSI / Nationality	TSINAT	.674	.001	-.025	-.422	-.025	.821	.000	-.013	-.227	-.014
	FSA / Nationality	FSANAT	.131	.008	-.095	-1.513	-.091	.016	.018	-.146	-2.422	-.144

Source: Multiple regression estimates of SPSS 18

The analysis provided support for the following hypotheses:

H2: The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H3: Exposure to futures thinking / foresight concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders.

H4: Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H7: The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H8: There is no significant difference between Australian and South African strategy-level leaders in terms of their foresight competence and strategic thinking.

The analysis did not support the following hypotheses:

H5: Role experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.

H6: The position of strategy-level leaders in the organisation moderates the relationship between their foresight competence and strategic thinking.

The analysis of results was primarily concerned with the R^2 change of the regression model as this describes the change in variation explained attributed to the interaction term (Aiken & West 1991). The analysis also examined whether the F change was significant and to the relative importance of the interaction term illustrated by the Beta coefficient (Hair et al. 2006). The moderating effect as specified in H2. H3, H4, H7 and H8 was found to be statistically significant ($p<.05$) thus supporting the hypotheses (see Table 4.19). None of the interaction terms that were statistically significant explained more than 1.8% change in the total variance between the original variables. There was no statistical support for H5 and H6 which were rejected. The interpretation of these results will be discussed in Chapter 5.

4.6.7 Summary

A summary of conclusions based on the statistical results related to the hypotheses of the study are listed in Table 4.20. *Primary conclusions 1-12 and ancillary conclusions 18-20* all relate to Research Issues 1, 2 and 3 and are discussed in detail in Chapter 5. In the case where hypotheses were rejected or a conclusion could not yet be reached, the table does not indicate a conclusion as these will be dealt with in the discussions pertaining to the relevant research issues.

Table 4.20: Research issues, hypotheses and conclusions.

	Conclusions
RI 1: *Is foresight competence positively associated with the strategic thinking of strategy-level leaders?*	
H1: Foresight competence is positively associated with strategic thinking in strategy-level leaders.	**Conclusion: Partially Supported**
H1a: Strategy-level leaders' orientation to the future is positively associated with the Conceptual Decision Style propensity.	**Conclusion 1:** *Strategy-level leaders' orientation to the future is positively associated with the Conceptual Decision Style propensity.*
H1b: Strategy-level leaders' Framer foresight style is positively associated with the Conceptual Decision Style propensity. (Williams 2006)	**Conclusion 2:** *Strategy-level leaders' Framer foresight style is positively associated with the Conceptual Decision Style propensity.*
H1c: Strategy-level leaders' Adapter foresight style is positively associated with the Analytic Decision Style propensity.	**Not supported**
H1d: Strategy-level leaders' orientation to the past is positively associated with the Analytic Decision Style propensity.	**Not supported. Hypothesis reviewed.**
H1e: Strategy-level leaders' orientation to time is positively associated with their Foresight Styles.	**Conclusion 3:** *Strategy-level leaders' orientation to time is positively associated with their Foresight Styles.*
H1f: Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style	**Conclusion 4:** *Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style*
H1g: Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style.	**Conclusion 5:** *Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style.*
H1h: Strategy-level leaders' orientation to time is positively associated with their Conceptual Decision Style.	**Not supported.**
H1i: Strategy-level leaders' Foresight Styles are positively associated to their Analytic Decision Style.	**Not supported.**
H1j: Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style.	**Conclusion 6:** *Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style.*
RI2: How do the demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking?	
H2: The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking	**Conclusion 7:** *The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking*
H3: Exposure to futures thinking /	**Conclusion 8:** *Exposure to futures thinking / foresight*

foresight concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders.	*concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders.*
H4: Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.	**Conclusion 9:** *Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.*
H5: Role experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.	**Not supported.**
H6: The position of strategy-level leaders in the organisation moderates the relationship between their foresight competence and strategic thinking.	**Not supported.**
H7: The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.	**Conclusion 10:** *The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking.*
H8: There is no significant difference between Australian and South African strategy-level leaders in terms of their foresight competence and strategic thinking.	**Not supported.**
RI 3: Is the strategic thinking of a strategy-level leader positively associated with the organisation's strategy-making mode?	
H9: Strategy-level leaders' strategic thinking is associated with the strategy-making process of the organisation.	**Partially supported.**
H9a: Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.	**Conclusion 11:** *Strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.*
H9b: Strategy-level leaders' Conceptual Decision Style is positively associated with the strategy-making process of the organisation.	**Partially supported.**

Source: Developed for this research

Ancillary conclusions. The analysis of data provided additional insights into statistically significant relationships that were not hypothesised by the study but have emerged as related to the study. These are summarised in Table 4.21.

Table 4.21: Ancillary conclusions arising out of the analysis

OBSERVATION	STATISTIC
Conclusion 13: Strategy-level leaders' orientation to the future is negatively associated with a Directive Decision Style	*p*=0.004, Beta= -.223, t= -2.931, correlation= -.324
Conclusion 14: Strategy-level leaders' orientation to the present is negatively associated with a Behavioural Decision Style	*p*=0.004, Beta= -.170, t= -2.898, correlation= -.138
Conclusion 15: Strategy-level leaders' Reactor Foresight Style is positively associated with a Directive Decision Style	*p*=0.004, Beta= .175, t= 2.895, correlation= .257
Conclusion 16: Strategy-level leaders' Reactor Foresight Style is negatively associated with an Analytic decision Style	*p*=0.034, Beta= -.131, t= -2.126, correlation= -.125
Conclusion 17: Strategy-level leaders' Framer Foresight Style is negatively associated with a Behavioural decision Style	*p*=0.003, Beta= -.294, t= -2.974, correlation= -.281
Conclusion 18: Strategy-level leaders' Foresight Styles are positively associated with the Strategy-Making Processes of the organisation	*p*=***, C.R.= 4.174, STD regression = .335

Source: Developed for this research

Conclusions 13 – 17 are regarded as ancillary to the research issues and provide contextual insights as to the main research problem. *Conclusion 18* is relevant to and discussed within the context of *Research Issue 3*. These will be discussed in Chapter 5.

4.7 Conclusion

This chapter described the data analysis undertaken in this research study. The process included data preparation, data cleaning and screening, generating descriptive statistics, frequency analysis, SEM measurement model evaluation, SEM structural model evaluation and the testing of hypotheses. The latter two stages included multiple regression analysis of statistical significance of lower order factorial constructs and in the testing of moderating variables influencing the relationship between foresight competence and strategic thinking of strategy-level leaders.

The data preparation stage ensured that the assumptions of SEM and multiple regression would be met. This included the identification of missing data, outliers and non-normality in the distribution. Where applicable data transformations were performed and cases deleted as appropriate. Descriptive statistics of the data were assessed.

Next, the frequencies related to the demographic characteristics of the respondents was produced and analysed. This was critical in determining the representativeness of the sample.

Structural Equation Modelling (SEM) using the maximum likelihood (MI) method of extraction was then used to test the hypothesised model in accordance with the conceptual framework developed in Chapter two. This included evaluating the measurement model by adopting Mulaik and Millsap's (2000) approach to first conducting exploratory factor analysis (EFA) and then confirmatory factor analysis (CFA). The development of one-factor congeneric models and specifying single indicator latent variables was also included in this stage. In order to determine the significance of the relationship between the lower order factorial structures of the independent variables and the intervening variables, multiple regression analysis was used in order to limit the potential complexity of the structural model. This was decided primarily based on the effect of model complexity in determining appropriate model fit as related to available sample size. This approach also established statistical support for the hypothesised paths underlying the study's main constructs. The results of this analysis indicated that the lower and higher order constructs of the study were statistically supported by the measures and data.

Lastly, the structural model was evaluated. This included evaluating the hypothesised model. No competing model was evaluated as no prior theoretical models related to the interaction of the constructs were evident. A Model Development Strategy was adopted (Hair et al. 2006). One modification as aligned with theory was made. The resulting model indicated that the data fit the model well and reproduced the conceptual framework adequately. Finally the research hypotheses were confirmed or disconfirmed according to the results of the SEM and multiple regression analysis of interaction terms. The interpretation and implications of these results are discussed in the next chapter.

Chapter 5

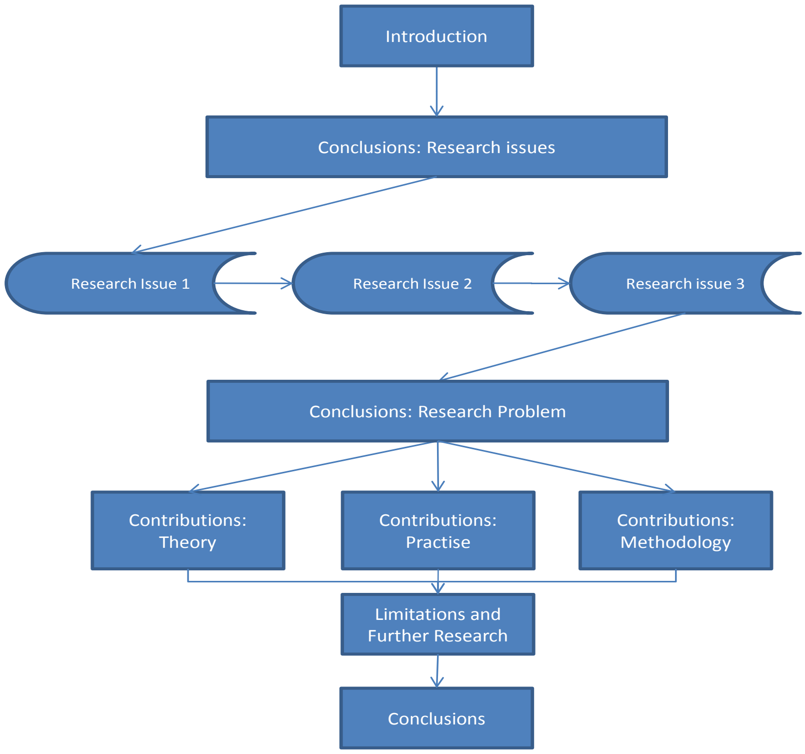
Conclusions

5.1 Introduction

This study was designed to investigate the research question: *How and to what extent are foresight competence and the strategic thinking of strategy-level leaders associated within the context of organisational strategy-making?* This chapter reports on the findings that have emerged in response to the question primarily as the result of a quantitative investigation into the relationship between the study's constructs.

This chapter presents the conclusions reached in relation to each of the research issues presented in the thesis. This chapter interprets the results presented in chapter four in terms of the relevant literature in order to consider their alignment and contrasts to existing theory. It further highlights where this research expands existing theory. It culminates in summarising where the study has contributed to the body of knowledge in terms of theory, practise and methodology, while outlining the limitations of the research and propositions for future research. An outline of chapter 5 is illustrated in figure 5.1.

Figure 5.1: Outline of Chapter 6



Source: developed for this research.

5.2 Research Issues and research problem

Effective strategic thinking is seen as source of sustainable competitive advantage and is critical to organisational longevity (de Geus 1997; Hamel & Prahalad 1994; Malan 2010). It was further noted that foresight is regarded as a critical competence of effective strategic leadership (Cuhls 2003; Hamel & Prahalad 1994; Major, Asch & Cordey-Hayes 2005). This thesis describes how the concepts of foresight competence and strategic thinking are differentiated, associated and a critical antecedent to effective organisational strategy. It also investigated the influence of leaders' demographic proxies related to this model of strategy-making by strategy-level leaders in determining their predictive power as suggested by the Strategic Leadership Theory (Finkelstein & Hambrick 1996; Hambrick 2007).

Based on a review of the literature the theoretical foundations and a conceptual framework of this study was established and developed respectively. Three research issues were derived in order to explore the research problem. This section outlines the results of the analysis as related to the research issues and extant literature reviewed in Chapter 2.

The objectives of the study (Section 1.5) were to i) examine the relationships between the measures of orientation to time and foresight styles and the hypothesised foresight competence construct as based on existing literature, ii) examine the relationships between decision styles and the hypothesised strategic thinking construct, iii) investigate the link between the foresight competence and strategic thinking constructs, and the influence that interaction terms may have on the hypothesised relationship, and iv) investigate how strategic thinking in strategy-level leaders is related to the strategy making process of organisations. Based on the extant literature these objectives could be met by investigating the three research issues.

5.2.1 Research Issue 1: the association between foresight competence and strategic thinking in strategy-level leaders.

The first research issue considers whether the concepts of foresight competence and strategic thinking are a) distinct and b) associated. The study hypothesised that the concepts were positively associated within the context of organisational strategy. In order to test this hypothesis, the study developed sub-hypotheses that proposed that associations existed at a lower order factorial level of the constructs and at the higher order level of the constructs themselves.

The literature review was unable to identify prior empirical studies where the concepts of foresight competence and strategic thinking are treated as distinct from each other and related. This, despite foresight (Major, Asch & Cordey-Hayes 2005) and strategic thinking (Bonn 2001) being identified as a core competencies in leaders and organisations. Voros' (2003) assertion that foresight is an element of strategic thinking supports the notion of foresight as a product of foresight competence, indeed compliments strategic thinking and is a distinctive contributing part thereof (see Figure 15). The conceptual framework proposed that foresight as a competence of strategy-level leaders preceded the task of strategic thinking in the formation of strategy with strategic thinking preceding strategic planning (Tavakoli & Lawton 2005). *Theoretical support* justified the alignment of the elements of each of the constructs with the respective measures adopted by the study (Section 2.8.3).

As strategy is only meaningful with reference to the future (Tsoukas & Shepherd 2004b) and is a future orientated process (Costanzo & MacKay 2009), the elements of foresight competence and strategic thinking related to the future provided sufficient basis to link the constructs to organisational strategy making.

Foresight is regarded as a cognitive competence (Cunha, M. P., Palma & da Costa 2006; Seidl & van Aaken 2009; Tsoukas & Shepherd 2004b) and this study investigated the four Foresight Styles which explain the how foresight cognitions differ from individual to individual within the context of their internal disposition used to understand the future. Foresight competence was defined as a *human ability to creatively envision possible futures, understand the complexity and ambiguity of systems and provide input for the taking of provident care in detecting and avoiding hazards while envisioning desired futures* (Section 2.5.4). In terms of the foresight competence construct, the orientation to the future and the Framer Foresight Style were regarded as critical lower order factorial measures of the construct as determined by the definition of foresight competence. Since the measurement scales adopted by the study also measured back-up orientations, it was hypothesised that an orientation to the past and an Adapter Foresight Style further described the elements of foresight competence as it is acknowledged that competent foresight strategy-level leaders are able to switch between their dominant and back-up styles as the situation demands (Dian 2009; Gary 2008). These four factors were hypothesised to be positively associated which in turn would indicate a valid measure of foresight competence.

Based on a review of extant literature strategic thinking was defined by the study as *a synthesis of systematic analysis (rational) and creative (generative) thought processes that seek to determine the longer-term direction of the organisation* (Section 2.6.3). The elements of strategic thinking were theoretically aligned with a strategy-level leader’s decision styles (Tavakoli & Lawton 2005). In particular, the literature agrees that strategic thinking is both analytical and creative in terms of strategy-level leader cognitions (Raimond 1996). In particular, the definitions of strategic thinking are theoretically aligned to the Analytic and Conceptual Decision Styles (Rowe & Mason 1987a) which represented the rational and generative thought processes required for strategic thinking (Heracleous 1998; Mintzberg 1995; O' Shannassy 2005).

At the lower order factorial level, the hypotheses proposed that a dominant orientation to the future and backup orientation to the past as associated with a dominant Framer and back-up Adapter Foresight Style (foresight competence) would be positively associated with the Analytic and Conceptual Decision Styles (strategic thinking).

At the higher order factorial level, it was hypothesised that the strategy-level leaders' orientation to time would be positively related to Foresight Styles and that these would be positively associated with the Analytic and Conceptual Decision Styles as represented by one-factor congeneric models.

Results. The results of the analysis supported six of the ten hypotheses developed, in order to answer Research Issue 1. These results were all highly significant thus reducing the chance of accepting differences as significant when they are not significant (Hair et al. 2006). However, it should be noted that by selecting a more rigorous level of significance, the statistical power decreases, which by "being more selective in what is considered a statistical difference also increases the difficulty in finding a significant difference" (Hair et al. 2006, p. 415). As this aspect of the study was largely exploratory it was decided to retain a high level of significance yet anticipate that further insights could be provided by the results.

Conclusion 1: Strategy-level leaders' orientation to the future is positively associated with the Conceptual Decision Style propensity. The hypothesis underlying this conclusion was one of two primary premises linking foresight competence and strategic thinking. This conclusion suggests that strategy-level leaders that exhibit an orientation to the future are likely to exercise a Conceptual Decision Style. As such, future orientated thinkers will have an acute sense of multiple ways in which the future can develop and be able to creatively solve problems in terms of their creative and 'big picture' thinking (Fortunato & Furey 2009). These strategy-level leaders are more likely to assume a Conceptual Decision Style in which they are more likely to exercise judgement based on values and beliefs, initiate new ideas, show independence and creativity while also being humanistic and long-term orientated in their thinking (Martinsons & Davison 2007; Rowe & Boulgarides 1994; Williams 2006). These latter characteristics are associated with the elements of strategic thinking (Liedtka 1998) and as such the conclusion supports the study's assertion that the elements of foresight competence related to an orientation toward the future are associated with the elements of strategic thinking measured in terms of the Conceptual Decision Style.

Conclusion 2: Strategy-level leaders' Framer foresight style is positively associated with the Conceptual Decision Style propensity. The hypothesis underlying this conclusion, *Strategy-level leaders' Framer foresight style is positively associated with the Conceptual Decision Style propensity*, together with the premise underlying Conclusion 1, *an orientation to the future* were regarded as the primary indicators linking the elements of foresight competence to that of strategic thinking. Conclusion 2 suggests that strategy-level leaders that exhibit a Framer Foresight Style are likely to exercise a Conceptual Decision Style. As such, those who are future-time orientated, willingly engage the future in terms of bigger picture thinking and are interested in issues that may define how the future develops (Das 2004; Gary 2008; Thoms 2004) are likely to assume a decision style in which they are more likely to exercise judgement based on values and beliefs, initiate new ideas, show independence and creativity while also being humanistic and long-term orientated in their thinking (Rowe & Boulgarides 1994; Williams 2006). Again, these characteristics are reflected in the definitions of foresight competence and strategic thinking respectively (See Sections 2.4.4 and 2.6.3) and support the premise that the two constructs are related.

Conclusion 3: Strategy-level leaders' orientation to time is positively associated with their Foresight Styles. In terms of the structural equation modelling performed in terms of the higher order factor structures it was determined that strategy level leaders' orientation to time is positively associated with their Foresight Styles. The conceptualisation of foresight competence (Section 2.5.4) includes having a future-time orientation (Fortunato & Furey 2010) and being able to envision possible futures based on an understanding of the past (Gary 2008; Thoms 2004). In addition, the cognitive abilities to understand the complexity and ambiguity of systems while providing an input into taking provident care and envisioning desired futures requires that these dimensions are associated (Slaughter, Richard A. 1999). The significant positive association between the TimeStyles and Foresight Styles measures supports the assertion that these dimensions together, constitute foresight competence.

Conclusion 4: Strategy level leaders Analytic Decision Style is positively associated with their Conceptual Decision Style. In terms of the structural equation modelling performed of the higher order factor structures it was determined that strategy level leaders' Analytic Decision Style is positively associated with their Conceptual Decision Style. Rowe and Boulgarides (1994) indicate that the decision styles relied upon by decision makers vary in terms of their most preferred and back-up styles in accordance with the situations they confront. This is confirmed by Williams (Williams 2006). The conceptualisation of strategic thinking (Section 2.6.3) suggests that strategy-level leaders are required to integrate both analytical and creative cognitive processes in terms of determining the longer-term direction of their organisations (Allio 2006; Markides 2000). In terms of the DSI (Rowe & Boulgarides 1994) the Analytic Decision Style is primarily based on using careful analysis and reasoning while the Conceptual Decision Style is primarily based on creative and generative thought processes. The styles are therefore aligned in terms of strategic thinking and the significant positive relationship between these measures supports the assertion that these dimensions together, constitute strategic thinking.

Four hypotheses were not supported. Of these H1d hypothesised that an individual's back-up orientation to the past would be positively associated with Analytic Decision Style. This was based on the theory that foresight is not only typified by a dominant orientation to the future but requires an understanding of the past (Das 2004; Gary 2008; Seidl & van Aaken 2009). The analysis did not support this hypothesis indicating no significance in the relationship and as such the hypothesis was rejected. This was primarily due to the Theory of MindTime's (Fortunato & Furey 2010) determination that an orientation to the present, captures an understanding of the past.

Conclusion 5: Strategy-level leaders' orientation to time is positively associated with their Analytic Decision Style. In terms of the modified structural equation model, strategy-level leaders' orientation to time is positively associated with the Analytic Decision Style. This association is primarily explained in term of the significant positive association between an orientation to the present being typified by organised thinking based on current observations that integrate past and future (Fortunato & Furey 2009) and the strategy level leaders' propensity to tolerate ambiguity, seek out challenges and primarily rely on rational thought and careful analysis. The latter being an essential part of strategic thinking (Allio 2006; Mintzberg 1987).

Despite the rejection of H1d, it is suggested that an orientation to the present, described by the Theory of MindTime (Fortunato & Furey 2009, p. 242) as "dominantly orientated toward 'getting things done'… [by] Develop[ing] actions and allocate[ing] resources according to integration of past and future" sufficiently captures the dimension of foresight competence to understand the past in order to engage the future. Given that the sample is primarily composed of senior executives and managers the majority of whom are influential in their organisation's strategy and have had exposure to formal foresight or futures thinking education this observation was acceptable. As such it was determined that the rejection of H1d did not represent a material departure from the hypothesised constructs and that within the MindTime theoretical paradigm a conclusion that *strategy level leaders' orientation to the present is positively associated with an Analytic Decision Style propensity* was acceptable.

Conclusion 6: Strategy-level leaders' Foresight Styles are positively associated with their Conceptual Decision Style. In terms of the modified structural equation model, strategy-level leaders' Foresight Styles and their propensity to be creative, long-term orientated, able to generate multiple alternatives and rely on judgement in terms of their Conceptual Decision Style (Rowe & Boulgarides 1994), are positively related.

There was no statistically significant support for H1c that *Strategy-level leaders' Adapter foresight style is positively associated with the Analytic Decision Style propensity*. The lack of significance could possibly be explained by the dominant Framer Foresight orientation in the sample and the reduced statistical power (Hair et al. 2006) resulting from determining a higher significance level. It should however be noted that there were statistical indications of a potentially significant relationship between the Adapter Foresight Style and the Analytic Decision Style. Future research could examine this relationship further so as to satisfy the apriori hypotheses of the construct as suggested by this study.

General conclusion. Although H1h, *Strategy-level leaders' orientation to time is positively associated with their Conceptual Decision Style* and H1i, *Strategy-level leaders' Foresight Styles are positively associated to their Analytic Decision Style* were rejected, the highly significant relationships between the orientation to time and Foresight Styles, and between the Analytic and Conceptual Decision Styles indicate that the constructs of foresight competence and strategic thinking are supported. These positive relationships confirm the proposition that Foresight Competence is distinct from, antecedent to, and related to strategic thinking.

The highly significant results and explanations provided in the discussion lend qualified support for the hypothesis (H1) that *"Foresight competence is positively associated with strategic thinking in strategy-level leaders"*. This provides a framework for addressing Research Issue 2.

5.2.2 Research Issue 2: The demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking.

Having established that the construct of foresight competence is positively associated with the construct of strategic thinking, the interpretation of results now addresses the question as to how the demographic characteristics of strategy-level leaders moderate this relationship. Based primarily on the Strategic Leadership theory, and more specifically its methodology (Finkelstein & Hambrick 1996), the study hypothesised that the demographic characteristics of strategy-level leaders will influence the relationship between foresight competence and strategic thinking in terms of their effect on the strategic decisions of the leaders. Strategic Leadership theory posits that an organisation will be a reflection of the values and cognitions of its most influential leaders (Carpenter, Geletkanycz & Sanders 2004; Finkelstein & Hambrick 1996). As a methodology it posits that the demographic proxies of leaders serve as valid representations of the underlying cognitions and behaviour of leaders (Hambrick 2007; Storey 2005).

The study investigated the moderating effects of the respondents' age, education, exposure to formal futures education, industry experience, position experience, position and country of origin (Australia and South Africa) on the association between foresight competence and strategic thinking. It was hypothesised that each of these characteristics would moderate the relationship.

Results. The results of the analysis supported five of the seven hypotheses (Section 4.6.6). Based on these results the following conclusions are drawn.

Conclusion 7: The level of education of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking. The level of education was found to have a moderating effect. This aspect has been of interest to Boyatsis (2008) in particular, with studies related to the development of competencies over a period of twenty years. It should be noted that a large majority of the sample had Bachelor Degrees or Post-Graduate degrees and as such the effect of level of education on the relationship between foresight competence and strategic thinking is primarily informed by the pedagogies associated with these qualifications. It was found that effect of level of education was significant in regard to the Analytic Decision Style but that the additional explanation of variance was low. The significance of the effect may be assumed to be attributed to the skill development required for completing such graduate education in terms of planning, analytical thinking and the largely rational basis of understanding the theoretical paradigms. This finding confirms previous findings that graduate programmes among mature age students do develop their cognitive intelligence (Boyatzis, Richard E., Stubbs & Taylor 2002).

Of interest is the very low partial correlation between the level of education and the conceptual cognitive abilities of the respondents which seems to indicate that although cognitive development has been found to be significant, it has been in terms of more analytical, task orientated and rational thinking skills rather than the more creative, future-orientated and humanistic cognitive processes. The latter cognitive processes can be regarded as indicators of emotional and social intelligences. Burke (2001) illustrates this phenomena as associated with a typical Western worldview of discounting alternatives for the future and concentrating on the ‘here and now’. He adds that traditional approaches to education re-enforces this paradigm rather than develop emotional and social intelligences in tandem. These are recognised as critical in a rapidly changing worldview of what should constitute effective leadership (Boyatzis, R E 2008; Burke 2001, 2004). This seems to confirm the implication that *traditional pedagogies related to higher education in this sample, with a vast majority of highly educated respondents, show an insignificant effect on the individual’s conceptual thinking ability.* This is a fundamental observation; the results seem to illustrate the dichotomy between formal educational interventions that develop more rational, intelligence quotient (IQ) orientated cognitive abilities and those that seek to include the development of social and emotional intelligence competencies (Boyatzis, Richard E., Stubbs & Taylor 2002).

Conclusion 8: Exposure to futures thinking / foresight concepts and methodology will moderate the relationship between foresight competence and strategic thinking in strategy-level leaders. Related to the moderating effect of education level is the study’s assertion that *exposure to futures / foresight concepts and methodology* would moderate the relationship between foresight competence and strategic thinking. This hypothesis was supported with the significance of the effect attributed to the Conceptual Decision Style. The moderating effect is therefore most significant in relation to the effect on the decision-styles of the strategy-level leader. This implies that exposure to futures / foresight discourse can be regarded as significantly associated with leaders who exhibit creative, future-orientated, highly complex, ambiguous and humanistic conceptual cognitive ability (Amabile 1998; Rowe & Boulgarides 1994; Williams 2006). As the large majority of the respondents have been exposed to formal education of futures / foresight concepts and methods, mostly at an advanced post-graduate degree level, this conclusion supports the premise that the formal education of futures / foresight education assists in the development of leaders' social and cognitive intelligences. Further, that such education develops strategy-level leaders foresight competence (Alsan 2008; Hayward 2005).

Conclusion 9: Industry experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking. The *industry experience* of strategy-level leaders was found to have a moderating effect. Out of all the hypothesised interaction terms, industry experience was found to significantly influence both the *Analytic and Conceptual Decision Styles*. The implication of this finding, especially to those interested in developing a cross section of the analytic and creative aspects of strategic thinking , is that industry experience is significantly associated with both. This empirically lends support to Goldman's (2007) conclusion that 'general work experience' exceeding 10 years, especially in terms of 'significant projects', contributes to the development of the participant's strategic thinking.

Role experience however, was not found to significantly influence the relationship between foresight competence and strategic thinking. This may be explained in reference to Goldman's (2007) benchmark of experiences in excess of 10 years being required to significantly develop strategic thinking. A large majority of the respondents had position experience of less than 10 years (50% having less than 5 years) and seems to indicate that the full developmental benefits of this experience is yet to be realised in this sample.

Position. Similarly, the *position* of the respondents was not found to significantly influence the relationship between foresight competence and strategic thinking. This may be due to the homogeneity of the sample in terms of position with a large majority indicating that they are at CEO / Director / Senior Manager level. The rejection of the hypotheses however, suggests that once in a strategy-level leadership position, it is the practise of an individual's foresight competence and strategic thinking abilities that is attributed to the position rather than the developmental aspects thereof. This may seem contrary to the findings of Goldman (2007) who concluded that the attainment of a senior position does develop the strategic thinking of individuals. It is suggested that the experiential aspects of the challenges and tasks faced by the strategy-level leaders in their position, is positively associated with their strategic thinking rather than the position itself. Stated differently, it is suggested that the experience associated with the position rather than the position itself influences the relationship between their foresight competence and strategic thinking. Although the related hypothesis too, was not found to be significantly associated, the likely reason is that the experience generally fell below 10 years as suggested by Goldman (2007).

Conclusion 10: The age of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking. It was found that the *age* of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking. It was found that effect of age was significant in regard to the Conceptual Decision Style although this effect can be regarded as small. From this conclusion it is confirmed that that as adults' age increases, they are more likely to rely on their values and beliefs rather than purely rational thought processes (Rowe & Boulgarides 1994). This is not surprising as it has been well-established that age mediates the cognitive development of adults (Warner Schaie 1996).

Nationality. Based on the discussion in Sections 2.8.5 and 3.9, the study hypothesised that there would be no significant difference between the Australian and South African strategy-level leaders' foresight competence and strategic thinking and that the said *nationalities* would not significantly influence the relationship between the constructs of interest. This was primarily based on previous studies (Abratt, Nel & Higgs 1992). However, this hypothesis was not supported as the results indicated that *nationality* was found to moderate the relationship between foresight competence and strategic thinking. The influence was specifically attributed to the Conceptual Decision Style as associated with the Foresight Styles. This is attributed to the high number of South African respondents indicating that they have had an exposure to futures / foresight concepts and methodologies at a post-graduate level. The majority of South African respondents were either graduates of, currently enrolled in the masters degree of or affiliated as members to the Institute of Futures Research at the University of Stellenbosch Business School. It was concluded, based on this observation that the groups remain largely homogenous and is supported by the conclusion that exposure to futures / foresight concepts and methodology does moderate the relationship between foresight competence and strategic thinking rather than ascribing the effect of nationality to cultural or operational differences between the strategy-level leaders in each of the countries.

Other than the large difference between the respondent's exposure to futures / foresight concepts and methodologies, no other demographic information differed to the same extent. As such, other than the difference attributed to tertiary level foresight education, the respondents were a homogenous sample who illustrates similar characteristics and views related to the practise of strategy in their organisations. Further research is required to confirm this conclusion.

Conclusion. Although H5, *Role experience of strategy-level leaders moderates the relationship between their foresight competence and strategic thinking* and H6, *The position of strategy-level leaders in the organisation moderates the relationship between their foresight competence and strategic thinking* were rejected, the discussion of the related results in the context of prior studies suggested possible reasons as to why the hypotheses were not supported. The qualified support for H8 is attributed to demographic differences between the respondents in terms of their exposure to educational interventions rather than cultural or operational differences attributed to the respondents' nationalities. All other hypotheses related to the moderating effect of demographic interaction terms were supported. As such the results and explanations provided in the discussion of results lend support for the conclusion that *certain demographic characteristics of strategy-level leaders influence the relationship between their foresight competence and strategic thinking* to the extent as noted in Section 4.4.6 and in discussed in this section. The analysis of results for Research Issue 2 provides a basis for addressing Research Issue 3.

5.2.3 Research Issue 3: The relationship between the strategy-level leader's strategic thinking and the strategy-making process of the organisation.

Having established that the constructs of foresight competence and strategic thinking are positively associated the study now considers whether there is a significant positive association with the strategy-making processes (SMP) within the organisation. The hypotheses arose out of the theoretical consideration that strategy-level leaders have a moderate to high influence on organisational strategy (Carpenter, Geletkanycz & Sanders 2004; Storey 2005) and as such can be hypothesised to influence strategy (Section 2.3.4). This assumption is supported by the literature related to the institutionalised power of dominant coalitions (Cyert & March 1963) and the concept of top management teams (Carpenter, Geletkanycz & Sanders 2004) within the context of Strategic Leadership Theory (Finkelstein & Hambrick 1996).

Results. The results of the analysis support the hypothesis (H9a) that *strategy-level leaders' Analytic Decision Style is positively associated with the strategy-making process of the organisation.* The results rejected the hypothesis (H9b) that *strategy-level leaders' Conceptual Decision Style is positively associated with the strategy-making process of the organisation.*

The results of the SEM indicate that H9b is not supported as the hypothesised relationship is not positive but rather indicates a significant negative association between the Conceptual Decision Style and the strategy-making process of the organisation.

In essence, the strategic thinking construct of the study was operationalised so as to reflect the analytical and creative aspects of strategic thinking (O' Shannassy 2005) and thus be aligned with the definition of strategic thinking adopted by this study (Section 2.7.4). The Analytic Decision Style reflects those elements of strategic thinking that are rational, transactive and primarily intended strategy, while the Conceptual Decision Style reflects those elements of strategic thinking that are creative, innovative, time-orientated, ambiguous and yielding greater levels of emergent strategy (Rowe & Boulgarides 1994). Based on the assumption that strategy-level leaders will influence organisational strategy (Carpenter, Geletkanycz & Sanders 2004; Finkelstein & Hambrick 1996; Storey 2005), it was deemed that as the dimensions of strategic thinking increase it would be positively associated with *both* intended and emergent strategy processes (Markides 2000; Mintzberg et al. 2003).

Three aspects of the results need to be considered: i) the Analytic Decision Style is positively associated with Conceptual Decision Style. This indicates that the Conceptual Decision Style is influenced significantly by the considerable use of data, control, rational analysis, problem solving and task orientation of the Analytic Decision Style (Rowe &

Boulgarides 1994), ii) the strategy making processes of the organisations represented by the sample are deliberate rather than emergent primarily reflecting a rational and symbolic mode of making strategy (White 1998). They are also positively associated with the Analytic Decision Style suggesting that the strategy-making processes of the organisation reflects the considerable use of data, control, rational analysis, problem solving and task orientation of the Analytic Decision Style (Rowe & Boulgarides 1994) and, iii) the Conceptual Decision Style is negatively associated with the strategy-making processes of the organisation. This suggests that the strategy processes reported upon by the respondents do not reflect the long-term orientation, creativity, humanistic, use of multiple alternatives and independent thinking of the Conceptual Decision Style (Rowe & Boulgarides 1994) which was by far the most dominant style among the respondents.

The results indicate that the strategy-making processes in the sample are largely independent of individual influence and primarily determined by a deliberate procedural approach dependent on analytical cognitive processes. The exceptions to this may be business owners or entrepreneurs and deserves further research. Rather, it is likely that the collective influence of the members of the dominant coalition (Pearce 1995) operating within the precedent set by previous dominant coalitions in terms of governance and institutionalised power (Cyert & March 1963) largely still determines how strategy is made. Of critical importance to this observation would be that the paradigms of strategy as espoused in the earlier-generation organisations and significantly influenced by the classical approach to strategy as predominantly espoused by business schools (Whittington 2001), according to the results of this study, still prevail.

The disconnect apparent in the structural model derived from the analysis is cause for concern. The results indicate a negative association between how strategy is formulated in organisations, and the use of long-term, creative, people-orientated and independent thinking about alternative futures inherent in the Conceptual Decision Style. The implication of this is that the more institutionalised classical approach to strategy remains the dominant paradigm of making strategy in the organisations and that this seems to indicate that the organisations are not able to exploit the strategic thinking abilities of its strategy-level leaders.

Conclusion. Although H9b was rejected it was found that the hypothesised relationship is still significant albeit negatively. The support for H9a reinforces the notion that the strategic thinking construct remains valid and that the discussion of results still provides insights that satisfactorily answers Research Issue 3.

The significant statistical results and explanations provided in the discussion lend support for the conclusion that *strategic thinking is associated with the strategy-making processes of the organisation. The extent to which this association is positive or negative depends on the institutionalised approach to strategy and the level of influence of the strategy-level leader in the dominant coalition.*

It was concluded from the discussion that the results indicate a concern that the strategic thinking abilities of an organisation associated with creativity, long-term orientation, orientation to people, the use of multiple alternatives and independent thinking of its strategy-level leaders (Liedtka 1998), may be suppressed by the organisations in the sample rather than developed into a core-competency. Goldman (2005) was noted to support the assertion that strategic thinking is fundamentally one of conceptual style and resides at the level of the individual. It is thus asserted that while the Analytic Decision Style reflects the analytical aspects of strategic thinking in terms of its definition, the dominant orientation to strategy by strategic thinkers would be the more creative Conceptual Decision Style. The disconnect apparent from the analysis, between the Conceptual Decision Style and the organisational strategy-making processes seems to illustrate that strategic thinking is not fully employed in the majority of the sample organisations. This implies a potential loss of competitive advantage and unsustainable organisational leadership due to rational planning processes outweighing the cognitive intelligence and strategic thinking potential of its leadership (Colville & Murphy 2006; Day, G. & Schoemaker 2005; Montgomery 2008).

Indeed, Montgomery (2008, p. 54) concludes that strategy has become not what it could be but rather a predominantly rational and analytical problem to be solved by “legions of MBAs and strategy consultants – armed with frameworks and techniques, eager to help managers analyse their industries”. Strategy has been tapered into a rational plan of positioning at the expense of leadership’s continuous guidance and involvement (Colville & Murphy 2006; Montgomery 2008). The results of the study confirms this notion, in that despite strategy-level leaders’ periodic involvement in the formulation of strategy, it remains at a rational deliberate planning level *rather than* at a dynamic level by developing capabilities based on feedback processes (Grupp & Linstone 1999). The latter perspective creates value rather than merely trying to maintain competitive positioning (Montgomery 2008). Of greater concern is that the social, emotional and cognitive intelligences of organisations' leaders are seemingly underexploited.

This concern is partly addressed by the significant positive association between the Foresight Styles of the respondents, with the future-orientated Framer Style being predominant, and the strategy-making processes of the organisation. This suggests that although the respondents are limited by the dominant rational processes of strategy in exercising their full strategic thinking abilities (Mintzberg 1995), they still utilise their foresight competence when they engage with strategy albeit not dynamically or in terms of effective strategic thinking.

5.2.4 Ancillary conclusions

Various conclusions emerged from the statistical analysis in Chapter 4 (Table 4.19) that were not hypothesised or directly related to the research issues yet provide meaningful insights to the study and provide support for the operationalisation of the constructs.

Conclusion 13: Strategy-level leaders' orientation to the future is negatively associated with a Directive Decision Style. This conclusion suggests that as strategy-level leaders become more orientated to the future, they become increasingly unlikely to rely on a Directive Decision Style. As such, they are less likely to be driven by intuition only, need power, depend on a regulatory framework / rules and be prone to act quickly (Rowe & Boulgarides 1994). These latter characteristics are also not associated with the elements of strategic thinking (Liedtka 1998) and as such the conclusion supports the study's assertion that the Directive Decision Style does not represent the strategic thinking construct.

Conclusion 14: Strategy-level leaders' orientation to the present is negatively associated with a Behavioural Decision Style. This conclusion suggests that as strategy-level leaders become more orientated to the present, they become increasingly unlikely to rely on a Behavioural Decision Style. As such, they are less likely to rely on their feelings, affiliations, structure and use more data while also being less empathetic (Rowe & Boulgarides 1994). While being more people-orientated is a characteristic of effective leadership (Bennis 2007) it does not suggest that effective leaders depend on their affiliations, feelings or require structure. Rather, a Behavioural Decision Style does rely on these factors and the conclusion therefore lends support to the assertion that it is not associated with strategic thinking as suggested by Liedtka (1998).

Conclusion 15: Strategy-level leaders' Reactor Foresight Style is positively associated with a Directive Decision Style. This conclusion suggests that strategy-level leaders that have a Reactor Foresight Style are more likely to also exhibit a Directive Decision Style. Accordingly, those who preserve their own position, mitigate and are resistant to change (Gary 2008) are more likely to also exhibit a decision style that is driven by intuition only, the need for power, a dependence regulatory frameworks / rules and prone to act quickly (Rowe & Boulgarides 1994). The characteristics exhibited by these foresight and decision styles are not aligned with the elements of foresight competence and strategic thinking. In terms of the results of this study and extant literature (Avolio 2007; Beer & Eisenstat 2000; Boyatzis, R E & Saatcioglu 2008; Burke 2006; Hamel & Prahalad 2005; Yukl 2008) there is empirical support that these styles are less likely to be associated with effective leaders, effective strategy and successful organisations.

Conclusion 16: Strategy-level leaders' Reactor Foresight Style is negatively associated with an Analytic Decision Style. This conclusion suggests that as strategy-level leaders exhibit a greater tendency to have a Reactor Foresight Style, they are less likely to rely on an Analytic Decision Style. As such, those who place a greater emphasis on preserving their own position, mitigate and resist change (Gary 2008) are less likely to apply careful analysis, engage in effective problem solving, use reasoning and need achievement in terms of new challenges (Rowe & Boulgarides 1994).

Conclusion 17: Strategy-level leaders' Framer Foresight Style is negatively associated with a Behavioural decision Style. This conclusion suggests that as strategy-level leaders exhibit a greater tendency to have a Framer Foresight Style, they are less likely to rely on a Behavioural Decision Style. As such, those who are interested in the future, actively engage the future and inclined to envision 'big picture' future alternatives (Gary 2008) are less likely to rely on their feelings, affiliations, prefer meetings, structure and use limited data (Rowe & Boulgarides 1994).

According to **conclusions 1.13 – 1.17** it can be deduced that strategy-level leaders that have a dominant Directive Decision Style are likely to have a more dominant Reactor

Foresight Style and unlikely to have a dominant orientation to the future. A strategy-level leader displaying a dominant Reactor Style is also less likely to have an Analytic Decision Style which in terms of the definition of strategic thinking (Bonn 2001; Goldman 2007; Liedtka 1998; O' Shannassy 2005) suggests that such leaders will not effectively engage in strategic thinking. They will also more likely display a Directive Decision Style and think less about the future.

Strategy-level leaders that exhibit an orientation to the present and the Framer Foresight Style are less likely to adopt a Behavioural Decision Style. This implies that such leaders have a moderately low need for affiliation (DuBrin, Dalglish & Miller 2006) and are not reliant on affiliation as a source of their influence. Rather they are able to influence others by retaining a high personal standing (Yukl 2006) not based on their persuasive techniques or empathy but rather through aspects such their determination, vigour and creativity.

These conclusions relate to the research problem in that they provide a supplementary insight into what strategy-level leaders that display foresight competence and strategic thinking, are not. This is further explored later in the chapter. The conclusions related to the research issues and hypotheses of the study will be examined next.

5.2.5 Revised Conceptual Framework

The purpose of the study was to develop and validate a conceptual model of how the concepts central to the research question are related and provide an epistemological basis for further explanatory, interpretive and critical studies (Section 1.3).

Effective strategic thinking as a source of competitive advantage is critical to organisational longevity (de Geus 1997; Hamel & Prahalad 1994). Understanding foresight as a fundamental antecedent competence of strategic thinking and leadership effectiveness (Cuhls 2003; Hamel & Prahalad 1994) in terms of the dynamic model of strategy (Mintzberg et al. 2003) by establishing empirical evidence of this construct, is suggested to make a key contribution to the theory in this regard.

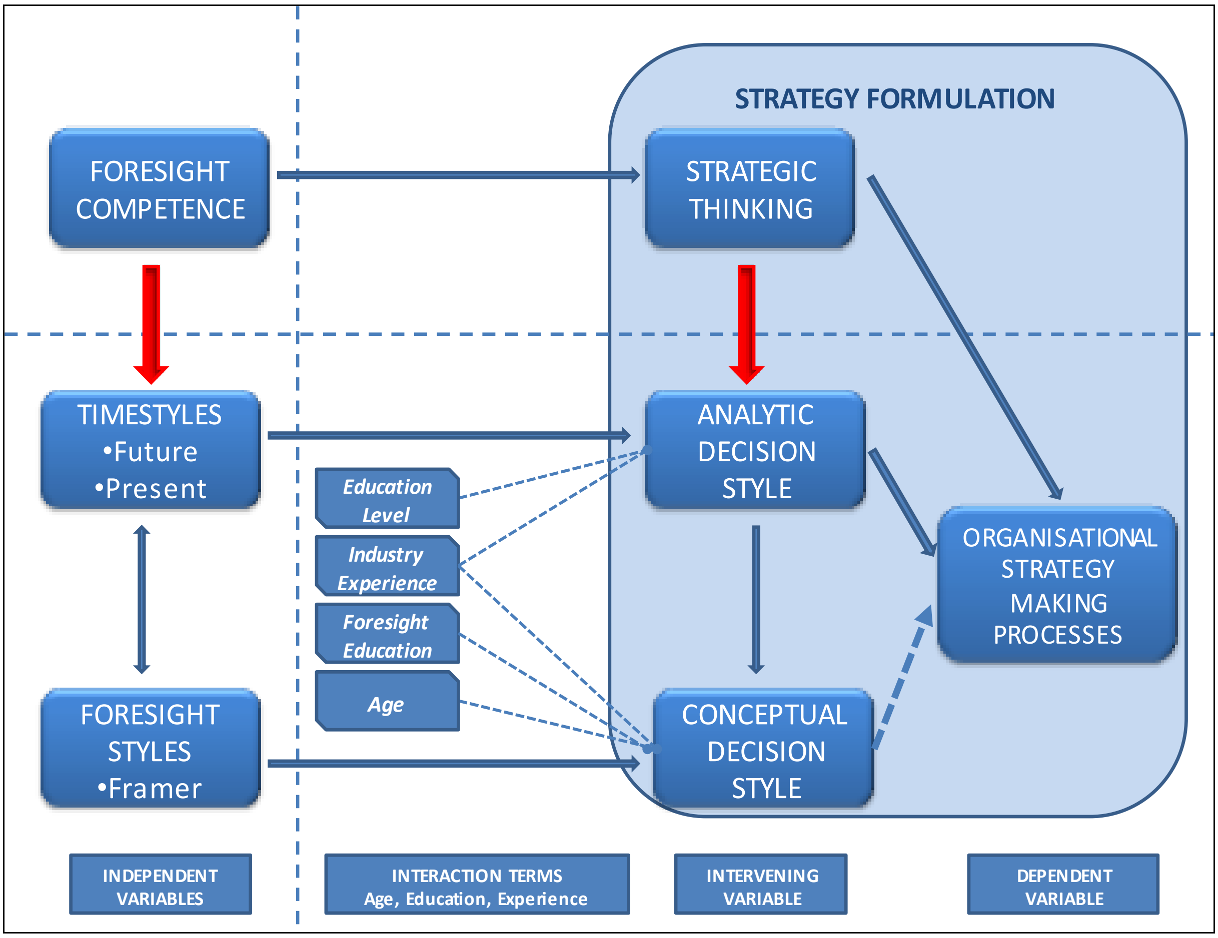
The conceptual framework was developed and presented in Section 2.8 of the dissertation. It was based on the assumption that although overlapping conceptually (Voros 2003), foresight competence and strategic thinking are distinctly different concepts. Further, that strategic thinking is a critical antecedent of strategy-making in organisations (Heracleous 1998; Liedtka 1998; O' Shannassy 2005). A review of the relevant literature was able to provide theoretical support for the constructs and measurements. An analysis of the data was used to test the relationships implied by the framework. The conclusion that *strategy-level leaders' orientation to time is positively associated with their foresight styles* provided support for the construct of foresight competence. Further, the conclusion that *strategy-level leaders' Analytic Decision Style is positively related to their Conceptual Decision Style* provided support for the strategic thinking construct. Conclusions 1 and 2 indicate that *strategy-level leaders' orientation to the future and framer foresight styles are positively related to the conceptual decision style* and are thus related to the generative aspect of strategic thinking (O' Shannassy 2005). This is further supported by conclusions 5 and 6 that *strategy-level leaders orientation to time and foresight styles are positively related to the Analytic and Conceptual Decision Styles respectively* and the rational and generative aspects of strategic thinking.

Conclusion 13, 14 and 17 illustrates that *strategy-level leaders that are present or future orientated and have a dominant Framer Foresight Style are unlikely to exhibit the characteristics of Directive and Behavioural decision Styles.* Conclusions 15 and 16 further illustrate that *strategy-level leaders that have a dominant Reactor Foresight Style are more likely to have a Directive Decision Style and less likely to have an Analytic Decision Style.* Conclusions 13 – 17, although not hypothesised provide support for the revised conceptual framework as they clearly illustrate the associations that are diametrically opposite to the premises of the constructs.

Conclusions 7 – 10 all support the premise that *leader demographic characteristics moderate the relationship between foresight competence and strategic thinking,* specifically in terms of age, education level, exposure to futures / foresight education and industry experience. Subsequent to the discussion in Section 5.1.1.2 it was further concluded that *the characteristics of strategic thinking are significantly related to the strategy-making processes in the organisation.*

Based on the analysis a revised conceptual framework was generated and validated in terms of the SEM technique. The revised conceptual framework is illustrated in Figure 5.2.

Figure 5.2: Revised Conceptual Framework based on analysis of data.



Source: Developed from this research.

The revised conceptual framework was found to be a valid reflection of the statistically significant relationships explored by the study. In terms of Research Issue 1 the conceptual model supports the assertion that foresight competence is distinctive from and positively related to strategic thinking as proposed by the study. It further confirmed that foresight competence is antecedent to strategic thinking. Research Issue 2 investigated and confirmed the proposition that the relationship between foresight competence and strategic thinking is influenced by certain interaction terms (Finkelstein & Hambrick 1996; Hambrick 2007) and assists in predicting certain elements of the strategic thinking of strategy-level leaders. In particular, age and industry experience predicted the analytical aspect of strategic thinking while education level, exposure to futures / foresight concepts and methods and industry experience predicted greater generative aspects of strategic thinking. Research Issue 3 sought to investigate that strategic thinking precedes strategic planning. The results confirmed previous findings in this regard (Heracleous 1998; Mintzberg 1994; O' Shannassy 2005). The results also support the conclusion that foresight competence is significantly associated with the more creative and conceptual cognitive abilities of strategic thinking (Chia 2004).

The research culminates in various implications and contributions to theory, methodology and practise.

5.3 Implications and Contributions

The contributions driving this study was to primarily contribute to the conceptual, methodological and academic discourse of futures perspectives as related to the practise of strategy as suggested by Sardar (2010). The study further contributes to the academic discourse, methodology and practise in the fields of leadership and psychology. As modes of work have increasingly become more knowledge orientated, the understanding of how knowledge is connected with action is regarded as an important research focal area (Sandberg & Pinnington 2009) and as such the study contributes to filling the gap in the literature in this regard.

It was noted that despite being referred to extensively in the literature, there is a dearth of empirical studies related to the concepts of foresight (Gary 2009) and strategic thinking (Bonn 2001). The concepts of foresight and strategic thinking are under-researched and have not, to the knowledge of the researcher, been differentiated and investigated in terms of their inter-relationship and contribution to the strategy-making processes. It is proposed that research in this regard would provide valuable insights into the 'black box' of strategy-making (Finkelstein & Hambrick 1996). Calls for further research related to the impact of leaders' characteristics on the content of strategy (Hambrick 2007), the investigation of the relationship between leaders' orientation to time and their strategic decision making (Das 2004), and the investigation of the development of desirable competencies (Boyatzis, R E 2008) of strategists at the level of the individual (Whittington & Mantere 2008) were also noted as underpinning the motives of this study.

It has been noted that this study is primarily exploratory and partly descriptive. The hypotheses of the study are embedded at three levels in the literature. Firstly, the hypotheses may already have been established in the literature based on empirical evidence but not within the context and population as determined by this study. Secondly, the hypotheses may have been speculated upon by other researchers or implied but not empirically investigated. In this regard the contribution of this study constitutes additions to the existing literature. Lastly, the hypotheses may not have attracted prior research and thus represent a purely exploratory investigation. In this regard the contribution is regarded to represent advances in the literature. These contributions are considered to advance current knowledge to a minor extent, to some extent and to a great extent respectively.

5.3.1 Contribution to Theory

There have been recent calls for further research relating to the development of competencies of strategists (Beer & Eisenstat 2000; Mintzberg 2004; Montgomery 2008; Whittington & Mantere 2008). This research addresses certain gaps that were identified in the literature namely, the relative lack of research related to the individual level of analysis (Bennis 2007; Boyatzis, R E 2008; Colville & Murphy 2006; Yukl 2008), the lack of quantitative empirical studies related to the constructs of foresight competence and strategic thinking (Amsteus 2008; Costanzo & MacKay 2009; Gary 2009), research at the individual within the Strategy-As-Practise (S-A-P) paradigm (Jarzabkowski, P. 2005; Whittington & Mantere 2008) and, the need for further studies related to the Strategic Leadership theory at the level of the individual (Boal & Hooijberg 2000; Hambrick 2007). Furthermore this study addresses the possible influence of educational interventions related to foresight and strategic thinking (Goldman 2007; Hayward 2005; Inayatullah 1998; Liedtka 1998) as well as empirical evidence related to the relationship between strategy-level leaders' cognitive predilections and how this may influence the formulation of strategy. The study contributes to theory in terms of the following core aspects:

- *Concepts of foresight competence and strategic thinking.* The primary focus of the study was to empirically investigate the differences and inter-relationships between the concepts of foresight competence and strategic thinking. A review of the literature found that this had not been previously investigated despite the frequent references to both concepts in strategy and leadership discourse. Based on a review of the extant literature the concepts were differentiated and hypothesised to be closely associated in terms of an idealised model of effective strategy as controlled by the organisation's dominant coalition. The concepts were operationalised and found to be valid and reliable measures of the constructs within the context of organisational strategy.

Broadly encompassing innovation, the striving toward competitive advantage can be regarded as a key driver in leaders' strategic thinking (Hamel & Prahalad 1994) and organisational sustainability (de Geus 1997). Despite best practises for strategic thinking being enumerated in the literature, Chermack (2004) warns that organisations are still susceptible to decision failure even though the negative effects are realized and avoidable. Part of the solution to this form of decision failure underpins the study's purpose.

Chermak conceptually supports the premise that foresight can function as an input of strategic thinking that in turn should improve strategy-making. This is primarily due to the expanded alternatives presented by foresight and emphasis on provident care that encourages the avoidance of negative effects and is especially relevant to sustainable organisational development.

The differentiation between foresight competence and strategic thinking based on extant literature was enumerated by the study (Section 2.7.3). Previous studies have not clearly formulated these differences and similarities or provided a conceptual framework as to how they are proposed to interact. Further, previous studies have not empirically measured these constructs within the context of leadership cognitions and strategy-making.

EFA, CFA, SEM and MRA statistical techniques were utilised to investigate the relationship within and between the lower and higher order factorial structures of the constructs and model. The level of statistical significance adopted by the study was highly significant thus decreasing the level of chance that could be ascribed to relationships found to be statistically significant (Hair et al. 2006).

The measures of the constructs were found to be valid and reliable. Foresight competence was found to be an antecedent input into strategic thinking which in turn, was found to be significantly related to the strategy-making processes of the sample organisations.

The combination of theoretical and statistical rigour applied in the study provided considerable support for the revised conceptual framework (Figure 5.2). This is considered to represent a unique trans-disciplinary contribution to theory as related to the disciplines of leadership, management, strategy, psychology and futures studies.

- *Strategy*. Together with confirmation that the dominant coalition controls strategy in organisations, it is apparent that the dominant paradigm of engaging strategy is as “a rational process of deliberate planning and actions” (Nerur, Rasheed & Natarajan 2008). This confirms Whittington’s (2001) conclusion that the classical approach to strategy as represented by Ansoff and Porter (see section 2.2.2.1) remains the most influential in practise. This paradigm is based on the deliberate intent of senior managers as ‘rational men’ and is aimed at profit maximisation and economic advantage as the primary objective and outcome. Given the understanding that effective strategy should not only be deliberate but accommodate emergent strategy (Dickson et al. 2001; Mintzberg et al. 2003), and is dependent on the organisation’s strategic thinking capability (Sanchez & Heene 2004) (see section 2.2.6), it is apparent that practise may be lagging behind this insight. Especially in terms of the current emphasis on sustainable development, a dominant classical approach to strategy based on profit maximisation and economic advantage as determined by the ‘rational economic man’, seems maligned. Evidence of this continued approach to strategy has been illustrated by the study.

  The Idealised Integrated Strategy Process (IISP) model developed in Chapter 2 represents a model developed for this research that seeks to integrate divergent approaches to strategy in terms of an idealised design. It is largely based on the acknowledgement that the dominant coalition of an organisation still predominantly controls organisational strategy (Carpenter, Geletkanycz & Sanders 2004; Nerur, Rasheed & Natarajan 2008). The dynamic model of strategy strategic thinking (Dickson et al. 2001), the competence-based approach to strategy (Sanchez 2004), the insights gained from resource-based view of strategy (Hamel & Prahalad 1994) and processual approach to strategy (Mintzberg & Waters 1985) were largely integrated to depict an idealised design of strategy processes. The research confirmed the dominance of the classical approach to strategy among organisations (Whittington 2001) as controlled by the dominant coalition at the expense of more emergent and creative approaches to strategy that typify the utilisation of effective strategic thinking (Bonn 2001; Goldman 2007; Mintzberg 1994; Montgomery 2008). The results verify that the adherence to a process of deliberate strategy increases the disconnect between the more conceptual aspects of strategic thinking and strategy formation. This leaves the creative abilities, regarded by Goldman (2007) as the predominant aspect of strategic thinking, of the strategy-level leaders relatively unexplored. The IISP model seeks to provide an integrated approach to address this gap by integrating the individuals' foresight competence and strategic thinking in order to develop the organisation's strategic thinking capabilities, and ultimately core-competence, by introducing a three step process that encourages the assimilation of emergent strategy into the organisation's realised strategy as controlled and determined by the strategic capabilities of the dominant coalition.

The research contributes to aspects related to the role and tasks of strategy-level leaders. The research provides support for the premises suggested in Figure 2.9 and 2.10 related to the separation of tasks and roles of strategy-level leaders in the organisational strategy-making process and the different outcomes associated with each. The figures propose that the strategy-level leader's foresight competence is an important part of the organisation's foresight capabilities and that this not only informs the strategy-level leader's strategic thinking but also the strategic thinking capabilities of the organisation. This, in turn, drives the organisation's strategic decision-making and strategy formulation. This construct has seemingly not been previously formulated and empirically modelled in this way.

The analysis confirmed that strategy-level leaders exhibiting higher levels of foresight competence and strategic thinking are more likely to reject the traditional notions of control, power motives and transactional approaches embedded in the classical approach to strategy (Whittington 2001). Rather they are likely to exhibit the qualities associated with emergent theoretical leadership paradigms such as cognitive complexity, social intelligence and spiritual leadership (Boal & Hooijberg 2000).

It is important to note that the conceptual framework of the study is modelled on the intervening processes of strategy-level leader cognitions preceding strategy formulation (Donaldson 1997). This is primarily based on the Strategic Leadership

Theory (Finkelstein & Hambrick 1996) which due to the difficulty of capturing the these cognitions empirically, invokes and provides validated support for the predictive value of demographic proxies. However, the model supported by the study suggests that not only do the demographic proxies have predictive power in determining the strategic decisions of organisational leaders but that they do influence the cognitive 'black box' of strategy making. This study therefore makes an original contribution to the strategic leadership theory in that some of what constitutes the 'black box' of leaders' cognitions related to strategy but also confirms they moderating effect of their demographic characteristics.

- *Leader demographics.* There have been a limited number of empirical studies related to the influence of leader characteristics on strategic decision-making (Papadakis & Barwise 2002). The results of this study address this gap in that the leader characteristics of age, education, foresight education and industry experience were found to have a statistically significant influence on the association between foresight competence and strategic thinking.

Aside from augmenting the discourse related to Strategic Leadership theory and the predictive effects of demographic proxies (Hambrick 2007), it is proposed the conclusions related to the moderating effects tested by the study, also relate to the Theory of Multiple Intelligences (Gardner 1999). Modes of work have increasingly become more knowledge orientated, the understanding of how knowledge is connected with action is regarded as an important research focal area (Sandberg & Pinnington 2009) and is linked by the results of this study in terms of the moderating effect of formal education on the development of social, emotional and cognitive intelligence competencies (Boyatzis, R E 2008; Boyatzis, R E & Saatcioglu 2008; Boyatzis, Richard E., Stubbs & Taylor 2002; Burke 2001). While the scope of this study does not further explore all the possible bifurcations of cognitive development, education and learning, it is suggested that this conclusion may be related to Gardner's definition of intelligence as a group of abilities that have a clear developmental path aligned with the stages of development human's experience (as cited in Burke 2001). The conclusion that that age, foresight education and industry experience is positively associated with the cognitive development of leaders or certainly in terms of beneficial intellectual, physical and social intelligence (Hertzog et al. 2008) further describes previous theories in this regard.

The conclusion that exposure to formal education including futures / foresight concepts and methodologies significantly moderates the relationship between foresight competence and strategic thinking provides further empirical support that strategic thinking can be developed (Goldman 2005; Liedtka 1998). It is also evident that due to the majority of respondents having had exposure to these concepts and methods, their orientations and styles have largely converged in the dimensions that typify foresight competence (Section 2.4.4). This conclusion provides empirical support for Alsan's (2008) assertion that individual foresight competence can be further developed by being exposed to discourse on foresight concepts, its methods and application.

- It is anticipated that the sample has a high level of homogeneity despite being drawn from two populations (strategy-level leaders in South Africa and Australia). Despite the obvious socio-economic and political differences, no significant differences among the ethical considerations of managers in the two populations were found. The sample was drawn from predominantly Western style organisations, in English medium environments functioning in resource-based economies that illustrate similar modes of managing despite the geographic diversity of the sample. The populations are therefore assumed to be discretely different groups rather than largely divergent. This study will test this assumption in detecting any significantly divergent results.

5.3.2 Contribution to Methodology

- The problems associated with ordinal data in SEM were found to be particularly relevant to the Decision Style Inventory (Rowe & Boulgarides 1994; Rowe & Mason 1987a). Theoretically the DSI is well supported and a useful indicator of managerial decision making. Treated as a single measurement scale in SEM, the categories negatively covaried and were unable to converge into a statistically valid higher order factorial structure. The negative covariance in particular, but also aspects related to sample size and the estimated parameters generated by SEM, was of particular concern. Specifying a single indicator latent variable was inappropriate as the dimensions of each style measure were of critical importance in the study. It was decided that rather than losing the explanatory power of the measurement items, CFA would be conducted for each style which assisted in developing one-factor congeneric models for each of the unidimensional styles. The associations between the styles were retained in the final model. This was found to be a valid, reliable and useful way to approach this particular issue within the context of this research.

- The measures of the *orientation to the past* factor of the TimeStyle Scale were found to have low item reliabilities and did not yield high regression weights. It should be noted that the nature of the sample may have influenced this outcome. In addition, the scale used by the study is a reduced scale as determined by the originators Fortunato and Furey (2009, 2010). In considering the individual items for the orientation to the past within the context of the population parameters of this study, it was concluded that the items did not capture the past dimension as anticipated. Rather the TimeStyle theory was found to capture the consideration of the past in order to formulate decisions, as being captured in the orientation to the present.

- An EFA and CFA of the Foresight Styles Assessment scale revealed that the regression weight attributed to the Reactor Factor was very low. The CFA of the scale did not yield a significant CMIN, this was due to a reduced level of convergence resulting from the inclusion of the Reactor Style. However, further model fit indices still yielded acceptable model fit and it was decided to retain the original factor structure of the scale for this study.

  The reduced level of convergence could be attributed to the nature of the sample bearing in mind that the scale was validated in terms of a large online sample without any specific population parameters (Gary 2008). The original data collection was certainly not specified in terms of strategy-level leaders, which in this research the majority of whom displayed a predilection to being orientated to the present or future.

  The question arose out of the results as to whether a Reactor Style is theoretically justified when measuring styles of foresight. The research recognises that there are different approaches to having foresight but *questions whether having a predominantly reactionary style of foresight is theoretically justifiable in terms of* *the definition of foresight*. The study, based on the quantitative data analysis and in revisiting the theoretical foundations of foresight as a concept, concluded that the inclusion of the Reactor Style cannot be justified despite its usefulness in the analysis. It is rather suggested that if this dimension is theoretically applicable, it is treated as a separate construct.

- The Strategy making Processes (SMP) scale would not converge into the original four factor structure. The sample reflects a fitting population for the scale as related to previous studies (White 1998). However, the analysis indicates that the scale should converge into three processes (Emergent, Directive/Symbolic, Transactional) rather than the four processes suggested by White (1998). This change may be attributable to a shift in theory and provides tentative support for the strategy model suggested by this study (Figure 2.4). Despite the difference in factorial structure of the scale, it was found that most item reliabilities were high and that the measurements were valid reflections of strategy processes in organisations.

5.3.3 Contribution to Practise

The antecedents of organisational success and sustainability have been the object of significant research efforts. Both empirically and conceptually, strategy has featured prominently as an indicator of organisational performance (Goll & Rasheed 2005; Levenson, Van der Stede & Cohen 2006). The literature in this regard has focussed primarily at the organisational level (Hambrick 2007; Jarzabkowski, P. 2005; Whittington et al. 2003). The primary focus of this research was on the foresight competence and strategic thinking of the strategy-level leader within the context of organisational strategy-making processes. The insights provided by the research make a number of contributions to the practise of strategy and human resource considerations at the level of the practitioner with implications at the organisational level. These are summarised as:

- *Organisation's Approach to Strategy*. Results from the research confirm that strategy is still predominantly controlled and formulated by the dominant coalition who firmly controls the strategic direction of an organisation. Together with confirmation that the dominant coalition controls strategy in organisations, it is apparent that the dominant paradigm of engaging strategy is as "a rational process of deliberate planning and actions" (Nerur, Rasheed & Natarajan 2008). This confirms Whittington's (2001) conclusion that the classical approach to strategy as represented by Ansoff and Porter (see section 2.2.2.1) remains the most influential in practise.

The results confirm that the majority of organisations in the sample have a predominantly 'top-down' approach to strategy. This would, within the paradigm of the classical approach, be based on a uni-dimensional and deliberate approach to strategy without being capable of integrating emergent strategy.

Conflict within the dominant coalition related to the approach to strategy indicates the tension between the rational, classical approach and more participative approaches to strategy as expressed by the organisation's strategy-level leaders. The implications of maintaining an intended strategy at the expense of broader participation are that the organisation's strategic thinking capabilities are not optimised.

The results further indicate that the classical approach to strategy (Whittington 2001) remains the dominant paradigm in organisations at the expense of facilitating the creative and conceptual competencies of their strategy-level leaders. This in turn is concluded to result in a disconnect between the formulation of strategy and the 'creative' aspects of strategic thinking thus limiting the organisation's strategic thinking capabilities. This insight provides motivation for organisations to harness the strategic thinking competencies of its leaders and reassess the organisation's strategy-making processes. This would potentially involve addressing the disconnect between strategic thinking and strategy making, harness the competencies of the strategy-level leaders and developing a strategy core-competency resulting in effective strategy, organisational performance and sustainability.

- *Human Resources Recruitment and Development.* The results conclude that strategy-level leaders that have a dominant Directive Decision Style are likely to have a more dominant Reactor Foresight Style and unlikely to meaningfully engage the future and be 'vigilant leaders' (Day, G. & Schoemaker 2008). This is a significant finding within the sample as the prevalence of dominant Directive Styles in organisations indicates that the strategy-leader is unable to engage in effective strategic thinking illustrating a mostly reactive response to change. Similarly, the conclusion that strategy-level leaders that exhibit a farmer Foresight Style are likely to also exhibit a Conceptual Decision Style which is also influenced by analytical cognitive thought processes. Strategy-level leaders exhibiting these styles are likely to have the necessary competence to effectively engage in strategic thinking, tolerate ambiguity in change, be innovative and have the characteristics of a 'vigilant' leader. Leaders that predominantly have a Analytic Decision Style are likely to suit the classical approach to strategy. They are task-oriented and are likely to be predominantly orientated toward the present.

Education generally and exposure to futures / foresight concepts and methods in particular were found to positively influence the relationship between foresight competence as an individual ability and strategic thinking as an organisational task. Age is also recognised as having an influence with industry experience exceeding ten years being regarded as especially significant.

Organisational leadership development initiatives can be complimented with the insights gained from the study as foresight competence and strategic thinking can be developed by a) exposing individuals to foresight concepts and methodologies (Alsan 2008; Hayward 2005) and, b) through a range of experiential learning techniques respectively (Goldman 2007). All employee development programmes, and leadership development in particular, will contribute to building the core competences associated with an innovative, flexible, strategically-orientated and sustainable organisation.

5.4 Limitations and suggestions for further research.

Limitations of the study were determined prior to the study being conducted. These were outlined in Section 1.9 in terms of the limitations of the scope of the study and Section 3.9 in terms of the limitations in terms of the methodology. In order to avoid aspects of the methodological limitations that may reduce the validity and reliability of the research, Section 3.5.4 outlined the strategy adopted to preserve acceptable levels of the validity and reliability of the study and mitigate the effects of these limitations.

Although eclectic in terms of the trans-disciplinary nature of the study, the parameters of the scope were adhered to where possible. However a number of ancillary conclusions were formulated and were found to fall outside the scope of the study. In particular, the study was not designed to provide an extensive overview of the theories or the comprehensive literature related to the development of intelligences or the bifurcations of learning. The study was unable to comprehensively explore the relevance or the implications of the findings in the field. Further discipline specific research could further explore the application and implications of these findings.

Yin (2003) indicates that each research strategy has its advantages and disadvantages. As noted above, one of the purposes of this study is to present quantitative findings as an empirical foundation for further interpretive and critical work. A deeper analysis of the problem that may uncover underlying causes for the respondent's perceptions is however desirable but does not fall within the scope of this study.

Due to the non-random, cross-sectional and purposive sampling strategy adopted by the study causality and generalisability of the results in terms of other populations could not be established. Due to the limited scope and resources of the study, addressing this limitation was not possible. While this study contributes to theory development it is not sufficient to develop theory based on its findings (Parkhe 1993). Therefore, idiosyncrasies and narrowness can be addressed in future research by applying the findings of this study to assert causality and generalisability (Leedy & Ormrod 2005). This can further be addressed by including longitudinal data into the SEM model proposed by this study and collecting data from the populations in different contexts.

Other than the large difference between the respondent's educational exposure to futures / foresight concepts and methodologies, no other demographic information differed to the same extent. As such, the respondents were largely a homogenous sample who illustrated similar characteristics and views related to the practise of strategy in their organisations. As the sample was drawn from two different countries, it was determined that the populations were predominantly homogenous. The exception to this was in terms of the extent of their foresight educational backgrounds. The study was determined to represent a segment of organisational operational leadership regarded by prior studies to be similar. The study did not consider differences attributed to cultural or gender. In order to perform a statistically valid and reliable group analysis a sample size was required that exceeded that of the number of respondents collected. As such it was determined that the statistical power for analysis was too low. Further research could explore the possible significance and influence of these groups on the model.

A further limitation to the study is the lack of response from organisational leaders. This limitation was discussed in section 4.5.2.3. The sample size however, can still be regarded as ‘large’ in terms of SEM analysis (Kline, Rex B 2004). Despite not having achieved this, the sample size gained was adequate for the reliable statistical analysis of the data albeit not sufficient for group analysis.

The study relies on self report data only. Self-report data is laden with potential problems derived from response bias and social desirability bias (Zikmund 2003). These are the slants adopted and the over-reporting of desirable social characteristics from respondents respectively, that may have occurred in the study. For this reason, the survey design included questions that allowed the researcher to triangulate the responses and indicate obvious anomalies. However, the full impact of this bias resulting from self reported data only, cannot be totally eliminated (Leedy & Ormrod 2005). Qualitative methods and 360° feedback questionnaires would provide better ways of controlling this limitation

5.5 Conclusion

The final chapter of this dissertation considered and discussed the implications of the results generated by the data analysis (Chapter 4). It further compared the conclusions with the extant literature in order to determine the findings related to the three research issues. Accordingly, the conceptual framework was reviewed and adjusted to reflect the findings of the research. In following this approach solutions to the research problem emerged and sufficiently addressed the research question. Based on this the contributions to theory, methodology and practise were formulated and addressed within the context of existing theory. In conclusion, the limitations of the study were addressed and suggestions for further research specified.

This study sought to establish a theoretical framework that validly and reliably represented the association between the concepts of foresight competence and strategic thinking within the context of organisational theory. The possible influence of respondent demographic characteristics was also investigated. The theoretical framework based on the data analysis provided empirical support for the conclusion that foresight competence and strategic thinking are distinct yet highly associated concepts influenced by the age, education and experience of strategy-level leaders. Further, that strategic thinking is antecedent to strategy making in the organisation. The foresight competence and strategic thinking can be developed by being exposed to educational interventions especially those related to futures / foresight concepts and methods, in addition to industry experience.

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Appendices

Appendix A

Online Survey Questionnaire

THIS SURVEY IS ALSO ACCESSIBLE AND CAN BE SUBMITTED ONLINE AT: http://www.questionpro.com/akira/gateway/1293475-0-0

The items of this questionnaire are protected under copyright ©

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Survey Questionnaire

FORESIGHT COMPETENCE AND THE STRATEGIC THINKING OF INDIVIDUALS

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10 July 2009

Dear Sir / Madam

Survey: Foresight competence and strategic thinking in individuals

How do decision makers think about the future and how does this influence their decisions related to an organisation’s strategy? The answers to these questions have always been important but remain relatively unexplored yet have become even more critical to leaders globally in a time typified by rapid market and environmental change.

The accompanying questionnaire is part of a PhD research study which seeks to explore the relationship between individuals’ orientation toward the future and how they think strategically within the context of formulating strategy. By participating, you will benefit by gaining insights that will have strategic relevance to your organisation’s leadership and competitive position.

I appreciate your willingness to complete the questionnaire. It should take approximately 25 to 35 minutes of your time to complete. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Luke van der Laan at +61 7 46315508 or by email at the email address specified below.

Please answer all questions on the survey. If you have any queries or require further clarification regarding any part of the survey, please do not hesitate to contact me. If you would like to receive a summary of the findings, please contact the researcher.

Your honest and thoughtful responses are highly appreciated, and thank you again for playing an invaluable part in the study.

Kind regards

Luke van der Laan

SECTION A:

The following statements describe how individuals relate to time in the organisational context.

Read each statement carefully then decide how well the statement describes you by indicating the extent to which you agree or disagree with that statement. Please tick (√) the most applicable option. Please tick only once per statement.

Example:

In my organisation;	*Strongly disagree*	*Moderately Disagree*	*Slightly Disagree*	*Neither agree or disagree*	*Slightly Agree*	*Moderately Agree*	*Strongly agree*
1. I am known for generating ideas.	( )	( )	( )	( )	( )	(√)	( )

In my organisation;	*Strongly disagree*	*Moderately Disagree*	*Slightly Disagree*	*Neither agree or disagree*	*Slightly Agree*	*Moderately Agree*	*Strongly agree*
1. I am known for generating ideas.	( )	( )	( )	( )	( )	( )	( )
2. Being organized is important to me.	( )	( )	( )	( )	( )	( )	( )
3. I often think about past experiences	( )	( )	( )	( )	( )	( )	( )
4. People think of me as a visionary	( )	( )	( )	( )	( )	( )	( )
5. People think of me as organized.	( )	( )	( )	( )	( )	( )	( )
6. I tend to dwell on "what was"	( )	( )	( )	( )	( )	( )	( )
7. I agonize over making the right decision.	( )	( )	( )	( )	( )	( )	( )
8. People think of me as structured.	( )	( )	( )	( )	( )	( )	( )
9. I am known for invention/innovation.	( )	( )	( )	( )	( )	( )	( )
10. People think I am best at planning and organization.	( )	( )	( )	( )	( )	( )	( )
11. I am regarded as an agent of change.	( )	( )	( )	( )	( )	( )	( )
12. I often think about past decisions	( )	( )	( )	( )	( )	( )	( )
13. I prefer to work in a tidy environment.	( )	( )	( )	( )	( )	( )	( )
14. I am always on the lookout for new opportunities.	( )	( )	( )	( )	( )	( )	( )
15. I tend to second guess myself.	( )	( )	( )	( )	( )	( )	( )
16. People think of me as dynamic.	( )	( )	( )	( )	( )	( )	( )
17. I usually reflect carefully on what I know to see how it applies to the current situation.	( )	( )	( )	( )	( )	( )	( )
18. I am driven towards order	( )	( )	( )	( )	( )	( )	( )

The following statements describe how individuals relate to the future and orient their behaviour, especially with regards to planning, in terms thereof.

Please tick (√) the most applicable option as to how each statement best describes you.

Please tick only once per statement.

Example:

In my organisation, I / I am;	***Does not describe me***	***Describes me***	***Describes me a little bit***	***Describes me very well***	***Describes me extremely well***	***Describes me perfectly!***
1. Test new products/trends very early	( )	( )	( )	( )	(√)	( )

In my organisation, I / I am;	***Does not describe me***	***Describes me***	***Describes me a little bit***	***Describes me very well***	***Describes me extremely well***	***Describes me perfectly!***
1. Test new products/trends very early	( )	( )	( )	( )	( )	( )
2. Early follower of what is new	( )	( )	( )	( )	( )	( )
3. Don't like changes that disrupt my own opportunities	( )	( )	( )	( )	( )	( )
4. Initiate changes in my work place	( )	( )	( )	( )	( )	( )
5. Quickly adjust to new situations	( )	( )	( )	( )	( )	( )
6. Help others to be active and alert	( )	( )	( )	( )	( )	( )
7. Find new alternatives	( )	( )	( )	( )	( )	( )
8. Stop 'wild future plans' that are imposed	( )	( )	( )	( )	( )	( )
9. Don't want too much change	( )	( )	( )	( )	( )	( )
10. Consider how trends interact	( )	( )	( )	( )	( )	( )
11. Against changes that threaten one's position	( )	( )	( )	( )	( )	( )
12. Don't rush, but like to know what is coming	( )	( )	( )	( )	( )	( )
13. Influence others to make needed changes	( )	( )	( )	( )	( )	( )
14. Focus on future questions	( )	( )	( )	( )	( )	( )
15. Consider impacts of today's events	( )	( )	( )	( )	( )	( )
16. Conscious of big trends in society	( )	( )	( )	( )	( )	( )
17. Go along when new trends come	( )	( )	( )	( )	( )	( )
18. See possibilities in situations	( )	( )	( )	( )	( )	( )
19. React when "big" plans are presented	( )	( )	( )	( )	( )	( )
20. Interested in future questions	( )	( )	( )	( )	( )	( )
21. Focus on greater future questions	( )	( )	( )	( )	( )	( )
22. Make things happen when future demands it	( )	( )	( )	( )	( )	( )
23. Work with big picture projects	(	(	(	( )	(	(

	)	)	)		)	)
24. Take advantage of trends that pop up	( )	( )	( )	( )	( )	( )
25. Flexible person	( )	( )	( )	( )	( )	( )
26. Believe everything is possible	( )	( )	( )	( )	( )	( )

SECTION B:

The following section is related to the decision making of individuals. Use only the following numbers to answer each question: Please rank the following questions based on how each statement best describes you 4 (most),describes you moderately 3 (moderately),describes you a little 2 (slightly)least describes you 1 (least). You may use each number (4, 3, 2 and 1) only once.

For example, your answer may look like this:

1. My prime objective is to:	Have a position with status	**3**	Be the best in my field	**2**	Achieve recognition for my work	**4**	Feel secure in my job	**1**

It is important to record what ***first*** comes to mind about how you ***feel*** and not what you prefer or think is the right thing to do. There are no right or wrong answers.

1. My prime objective is to:	Have a position with status		Be the best in my field		Achieve recognition for my work		Feel secure in my job	
2. I enjoy jobs that:	Are technical and well defined		Have considerable variety		Allow independent action		Involve people	
3. I expect people working for me to be:	Productive and fast		Highly capable		Committed and responsive		Receptive to suggestions	
4. In my job, I look for:	Practical results		The best solutions		New approaches or ideas		Good working environment	
5. I communicate best with others:	In a direct one-to-one basis		In writing		By having group discussions		In a formal meeting	
6. In my planning I emphasise:	Current problems		Meeting objectives		Future goals		Developing people's careers	
7. When faced with solving a problem, I:	Rely on proven approaches		Apply careful analysis		Look for creative approaches		Rely on my feelings	
8. When using information I prefer:	Specific facts		Accurate and complete data		Broad coverage of many options		Limited data which is easily understood	
9. When I am not sure about what to do, I:	Rely on intuition		Search for facts		Look for a possible compromise		Wait before making a decision	
10. Whenever possible, I avoid:	Long debates		Incomplete work		Using numbers or formulas		Conflict with others	
11. I am especially good at:	Remembering dates & facts		Solving difficult problems		Seeing many possibilities		Interacting with others	
12. When time is important I:	Decide and act quickly		Follow plans and priorities		Refuse to be pressured		Seek guidance or support	
13. In social settings I generally:	Speak with others		Think about what is being said		Observe what is going on		Listen to what is going on	
14. I am good at remembering:	People's names		Places we met		People's faces		People's personality	
15. The work I do provides me:	The power to influence others		Challenging assignments		Achieving my personal goals		Acceptance by the group	
16. I work well with those who are:	Energetic and ambitious		Self confident		Open minded		Polite and trusting	
17. When under stress, I:	Become anxious		Concentrate on the problem		Become frustrated		Am forgetful	
18. Others consider me:	Aggressive		Disciplined		Imaginative		Supportive	

19.	**My decisions typically are:**	Realistic and direct		Systematic or abstract		Broad and flexible		Sensitive to the needs of others	
20.	**I dislike:**	Losing control		Boring work		Following rules		Being rejected	

SECTION C:

The following statements describe how individuals interact with strategy making in an organisational context. Please indicate by ticking (√) the most applicable option as to how each statement best describes your interaction with strategy.

Example;

		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1.	**Strategy, in this company, is primarily set by the CEO and a few of his or her direct subordinates**	( )	( )	( )	(√)	( )

		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1.	**Strategy, in this company, is primarily set by the CEO and a few of his or her direct subordinates**	( )	( )	( )	( )	( )
2.	**The CEO primarily defines our firm's 'vision' – its basic purposes and general direction**	( )	( )	( )	( )	( )
3.	**The CEO plays a key role in monitoring and controlling functional activities in this company**	( )	( )	( )	( )	( )
4.	**Based on feedback from the marketing place, our company continually adjusts its strategy**	( )	( )	( )	( )	( )
5.	**Strategy is developed on a continual basis, involving managers, staff and executives in an ongoing dialogue**	( )	( )	( )	( )	( )
6.	**Business planning in our company is ongoing, involving everyone in the process to some degree**	( )	( )	( )	( )	( )
7.	**Our middle managers play a critical role in converting top management's general vision into specific strategies**	( )	( )	( )	( )	( )
8.	**Our business planning process involves customers, suppliers and investors**	( )	( )	( )	( )	( )
9.	**Most people in this company have input into the decisions that affect them**	( )	( )	( )	( )	( )
10.	**Strategic planning in our firm is a formal procedure occurring on a regular cycle Symbolic mode**	( )	( )	( )	( )	( )
11.	**We have a clearly defined vision of the products and services we provide and the customers we serve**	( )	( )	( )	( )	( )
12.	**This company has a well-defined niche in the market-place**	( )	( )	( )	( )	( )
13.	**There is a clear set of values in this company that governs the way we do business**	( )	( )	( )	( )	( )
14.	**This company has a distinctive 'management style'**	( )	( )	( )	( )	( )
15.	**Employee initiative and entrepreneur ship shape our firm's future strategic directions**	( )	( )	( )	( )	( )

16. The strategy for this company emerges upward from the 'firing line' rather than downward from the top	( )	( )	( )	( )	( )
17. We spend a lot of time with customers, listening to what they have to say about our company	( )	( )	( )	( )	( )

SECTION D:

The following questions seek general information about you and your organization. Please provide your response by ticking or writing as appropriate.

1) What is your gender?	Male ( )	Female ( )

2) What is your nationality	Australian ( )	Other ( )	If other, please specify ………………………

3) What is your age?	1	2	3	4	5
	20-24 ( )	25–34 ( )	35–44 ( )	44–59 ( )	60+ ( )

4) What is your level of education?				
Primary school	High school	Diploma	Bachelor degree	Postgraduate Degree

5) Have you ever been exposed to futures thinking / foresight education or courses? YES / NO *If yes*, at what level..				
High school	Diploma	Executive Education	Bachelor Degree	Post-Graduate

6) Which best describes the main industry of your company?							
Financial Services	Manufacturing	Retail	Resources / Mining	Education	Gover nment		Others ……………(spe cify)

7) How long have you been working within this industry?				
1—5yrs ( )	6—10yrs ( )	11—15yrs ( )	16—20yrs ( )	Over 20 years ( )

8) What position do you hold in your organisation?	CEO/ Director ( )	Senior Manager ( )	Middle Manager ( )	Professional ( )	Other ( )

9) How long have you been working in this position?				
1—5yrs ( )	6—10yrs ( )	11—15yrs ( )	16—20yrs ( )	Over 20 years ( )

10) What is your role in your organisation's strategy formulation?				
Active / influential ( )	Advisor to / am consulted by senior management ( )	Member of employee strategy group ( )	Contribute informally through line management ( )	None ( )

11) Rate your influence on the strategy formulation of your organisation?				
Very High ( )	High ( )	Medium ( )	Minimal ( )	None ( )

12) When strategy is formulated in your organisation it is by;				
The CEO / Directors ( )	The CEO / Senior managers ( )	Senior / middle managers ( )	All employees ( )	There is no clear strategy formulation ( )

13) In terms of strategy formulation in my organisation; (You may tick √ more than one option)				
The main actors understand strategy in the same way ( )	There is conflict between the main actors ( )	It is very much 'top / down' ( )	It is a 'team effort' by all employees ( )	There is no clear strategy formulation ( )

I highly appreciate your contribution to this research by completing the questionnaire. If you have any further comments that may help the researcher draw conclusions to this study please feel free to write your thoughts here:

Appendix B

Expert panel feedback

EXPERT	FEEDBACK
Prof. KH Chen (GFIS, Tamkang University)	Every instrument included within your questionnaire is well established, yet they are just too similar. You may find problem of collinearity following statistical operation. Based on the methodology of triangulation, you'd better approach your research questions with a diversity of methods. For example, Delphi technique, scenario or CLA developed by Sohail Inayatullah, would be providing abundant insight to your analysis.
Dr. P Hayward (Director – Strategic Foresight Programme, Swinburne University)	What is there seems very solid and I've nothing to suggest. One small thing was that your instructions for Section C could be confusing - you say "circle the statement" and then your example shows a tick. There are a lot of questions and I can only assume that you have tested the instrument with prospective candidates. While its not an empirical measure I tried to keep my instrument completion time down to less than 30 minutes in order to try and get a good response rate and to avoid the data quality falling off if they person got bored etc. Of course I had no way to prove shorter was better. You've got over 100 questions I've calculated and that does seem a lot to me. I know that its hard to ask less questions and be claiming to measure something validly but it is something that I would be sensitive to and I'd be trying to test it to see how it goes.
Prof. A Roux (Director, Institute for Futures Research, University of Stellenbosch)	Research is do-able and will provide helpful insights. Questionnaire is clear and acceptable.
Prof. J Dator (Director, Hawaii research Centre for Futures Studies, University of Hawaii)	I went back over what you sent, and I am afraid I really don't have the expertise you need to help you here. Sorry, and good luck
Prof. P Spies (Institute for Futures Research, University of Stellenbosch)	The research should provide very useful insights. May I suggest that you have a look at the attached abstract which could provide another dimension to your inquiry. (Extract was marked confidential as it is part of work being conducted for a client but indicates similar unanswered questions to the proposed study in addition to unexplored dimensions).
Prof. E Smit (Dean, University of Stellenbosch Business School)	I think the questionnaire will take longer than five minutes. You may have a low response rate. I am not sure that in your FSA questionnaire the two ordinal categories of Describes me a little bit and Describes me, should not be interchanged. In your analysis you may have to consider higher order interactions between your relationships – log-linear modelling.
Dr. J Gary (Program Director, Master of Arts in Strategic Foresight, School of Global Leadership & Entrepreneurship Regent University, Virginia Beach)	It raises all kind of questions. First the epistemic connection between foresight competence and FSA and TSI is not clear. I realize that is a research question, but just with Dian, being more of Framer, or future oriented, doesn't mean one has more foresight competence. It is possible that a range of styles, or an ability to switch between styles might be of greater value in terms of adaptive and anticipatory managerial behavior, than the preference for one style… I look forward to reading your research and think you are asking the right questions. Your use of SEM with your hypotheses could tell us alot. I wish you could use better foresight and time measures. Look at Zimbardo over Furley, at least. I think the new BC profile, mentioned above in the 2009 article Lawrence, the revised MSAI practically speaking has a lot to it. The Create quadrant would be one's foresight competency, the others would be balancing it, but distinct. See their "circumplex" idea, ie. how to validate behavorials around a circle by looking at their range of correlation.
Dr. J Voros (Strategic Foresight Programme, Swinburne University)	I must say that I really want to read the thesis because I think it is a fantastically interesting topic you are undertaking I was confused by the diagram on p.2 of the outline - in particular on the relative positions of the elements in the various cells of the table. Is there a broader design/organising principle that is being drawn upon? If so, I think it can only help to make it more explicit. Also, I was concerned that the hypothesis in bold on p.2 seems to be requiring a certain type of relationship to be present between time/foresight styles and the way that strategy is formulated, namely that there is a strong enough correlation to 'predict' strategy mode. Perhaps this is the old cautious physicist in me, but I would probably have worded it a bit more broadly so that whatever comes out of the survey, you have done good work. In other words, rather than banking on one class of result (a positive one), maybe take the stance of 'this is an exploration to see if there are certain relationships' so that even if there are not, you have shown a result. Perhaps you are actually doing this, but the hypothesis reads as though you are looking for predictors of strategy making mode, as opposed to examining whether there are any correlations between that mode and the other styles. If there are any, bonus! If not, then there is still no bust because you have investigated the broader question of possible relationships and found whatever you found out, whatever it is. I guess I'm counselling caution and conservatism in what is being claimed, leaving open the possibility of finding something - or nothing - and for the result to still be reportable as the result of an exploration. Obviously, you'd like to find such, but I would hesitate in betting the farm on finding such a finding. Forgive me if I've misread the intent of the hypotheses. If I have, then perhaps it indicates a more clear statement is necessary to prevent confusion, especially in examiners?
Prof. P Bishop (Director, Graduate Program in Futures Studies at the University of Houston. Founding Member – Association of Professional Futurists)	You have some established instruments relating to people's styles of the future. You are correlating them to see if there are relationships. Therefore, you have lots of hypotheses, but none of them really have any content – just that there is a relationship or there is not. You have a diagram, and you might explain it elsewhere, but I don't see the explanation or the rationale for what you have done. A hypothesis in my lexicon is not just a statement of relationship, but a plausible belief that there will be one, and what the direction will be, and, most importantly, why there should be one. ..Do you have any expectations about what those relationships would be, and why? Any literature that leads you to believe one thing over another? I'd rather see you cut down the number of proposed relationships to those that you believe and/or the literature says should hold up and test those. A smaller study, but IMO more valuable. And on the FSA, which I know a little, I'm not sure if you know that Jay Gary recently did his dissertation on a study of the validity of that scale. Natalie has done a good job with it, and collected lots of data, which Jay used, but the items didn't particularly cluster the way she thought they would. That doesn't mean you shouldn't use it, but it might be something you'd better take a look at. If he scales are not valid, then you won't find relationships with the other instruments. Or perhaps you would use Jay's clusters rather then Natalie's. And on the survey, of course, these are all established instruments so not much to comment, except the length. You say 15 minutes. I totaled up 157 items, figuring three items per item for the ranking one. That is better than 10 items per minute or an item every six seconds. Have you done it in that time? Have some volunteers? If so, OK, but it looks longer than that.
Prof. R Slaughter (Director, Foresight International)	Have previously interacted relating to research. Has responded to invitation to participate in expert feedback. Unfortunately pressing schedule prevents response to this stage of the study.
Prof. I Bonn (Bond University)	Have previously interacted relating to research. Has responded to invitation to participate in expert feedback. Unfortunately pressing schedule prevents response to this stage of the study.

Appendix C

Abstract of pilot study report

Foresight Competence and the Strategic Thinking of Individuals

Report: Pilot study conducted in collaboration with the Institute of Futures Research, university of Stellenbosch Business School

September 2009

Prepared by:

Luke van der Laan● Faculty of Business

University of Southern Queensland ● Toowoomba ● Queensland ● Australia

FORESIGHT COMPETENCE AND THE STRATEGIC THINKING OF INDIVIDUALS: PILOT STUDY REPORT

Luke van der Laan

University of Southern Queensland

Australia

Abstract

As part of a study investigating the relationship between foresight competence and the strategic thinking of strategy-level leaders, a pilot study was conducted in collaboration with the University of Stellenbosch's Institute for Futures Research among post-graduate students and graduates. The purpose of the study was primarily to identify aspects of the survey instrument that could be improved and also to gain an insight as to the nature of the data. However some interesting insights emerged out of the study that deserve more extensive reporting. This paper provides for a discussion of these results.

Key words: foresight, competence, organisational strategy, leadership, strategic thinking

Appendix D

Email invitation to participate in online survey

Foresight and strategic thinking - An IFR and University of Southern Queensland collaborative study.

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Dear Sir / Madam

Survey: Foresight competence and strategic thinking in Australian organisational leadership

How do decision makers think about the future and how does this influence their decisions related to an organisation's strategy? How are Australian leaders equipped in terms of their strategic lthinking? The answers to these questions have always been important but remain relatively unexplored. In a time typified by rapid market and environmental change, understanding the benefits of this **have become critical** in terms of how you and your organisation adapts to rapid change and are competitively positioned.

This University of Southern Queensland study is *unique and an innovative* response to understanding how the future evolves and can impact on an organisation's performance. It seeks to explore the relationship between individuals' foresight propensity and how they think strategically within the context of formulating strategy. It has specifically been formulated to provide valuable insights relating to organisational decision-making in order to evaluate and enhance strategic decision-making capabilities and competitative advantage.

The accompanying questionnaire is part of and exciting research initiative in collaboration with the Institute of Futures Research (IFR). Your participation will assure that you gain first hand insights, **ahead of your competitors**, of the results. This is a highly relevant study in terms of the challenges you / your organisation currently face. Without sufficient responses the study may be compromised, so you are encouraged to offer 25 minutes of your valuable time in assisting in making the study a success.

The researcher will be unable to identify responses as they are automatically coded by the survey software and data administrator in the USA. Your participation is therefore completely anonymous.

By clicking on the **Start Survey** link below you will be able to simply tick your way through the survey. If you would like a copy of the results please send a 'request for results' email to the email address shown on the survey.

Your thoughtful responses and support are highly appreciated. Thank you again for playing an invaluable part in the study.

Kind regards

Luke van der Laan

PLEASE CLICK ON THIS LINK TO START
Start Survey

Please email luke.vanderlaan@usq.edu.au to unsubscribe.

Appendix E

IFR Associates

- ABN Amro
- AFGRI
- AMD
- Absa Bank Ltd
- Adcock Ingram Ltd
- Anglo American Platinum Corporation Ltd
- Anglogold Ashanti Ltd
- Aveng Ltd
- Avroy Shlain Cosmetics
- Avusa Media Ltd
- BP Southern Africa (Pty) Ltd
- Bankseta
- Basil Read (Pty) Ltd
- British American Tobacco SA (Pty) Ltd
- Bureau for Food and Agricultural Policy (BFAP)
- Business Connexion (Pty) Ltd
- Capespan (Pty) Ltd
- Central Policy Unit
- Chamber of Mines
- Circle Capital Ventures
- Credit Guarantee
- Deloitte
- Dept of Communications
- Department of Defence
- Department of Environmental Affairs & Tourism
- Department of Home Affairs
- Department of Labour
- Department of Minerals & Energy
- Department of Public Works
- Dept of Science & Technology
- Department of Social Development
- Dept of Trade & Industry
- Dept of Transport
- Destiny Corporation SA
- Development Bank of Southern Africa
- Dimension Data Holdings
- Distell Group Ltd
- Edcon
- Electricity Distribution Industry Holdings
- Electrolux SA (Pty) Ltd
- Ellerine Holdings Ltd
- Engen Petroleum Ltd
- Ernst & Young Services (Pty) Ltd
- Eskom
- Exxaro Resources Ltd
- Fiat Group Automobiles SA (Pty) Ltd
- FirstRand Ltd
- Foskor Ltd
- Freeworld Coatings Global (Pty) Ltd
- German Technical Co-operation (GTZ)
- GlaxoSmithKline SA (Pty) Ltd
- HBD Venture Capital
- Heinz Foods SA
- Hlano Investments (Pty) Ltd
- Hollard Insurance
- Imperial Bank
- Independent Development Trust
- Industrial Development Corporation
- Institute for Maritime Technology (Pty) Ltd
- JDG Trading (Pty) Ltd
- Janssen-Cilag SA
- Kumba Iron Ore
- Lafarge Industries South Africa (Pty) Ltd
- Leonard Dingler (Pty) Ltd
- M&I Groepsdienste Bpk
- MTN Group Management Services
- Massmart Holdings Ltd
- McCain Foods SA
- Mercedes Benz SA (Pty) Ltd
- Merck SA (Pty) Ltd
- Metropolitan Life
- Momentum Group Ltd
- Murray & Roberts Group
- National Intelligence Agency
- National Treasury
- NECSA
- NERSA
- Neotel
- Norilsk Nickel Africa (Pty) Ltd
- Old Mutual Life Assurance Co (SA) Ltd
- Oracle Corporation SA
- Pam Golding Properties
- Pioneer Foods (Pty) Ltd
- Power Construction (Pty) Ltd
- Presidency, The
- PricewaterhouseCoopers
- Rainbow Farms (Pty) Ltd
- Rand Water
- SABC
- SANLAM
- SANTAM LTD
- SARS Business Intelligence Unit
- Sasol Ltd
- Secretariat for Safety & Security
- Schenker (SA) (Pty) Ltd
- South African Bureau of Standards
- South African Post Office Ltd
- Spoornet
- Sun International Management Ltd
- Teba Bank
- Telkom SA Ltd
- Total South Africa
- Toyota South Africa Marketing
- Trustco Group International
- Umgeni Water
- Unilever SA (Pty) Ltd
- Virgin Money South Africa
- Vodacom (Pty) Ltd
- WSP Group SA
- Zurich Insurance Co SA Ltd

Appendix F

Ethical Clearance Notice

USQ
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OFFICE OF RESEARCH AND HIGHER DEGREES
Ashley Steele
Research Ethics Officer
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Friday, 13 February 2009

Lucas Willem van der Laan
2 May Court
Toowoomba QLD 4350

Re: Ethical Clearance – Foresight competence and the strategic thinking of individuals

Dear Lucas,

The USQ Human Research Ethics Committee recently reviewed your application for ethical clearance. Your project has been endorsed and full ethics approval was granted 13/02/2009. Your approval reference number is: **HO9REA021** and is valid until **13/02/2010.**

The Committee is required to monitor research projects that have received ethics clearance to ensure their conduct is not jeopardising the rights and interests of those who agreed to participate. Accordingly, you are asked to forward a **written report** to this office after twelve months from the date of this approval or upon completion of the project.

A questionnaire will be sent to you requesting details that will include: the status of the project; a statement from you as principal investigator, that the project is in compliance with any special conditions stated as a condition of ethical approval; and confirming the security of the data collected and the conditions governing access to the data. The questionnaire, available on the web, can be forwarded with your written report.

Please note that you are responsible for notifying the Committee immediately of any matter that might affect the continued ethical acceptability of the proposed procedure.

Yours sincerely

Ashley Steele

Ashley Steele
Research Ethics Officer
Office of Research and Higher Degrees

Toowoomba • Springfield • Fraser Coast usq.edu.au

Appendix G

Missing data Analysis

	Result Variable	N of Replaced Missing Values	Case Number of Non-Missing Values First	Case Number of Non-Missing Values Last	N of Valid Cases	Creating Function
1	DSI5A_1	0	1	305	305	SMEAN(DSI5A)
2	DSI5B_1	0	1	305	305	SMEAN(DSI5B)
3	DSI5C_1	0	1	305	305	SMEAN(DSI5C)
4	DSI5D_1	0	1	305	305	SMEAN(DSI5D)
5	DSI6A_1	0	1	305	305	SMEAN(DSI6A)
6	DSI6B_1	0	1	305	305	SMEAN(DSI6B)
7	DSI6C_1	0	1	305	305	SMEAN(DSI6C)
8	DSI6D_1	0	1	305	305	SMEAN(DSI6D)
9	DSI7A_1	0	1	305	305	SMEAN(DSI7A)
10	DSI7B_1	0	1	305	305	SMEAN(DSI7B)
11	DSI7C_1	0	1	305	305	SMEAN(DSI7C)
12	DSI7D_1	0	1	305	305	SMEAN(DSI7D)
13	DSI8A_1	0	1	305	305	SMEAN(DSI8A)
14	DSI8B_1	0	1	305	305	SMEAN(DSI8B)
15	DSI8C_1	0	1	305	305	SMEAN(DSI8C)
16	DSI8D_1	0	1	305	305	SMEAN(DSI8D)
17	DSI9A_1	0	1	305	305	SMEAN(DSI9A)
18	DSI9B_1	0	1	305	305	SMEAN(DSI9B)
19	DSI9C_1	0	1	305	305	SMEAN(DSI9C)
20	DSI9D_1	0	1	305	305	SMEAN(DSI9D)
21	DSI10A_1	0	1	305	305	SMEAN(DSI10A)
22	DSI10B_1	0	1	305	305	SMEAN(DSI10B)
23	DSI10C_1	0	1	305	305	SMEAN(DSI10C)
24	DSI10D_1	0	1	305	305	SMEAN(DSI10D)
25	DSI11A_1	0	1	305	305	SMEAN(DSI11A)
26	DSI11B_1	0	1	305	305	SMEAN(DSI11B)
27	DSI11C_1	0	1	305	305	SMEAN(DSI11C)
28	DSI11D_1	0	1	305	305	SMEAN(DSI11D)
29	DSI12A_1	0	1	305	305	SMEAN(DSI12A)
30	DSI12B_1	0	1	305	305	SMEAN(DSI12B)
31	DSI12C_1	0	1	305	305	SMEAN(DSI12C)
32	DSI12D_1	0	1	305	305	SMEAN(DSI12D)
33	DSI13A_1	0	1	305	305	SMEAN(DSI13A)
34	DSI13B_1	0	1	305	305	SMEAN(DSI13B)
35	DSI13C_1	0	1	305	305	SMEAN(DSI13C)
36	DSI13D_1	0	1	305	305	SMEAN(DSI13D)
37	DSI14A_1	0	1	305	305	SMEAN(DSI14A)

38	DSI14B_1	0	1	305	305	SMEAN(DSI14B)
39	DSI14C_1	0	1	305	305	SMEAN(DSI14C)
40	DSI14D_1	0	1	305	305	SMEAN(DSI14D)
41	DSI15A_1	0	1	305	305	SMEAN(DSI15A)
42	DSI15B_1	0	1	305	305	SMEAN(DSI15B)
43	DSI15C_1	0	1	305	305	SMEAN(DSI15C)
44	DSI15D_1	0	1	305	305	SMEAN(DSI15D)
45	DSI16A_1	0	1	305	305	SMEAN(DSI16A)
46	DSI16B_1	0	1	305	305	SMEAN(DSI16B)
47	DSI16C_1	0	1	305	305	SMEAN(DSI16C)
48	DSI16D_1	0	1	305	305	SMEAN(DSI16D)
49	DSI17A_1	0	1	305	305	SMEAN(DSI17A)
50	DSI17B_1	0	1	305	305	SMEAN(DSI17B)
51	DSI17C_1	0	1	305	305	SMEAN(DSI17C)
52	DSI17D_1	0	1	305	305	SMEAN(DSI17D)
53	DSI18A_1	0	1	305	305	SMEAN(DSI18A)
54	DSI18B_1	0	1	305	305	SMEAN(DSI18B)
55	DSI18C_1	0	1	305	305	SMEAN(DSI18C)
56	DSI18D_1	0	1	305	305	SMEAN(DSI18D)
57	DSI19A_1	0	1	305	305	SMEAN(DSI19A)
58	DSI19B_1	0	1	305	305	SMEAN(DSI19B)
59	DSI19C_1	0	1	305	305	SMEAN(DSI19C)
60	DSI19D_1	0	1	305	305	SMEAN(DSI19D)
61	DSI20A_1	0	1	305	305	SMEAN(DSI20A)
62	DSI20B_1	0	1	305	305	SMEAN(DSI20B)
63	DSI20C_1	0	1	305	305	SMEAN(DSI20C)
64	DSI20D_1	0	1	305	305	SMEAN(DSI20D)
65	SMP1_1	0	1	305	305	SMEAN(SMP1)
66	SMP2_1	0	1	305	305	SMEAN(SMP2)
67	SMP3_1	0	1	305	305	SMEAN(SMP3)
68	SMP4_1	0	1	305	305	SMEAN(SMP4)
69	SMP5_1	0	1	305	305	SMEAN(SMP5)
70	SMP6_1	0	1	305	305	SMEAN(SMP6)
71	SMP7_1	0	1	305	305	SMEAN(SMP7)
72	SMP8_1	0	1	305	305	SMEAN(SMP8)
73	SMP9_1	0	1	305	305	SMEAN(SMP9)
74	SMP10_1	0	1	305	305	SMEAN(SMP10)
75	SMP11_1	0	1	305	305	SMEAN(SMP11)
76	SMP12_1	0	1	305	305	SMEAN(SMP12)
77	SMP13_1	0	1	305	305	SMEAN(SMP13)
78	SMP14_1	0	1	305	305	SMEAN(SMP14)
79	SMP15_1	0	1	305	305	SMEAN(SMP15)
80	SMP16_1	0	1	305	305	SMEAN(SMP16)

81	SMP17_1	0	1	305	305	SMEAN(SMP17)

Appendix H

Descriptive Statistics

Descriptive Statistics			
	N	Mean	Std. Deviation
Known for generating ideas	274	6.1277	.99178
Being organised is important.	276	6.1232	1.02303
Often think about past experiences.	280	5.5821	1.25311
People think of me as visionary.	280	5.2821	1.38179
People think of me as organised.	277	5.4549	1.36026
Dwell on what was.	280	3.1071	1.65348
Agonize over right decsision.	280	3.6357	1.85190
People think of me as structured	280	5.1929	1.43882
Known for invention / innovation.	280	5.3821	1.33079
People think I am best at planning / organising.	280	5.1000	1.40046
Regarded as an agent of change	278	5.5647	1.24061
Often think about past decisions.	280	4.2714	1.62129
Prefer to work in tidy environment.	280	5.0893	1.57577
Always on the lookout for new opportunities.	277	6.0505	1.06202
tend to second guess myself.	280	3.9000	1.64524
People think of me as dynamic.	280	5.4107	1.18498
Usually reflect carefully on what i know and how it applies.	275	5.7636	.96591
Driven towards order.	280	4.9786	1.48815
Test new trends / products early.	280	3.5214	1.42918
Early follower	280	3.5250	1.39614
Don't like changes that disrupt opportunity.	280	2.7750	1.46259
Initiate changes in the workplace	280	4.3536	1.19736
Quickly to adjust to new situations	280	4.4071	1.25236
Help others be active and alert	280	4.3214	1.13761
Find new alternatives	280	4.4786	1.17603
Hold the line when new plans are imposed	280	2.8493	1.48067
Dont want too much change	280	1.8321	1.07282
Consider how trends interact	280	4.2179	1.29475
Against changes that threaten one's position.	280	2.1613	1.31947
Don't rush but know what is coming.	280	3.4714	1.23824
Influence others to make needed changes.	280	4.4500	1.10926
Focus on future questions.	280	4.4714	1.30036
Consider impacts of today's events.	280	4.3643	1.06229
Conscious of big trends in society	280	4.4214	1.26756
Go along when new trends come	280	3.5214	1.31421

See possibilities in situations	280	4.6464	1.09740
React when big plans are presented	280	4.0929	1.33814
Interested in future questions	280	4.8357	1.16158
Focus on greater future questions	280	4.5286	1.27812
Make things happen when future demands it	280	4.6321	1.11219
Work with big picture projects	280	4.6522	1.20524
Take advantage of trends that pop up.	280	4.0214	1.28664
Flexible person	280	4.5357	1.23225
Believe everything is possible.	280	4.5162	1.37003
Prime objective: position with status	280	2.3964	2.07476
best in my field	280	5.4536	2.85955
recognition for work	280	4.4071	2.28725
feel secure in job	280	2.7429	2.22199
Enjoy jobs that: technical and well defined	280	2.2607	2.35395
considerable variety	280	4.4643	2.36737
allow independent action	280	4.8750	2.70047
involve people	280	3.4000	2.50677
Expect people working for me: productive and fast	280	2.8107	2.30705
highly capable	280	4.4071	2.60382
committed and responsive	280	4.9357	2.75840
receptive to suggestions	280	2.8464	2.36491
My job, I look for: practical results	280	3.6071	2.52073
best solutions	280	4.4607	2.52128
new approaches / ideas	280	4.1571	2.83291
good working environment	280	2.7750	2.54340
Communicate best with others: one to one	280	5.5321	2.72760
in writing	280	2.9464	2.47148
group discussions	280	3.9429	2.41937
formal meetings	280	2.5786	2.04980
My planning I emphasise: current problems	280	2.8000	2.16919
meeting objectives	280	4.3500	2.46531
future goals	280	5.4714	2.83461
developing people's careers	280	2.3786	1.97645
Faced with solving a problem: rely on proven approaches	280	2.9000	2.33349
apply careful analysis	280	4.3429	2.57579
look for creative approaches	280	4.7321	2.79074
rely on my feelings	280	3.0250	2.53211
When using information: specific facts	280	3.6500	2.25260
accurate and complete data	280	4.0750	2.64062
broad coverage and many options	280	4.5786	2.91595
limited data easily understood	280	2.6964	2.52670
When I am not sure: rely on intuition	280	3.5750	2.60577

search for facts	280	5.1429	2.74892
look for compromise	280	2.9643	2.11806
wait before decision	280	3.3179	2.68989
I avoid: long debates	280	4.4786	2.71057
incomplete work	280	4.6857	2.68831
using numbers / formulas	280	2.5071	2.16686
conflict with others	280	3.3286	2.53843
Especially good at: remembering facts and dates	280	2.4929	2.34022
solving difficult problems	280	3.9500	2.40765
seeing many possibilities	280	5.1286	2.74833
interacting with others	280	3.4286	2.52768
When time is important: decide and act quickly	280	5.5071	2.87118
follow plans and priorities	280	3.6750	2.27139
refuse to be pressured	280	2.5714	2.28174
seek guidance and support	280	3.2464	2.34329
In social settings: speak with others	280	4.6571	3.15040
think about what is said	280	2.8214	2.14616
observe what is going on	280	3.8750	2.60040
listen to what is going on	280	3.6464	2.41708
Good at remembering: names	280	2.5464	2.43437
places we met	280	3.0571	2.23132
faces	280	4.8964	2.64913
personalities	280	4.5000	2.66667
Work I do provides: power to influence	280	4.1857	2.71617
challenging assignments	280	4.9321	2.59839
achieve personal goals	280	3.8893	2.42417
acceptance by group	280	1.9929	2.03375
Work well with : energetic and ambitious	280	4.2429	2.78854
self confident	280	3.1893	2.02402
open minded	280	4.9250	2.82553
polite and trusting	280	2.6429	2.41284
Under stress: become anxious	280	3.5714	2.38917
concentrate on the problem	280	5.7679	2.71852
become frustrated	280	3.4714	2.05983
am forgetful	280	2.1893	2.20700
Others consider me: aggressive	280	2.5750	2.45711
disciplined	280	3.9821	2.57010
imaginative	280	4.3000	2.80859
supportive	280	4.1429	2.53455
Decisions are typically: realistic and direct	280	5.0607	2.94390
systematic or abstract	280	3.4071	2.49270
broad and flexible	280	3.4714	2.47263

sensitive to the needs of others	280	3.0607	2.33715
Dislike: losing control	280	4.1964	2.74103
boring work	280	4.7821	2.79766
following rules	280	2.9750	2.28194
being rejected	280	3.0464	2.43658
Set by CEO and direct subordinates	280	3.7250	1.20010
CEO defines firm's vision and direction	280	3.8000	1.10197
CEO plays key role in motoring and controlling	280	3.4786	1.09720
Marketing feedback, contual adjustment of strategy	280	3.4750	1.06731
Strategy is developed by all in ongoing dialogue	280	3.5929	1.14470
Planning involves everyone ongoing	280	3.5964	1.07995
Middle managers convert top manager vision to strategies	280	3.7107	1.04653
Planning involves customers, suppliers and investors	280	2.9607	1.14936
Most people have input	280	2.9571	1.13195
Strat planning is formal and cyclical	280	3.6143	1.17675
Clearly defined vision of products, services and customers	280	3.9107	.99239
Well defined niche	280	3.9071	.98298
Clear set of values	280	4.0464	1.00962
Distinctive management style	280	3.9393	.95409
Initiative and entrepeneur shapes the future of the firm	280	3.1321	1.14239
Strategy is developed upwards	280	2.4036	1.05307
Listen to customers	280	3.0286	1.22660
Gender	280	1.2536	.43583
Nationality	280	1.4786	.50044
Age	280	3.4964	.85927
Level of education	280	4.4214	.89657
Exposure to Futures education	280	1.3071	.46214
Level of Futures education	198	5.6010	1.80451
Industry	280	4.6500	3.10607
Industry experience	280	3.2750	1.43912
Position	280	2.1464	1.15314
Position Experience	279	1.8638	1.07426
Role in strategy formulation	280	1.6786	1.06268
Level of influence on strategy	280	1.7607	.80538
The main actors understand startegy the same	134	1.0000	.00000
There is conflict between the main actors	72	1.0000	.00000
It is very much top / down	141	1.0000	.00000
It is a team effort by all employees	67	1.0000	.00000
There is no clear strategy formulation	28	1.0000	.00000
Who formulates strategy	280	1.9786	.80738
Valid N (listwise)	0		

Appendix I

EFA & CFA Results

TIMESTYLES: EFA AND CFA

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TSItotallatent	280	-2.60	1.26	.0000	.55516
Valid N (listwise)	280				

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.719	.719	9

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.773
Bartlett's Test of Sphericity	Approx. Chi-Square	1128.933
	df	45
	Sig.	.000

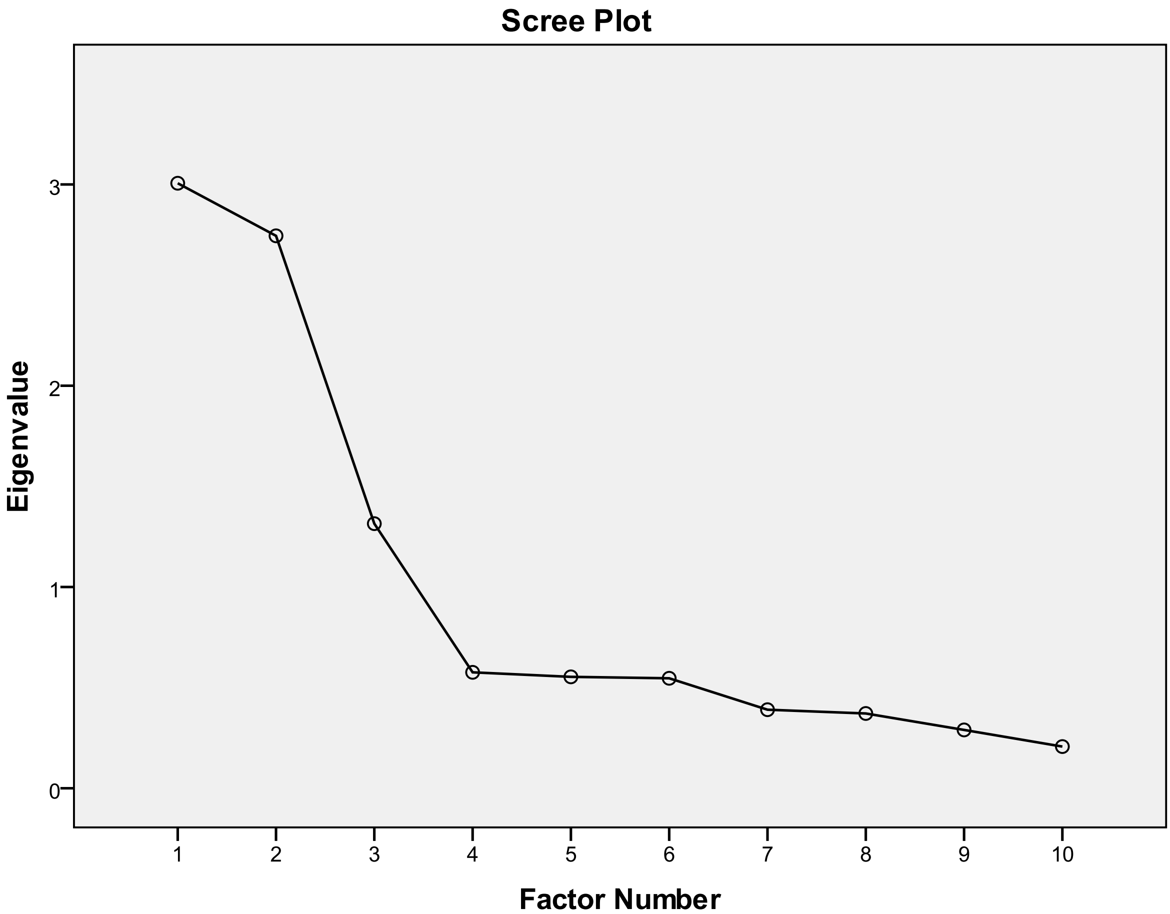
Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Su of Squarec Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.006	30.059	30.059	2.575	25.748	25.748	2.
2	2.745	27.447	57.507	2.386	23.863	49.611	2.
3	1.315	13.148	70.654	.839	8.386	57.997	1.
4	.576	5.759	76.413				
5	.554	5.535	81.949				
6	.546	5.463	87.412				

7	.390	3.903	91.315				
8	.372	3.715	95.031				
9	.290	2.898	97.929				
10	.207	2.071	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.



Goodness-of-fit Test

Chi-Square	df	Sig.
23.330	18	.178

Reproduced Correlations

		Known for generating ideas	People think of me as visionary.	People think of me as organised.	Dwell on what was.	People think of me as structured	Known for invention / innovation.	People think I am best at planning / organising.	Often think about past decisions.	Being organised is important.	People think of me as dynamic.
Reproduced Correlation	Known for generating ideas	.520[a]	.586	.031	-.087	-.005	.617	.065	.005	.001	.487
	People think of me as visionary.	.586	.663[a]	.080	-.091	.030	.693	.106	.013	.034	.553
	People think of me as organised.	.031	.080	.917[a]	.129	.729	.002	.659	.139	.678	.104
	Dwell on what was.	-.087	-.091	.129	.454[a]	.160	-.127	.187	.445	.115	-.117
	People think of me as structured	-.005	.030	.729	.160	.587[a]	-.036	.534	.164	.542	.049
	Known for invention / innovation.	.617	.693	.002	-.127	-.036	.733[a]	.048	-.019	-.025	.577

	People think I am best at planning / organising.	.065	.106	.659	.187	.534	.048	.502[a]	.203	.490	.103
	Often think about past decisions.	.005	.013	.139	.445	.164	-.019	.203	.453[a]	.119	-.031
	Being organised is important.	.001	.034	.678	.115	.542	-.025	.490	.119	.503[a]	.054
	People think of me as dynamic.	.487	.553	.104	-.117	.049	.577	.103	-.031	.054	.468[a]
Residual[b]	Known for generating ideas		-.015	-.004	-.017	-.010	.023	-.009	.017	.058	-.030
	People think of me as visionary.	-.015		-.002	.008	.004	-.008	.000	-.005	.005	.039
	People think of me as organised.	-.004	-.002		.004	-.002	.001	-.005	-.001	.007	.007
	Dwell on what was.	-.017	.008	.004		-.032	.002	.008	.003	.003	-.005

	People think of me as structured	-.010	.004	-.002	-.032		.003	.056	.017	-.031	-.016
	Known for invention / innovation.	.023	-.008	.001	.002	.003		.018	-.008	-.026	-.015
	People think I am best at planning / organising.	-.009	.000	-.005	.008	.056	.018		-.018	-.023	-.031
	Often think about past decisions.	.017	-.005	-.001	.003	.017	-.008	-.018		.004	.014
	Being organised is important.	.058	.005	.007	.003	-.031	-.026	-.023	.004		-.012
	People think of me as dynamic.	-.030	.039	.007	-.005	-.016	-.015	-.031	.014	-.012	

Extraction Method: Maximum Likelihood.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 2 (4.0%) nonredundant residuals with absolute values greater than 0.05.

Pattern Matrix[a]

	Factor		
	1	2	3
People think of me as organised.	.975	.001	-.076
People think of me as structured	.761	-.034	.022
Being organised is important.	.719	-.028	-.033
People think I am best at planning / organising.	.662	.074	.111
Known for invention / innovation.	-.064	.858	.000
People think of me as visionary.	.016	.815	.024
Known for generating ideas	-.028	.725	.023
People think of me as dynamic.	.069	.669	-.059
Often think about past decisions.	.006	.055	.674
Dwell on what was.	.008	-.073	.660

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 3 iterations.

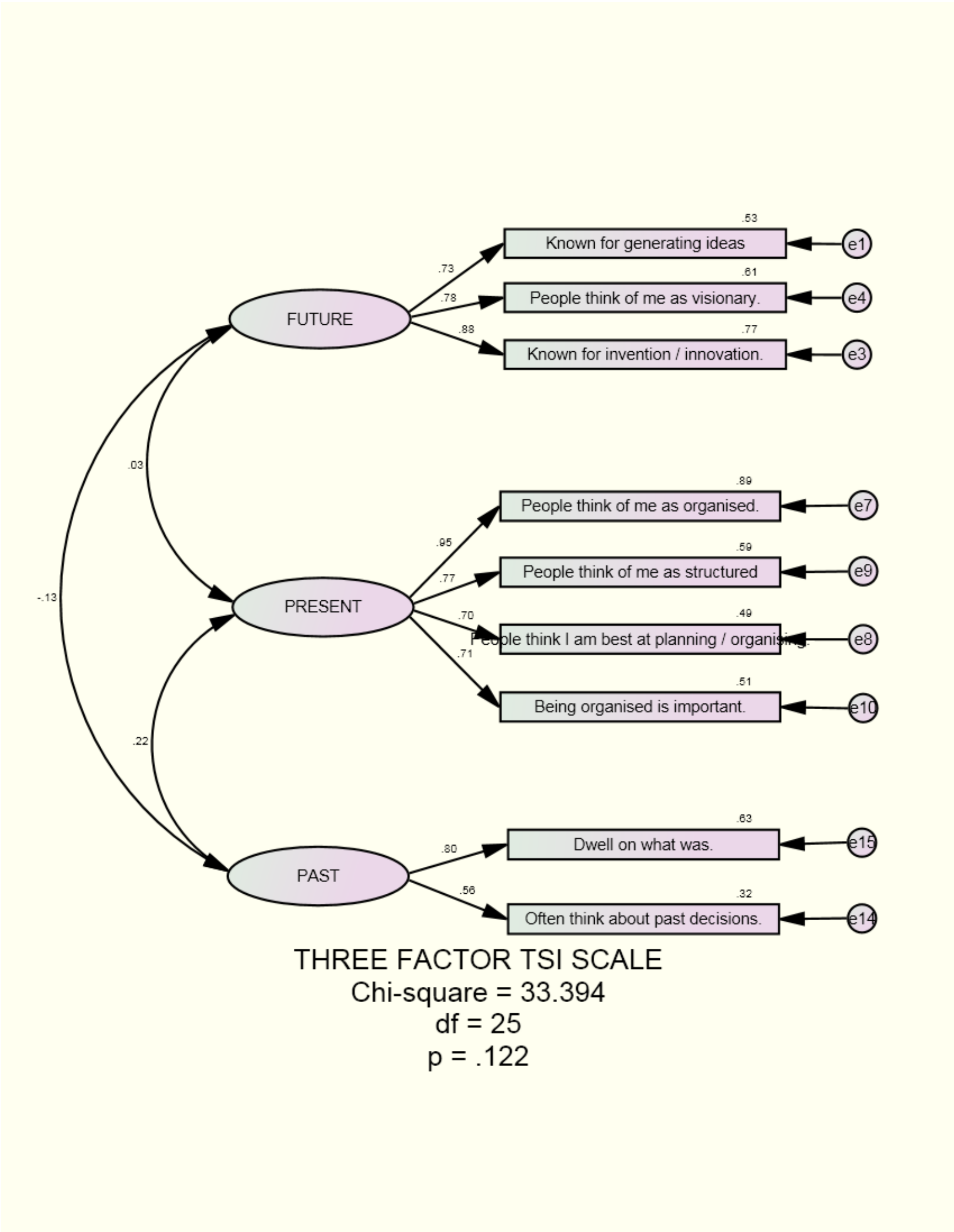
Structure Matrix

	Factor		
	1	2	3
People think of me as organised.	.955	.074	.192
People think of me as structured	.765	.015	.235
Being organised is important.	.708	.023	.168
People think I am best at planning / organising.	.698	.108	.286
Known for invention / innovation.	-.006	.854	-.098
People think of me as visionary.	.077	.814	-.049
Known for generating ideas	.027	.721	-.052

People think of me as dynamic.	.098	.680	-.103
Often think about past decisions.	.195	-.008	.670
Dwell on what was.	.185	-.134	.670

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.



FORESIGHT STYLES ASSESSMENT: EFA AND CFA

Reliability Statistics

Cronbach's Alpha	N of Items
.820	13

Goodness-of-fit Test

Chi-Square	df	Sig.
34.430	32	.352

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
FSAlattotB	280	1.92	6.00	3.7959	.71927
Valid N (listwise)	280				

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.910
Bartlett's Test of Sphericity	Approx. Chi-Square	2101.042
	df	78
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Su of Square Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.290	48.388	48.388	3.912	30.093	30.093	5.
2	1.676	12.893	61.280	2.561	19.698	49.792	3.
3	.932	7.169	68.449	.960	7.382	57.174	2.
4	.708	5.449	73.897	.797	6.133	63.306	4.
5	.641	4.933	78.831				
6	.491	3.780	82.610				
7	.470	3.613	86.224				
8	.452	3.473	89.697				
9	.389	2.993	92.690				
10	.331	2.542	95.232				
11	.260	2.000	97.232				

12	.229	1.764	98.996				
13	.130	1.004	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Structure Matrix

	Factor			
	1	2	3	4
Interested in future questions	.935	-.657	-.387	-.589
Focus on greater future questions	.923	-.642	-.323	-.667
Focus on future questions.	.808	-.618		-.571
Conscious of big trends in society	.709	-.605		-.638
Consider how trends interact	.714	-.998		-.494
Dont want too much change	-.359		.741	
Against changes that threaten one's position.			.740	
Don't like changes that disrupt opportunity.			.531	
Take advantage of trends that pop up.	.627	-.463		-.864
Go along when new trends come	.529	-.339		-.811
Quickly to adjust to new situations	.630	-.523	-.369	-.688
Make things happen when future demands it	.672	-.404		-.676
Test new trends / products early.	.506	-.468		-.518

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

Factor Correlation Matrix

Factor	1	2	3	4
1	1.000	-.687	-.356	-.690
2	-.687	1.000	.248	.469

3	-.356	.248	1.000	.236
4	-.690	.469	.236	1.000

Extraction Method: Maximum Likelihood.

Rotation Method: Oblimin with Kaiser Normalization.

DECISION STYLES INVENTORY-DIRECTIVE: EFA AND CFA

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.713
Bartlett's Test of Sphericity	Approx. Chi-Square	180.804
	df	6
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.077	51.914	51.914	1.487	37.178	37.178
2	.764	19.100	71.014			
3	.669	16.735	87.749			
4	.490	12.251	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix[a]

	Factor
	1
Enjoy jobs that: technical and well defined	.790
Especially good at: remembering facts and dates	.563
Faced with solving a problem: rely on proven approaches	.523
My planning I emphasise: current problems	.521

Extraction Method: Maximum Likelihood.

Factor Matrix[a]

	Factor
	1
Enjoy jobs that: technical and well defined	.790
Especially good at: remembering facts and dates	.563
Faced with solving a problem: rely on proven approaches	.523
My planning I emphasise: current problems	.521

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 4 iterations required.

Goodness-of-fit Test

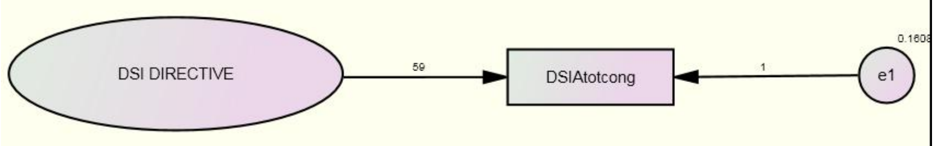
Chi-Square	df	Sig.
2.885	2	.236

Reliability Statistics

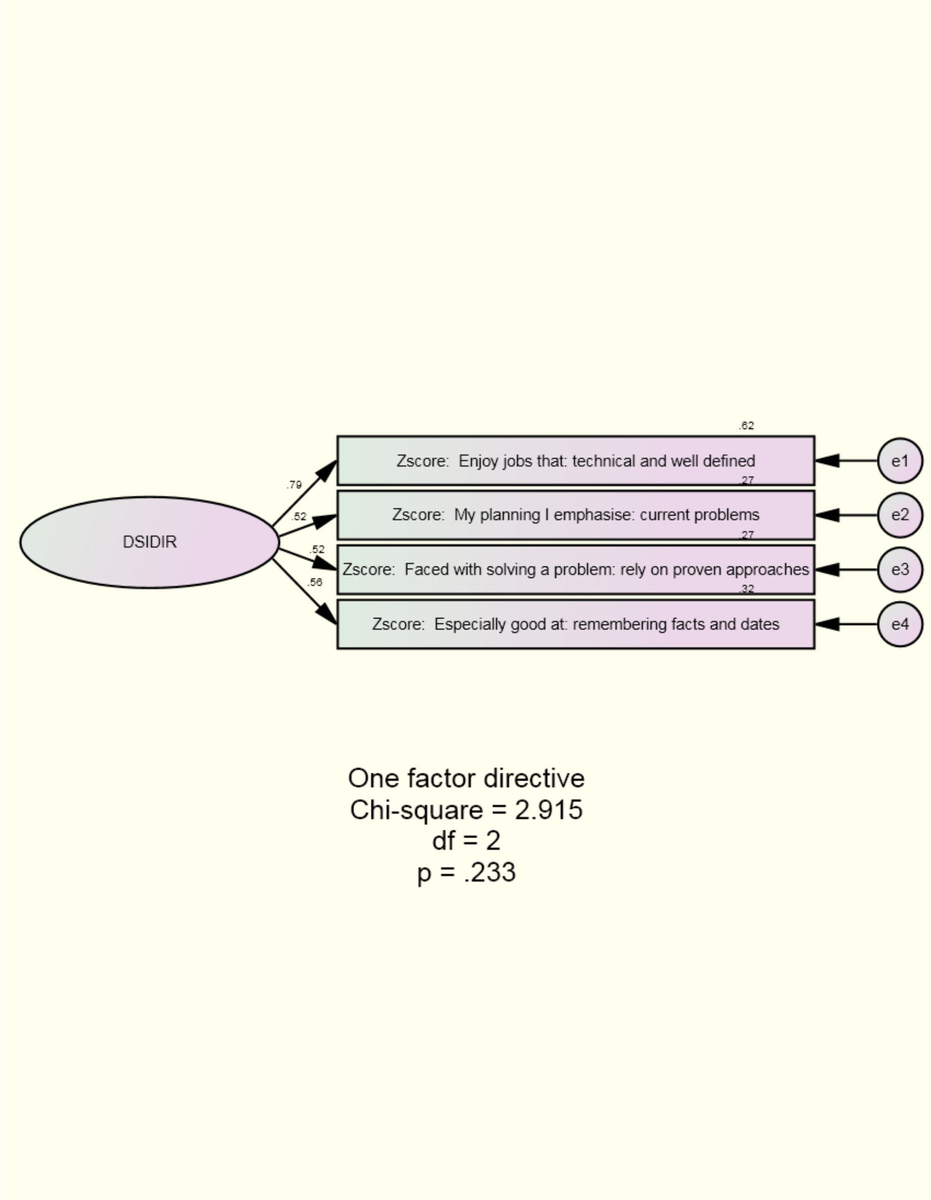
Cronbach's Alpha	N of Items
.689	4

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
DSIAtotcong	280	-.90	1.95	.0000	.71903
Valid N (listwise)	280				



Single indicator latent variable: DSI Directive



DECISION STYLES INVENTORY-ANALYTIC: EFA AND CFA

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.758
Bartlett's Test of Sphericity	Approx. Chi-Square	225.019
	df	10
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.297	45.943	45.943	1.660	33.195	33.195

2	.843	16.869	62.812			
3	.731	14.617	77.429			
4	.638	12.761	90.190			
5	.491	9.810	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix[a]

	Factor
	1
Zscore: best in my field	.629
Zscore: apply careful analysis	.455
Zscore: challenging assignments	.576
Zscore: concentrate on the problem	.728
Zscore: boring work	.442

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 4 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.
9.151	5	.103

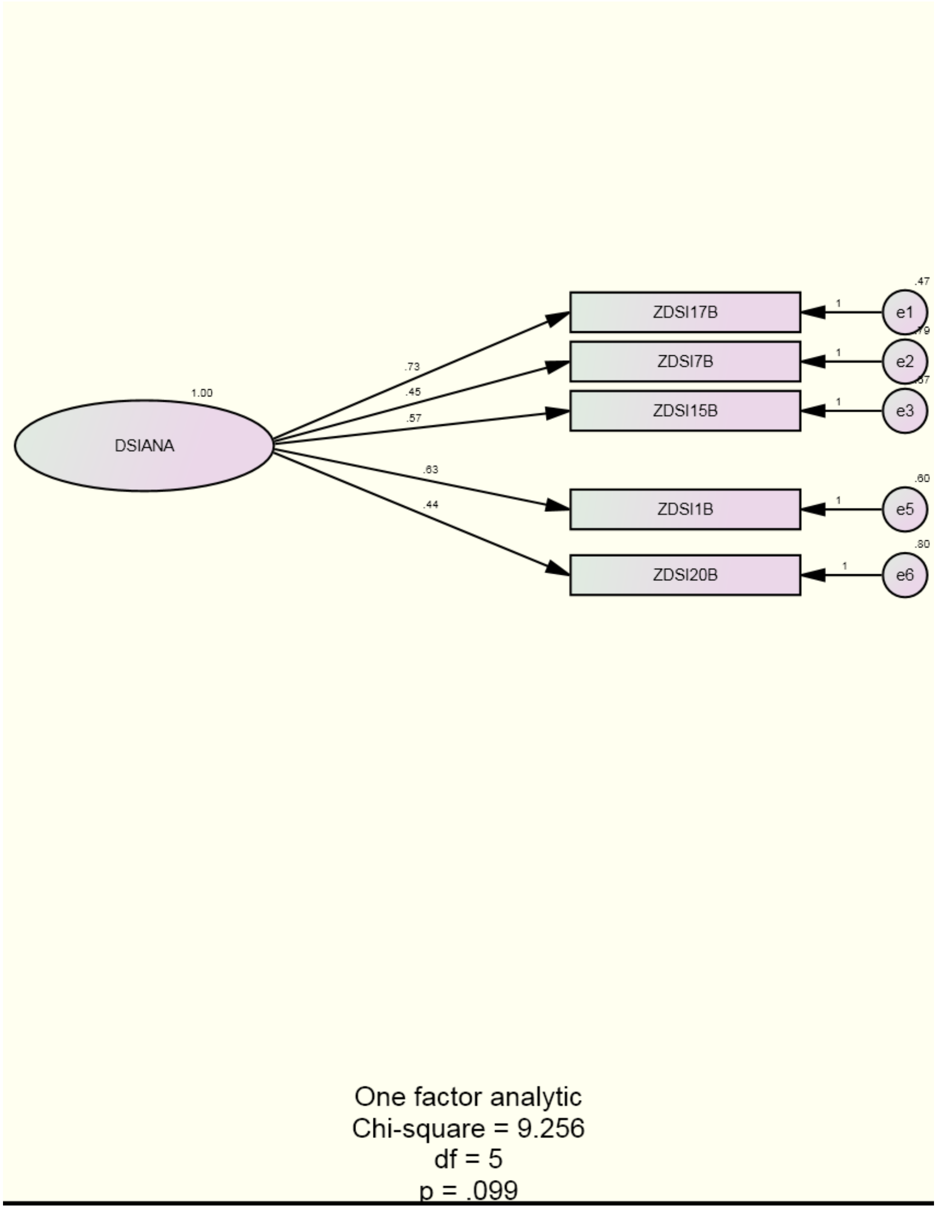
Reliability Statistics

Cronbach's Alpha	N of Items
.702	5

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation

DSIBtotcong	280	-1.81	.95	.0000	.67567
Valid N (listwise)	280				



DECISION STYLES INVENTORY-CONCEPTUAL: EFA AND CFA

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. Chi-Square	364.356
	df	10
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.742	54.831	54.831	2.188	43.754	43.754
2	.665	13.297	68.128			
3	.620	12.405	80.532			
4	.493	9.856	90.389			
5	.481	9.611	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix[a]

	Factor
	1
Zscore: look for creative approaches	.721
Zscore: new approaches / ideas	.707
Zscore: future goals	.672
Zscore: imaginative	.605
Zscore: broad coverage and many options	.592

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 3 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.
4.747	5	.448

Reliability Statistics

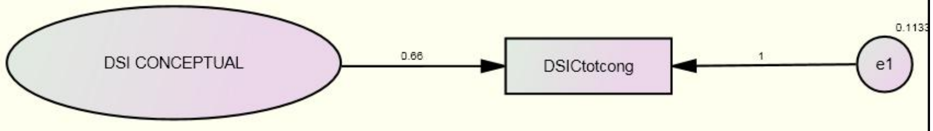
Cronbach's Alpha	N of Items

Reliability Statistics

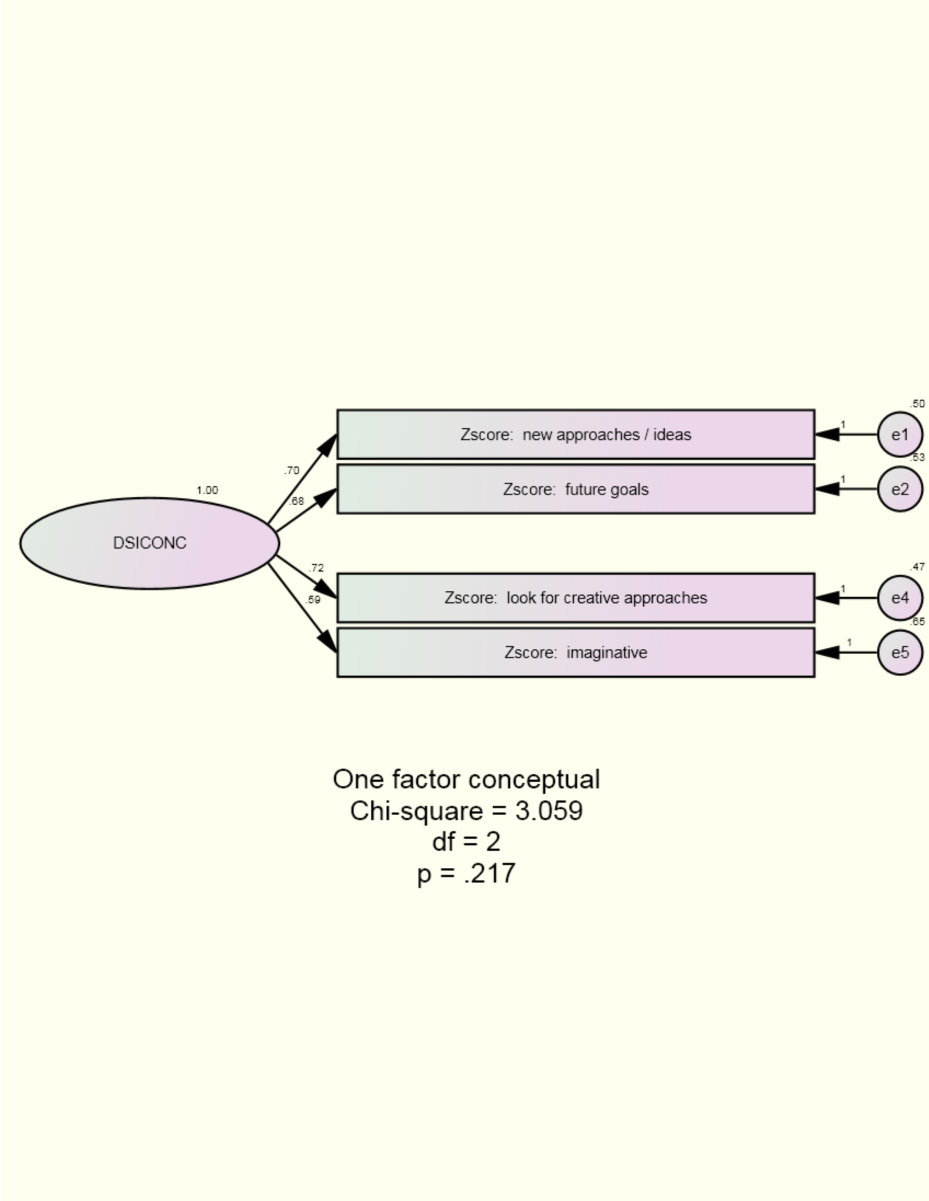
Cronbach's Alpha	N of Items
.793	5

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
DSICtotcong	280	-1.71	1.05	.0000	.73981
Valid N (listwise)	280				



Single indicator latent variable: DSI Conceptual



DECISION STYLES INVENTORY-BEHAVIOURAL: EFA AND CFA

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.818
Bartlett's Test of Sphericity	Approx. Chi-Square	386.694
	df	10
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.760	55.206	55.206	2.232	44.638	44.638

2	.677	13.541	68.746			
3	.618	12.351	81.097			
4	.569	11.384	92.481			
5	.376	7.519	100.000			

Extraction Method: Maximum Likelihood.

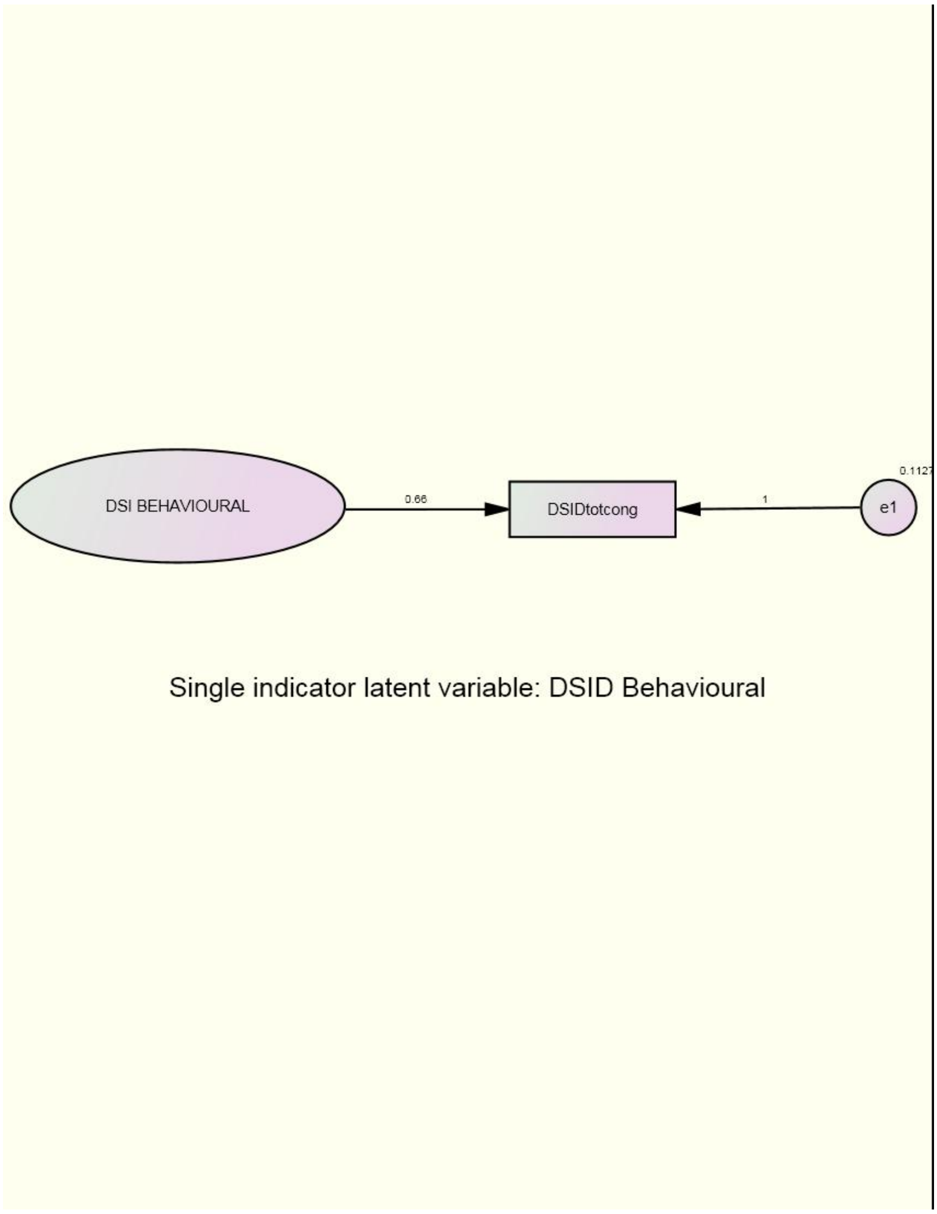
Factor Matrix[a]

	Factor
	1
Zscore: acceptance by group	.824
Zscore: polite and trusting	.695
Zscore: feel secure in job	.612
Zscore: am forgetful	.597
Zscore: good working environment	.582

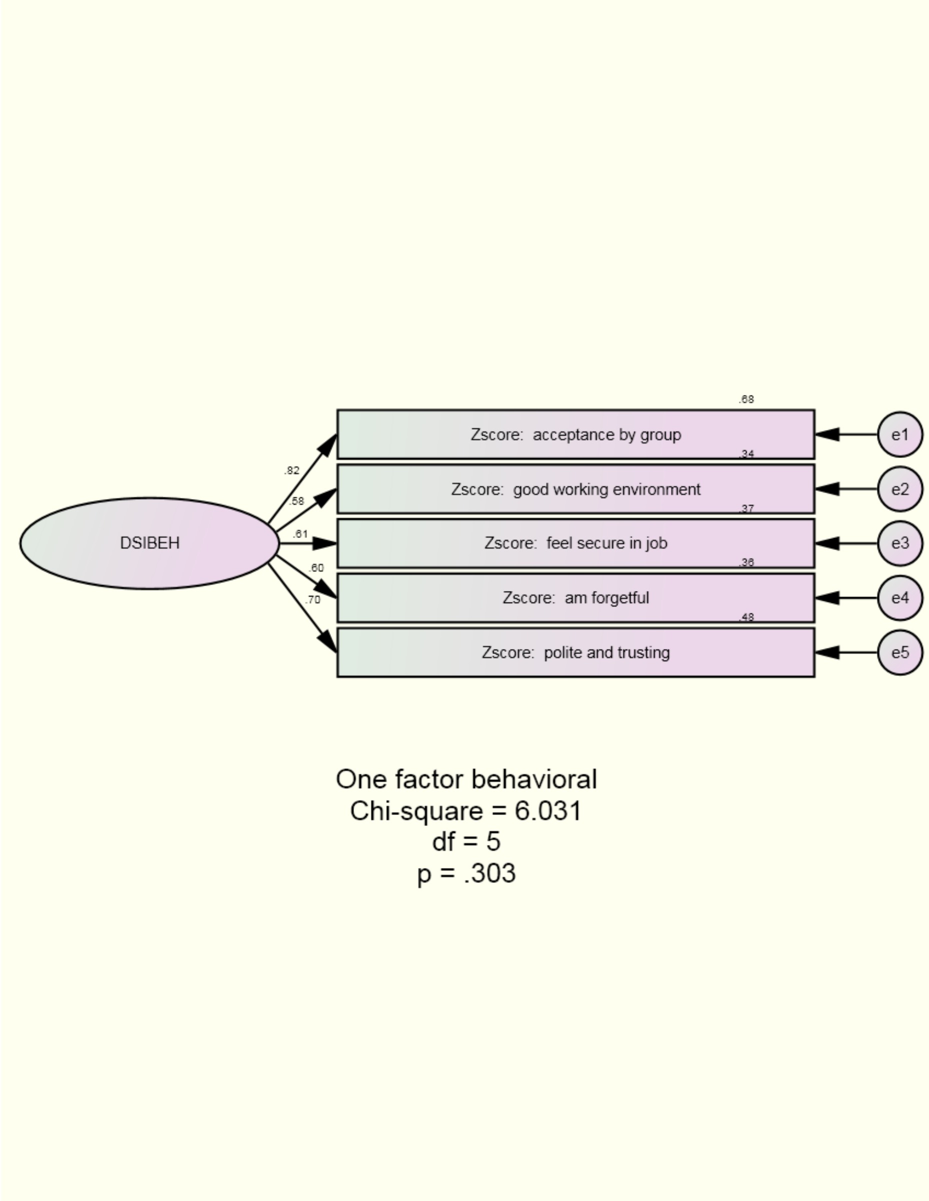
Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 4 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.
5.962	5	.310



Single indicator latent variable: DSID Behavioural



STRATEGY MAKING PROCESSES: EFA AND CFA

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	340.209
	df	10
	Sig.	.000

Total Variance Explained B

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings

	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.639	52.786	52.786	2.079	41.589	41.589
2	.724	14.470	67.257			
3	.648	12.961	80.218			
4	.587	11.734	91.952			
5	.402	8.048	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix[a]

	Factor
	1
Zscore: Strategy is developed by all in ongoing dialogue	.747
Zscore: Planning involves everyone ongoing	.757
Zscore: Middle managers convert top manager vision to strategies	.539
Zscore: Planning involves customers, suppliers and investors	.546
Zscore: Most people have input	.600

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 4 iterations required.

Goodness-of-fit Test

Chi-Square	df	Sig.

Goodness-of-fit Test

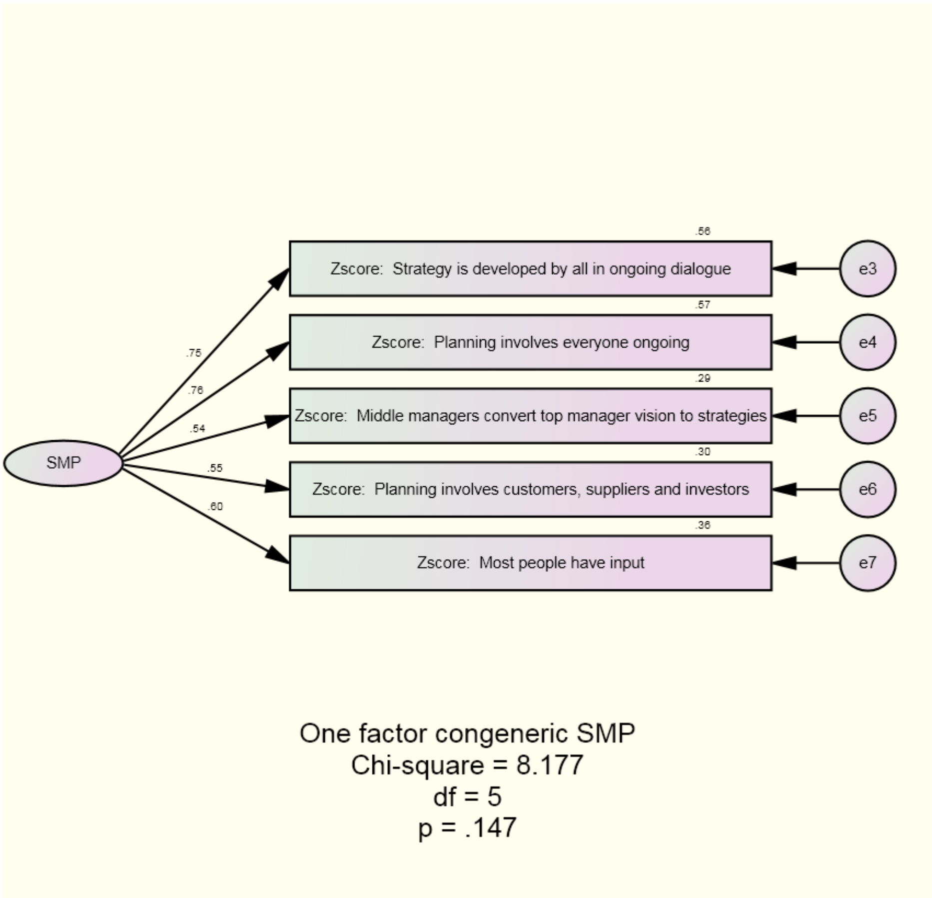
Chi-Square	df	Sig.
8.084	5	.152

Reliability Statistics

Cronbach's Alpha	N of Items
.774	5

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
SMPlatenttot	280	-2.14	1.47	.0000	.72479
Valid N (listwise)	280				



Appendix J

Regression Analysis: TSI, FSA and Decision Styles

TSI, FSA – DSI Directive

Descriptive Statistics

	Mean	Std. Deviation	N
DSIA	.0000000	.71903427	280
FUT	5.5973	1.07412	280
PRES	5.4677	1.09777	280
PAST	3.6893	1.39311	280
TEST	3.8714	1.05621	280
FRAM	4.5134	1.11966	280
ADAPT	4.5411	.97464	280
REACT	2.5600	.88084	280

Correlations

		DSIA	FUT	PRES	PAST	TEST	FRAM
Pearson Correlation	DSIA	1.000	-.324	-.072	.138	-.191	-.266
	FUT	-.324	1.000	.044	-.071	.552	.607
	PRES	-.072	.044	1.000	.212	.085	-.009
	PAST	.138	-.071	.212	1.000	-.191	-.245
	TEST	-.191	.552	.085	-.191	1.000	.724
	FRAM	-.266	.607	-.009	-.245	.724	1.000
	ADAPT	-.223	.583	.029	-.283	.764	.773
	REACT	.257	-.277	.090	.256	-.119	-.132
Sig. (1-tailed)	DSIA	.	.000	.115	.010	.001	.000
	FUT	.000	.	.233	.118	.000	.000
	PRES	.115	.233	.	.000	.077	.443
	PAST	.010	.118	.000	.	.001	.000

	TEST	.001	.000	.077	.001	.	.000
	FRAM	.000	.000	.443	.000	.000	.
	ADAPT	.000	.000	.314	.000	.000	.000
	REACT	.000	.000	.067	.000	.023	.014
N	DSIA	280	280	280	280	280	280
	FUT	280	280	280	280	280	280
	PRES	280	280	280	280	280	280
	PAST	280	280	280	280	280	280
	TEST	280	280	280	280	280	280
	FRAM	280	280	280	280	280	280
	ADAPT	280	280	280	280	280	280
	REACT	280	280	280	280	280	280

Correlations

		ADAPT	REACT
Pearson Correlation	DSIA	-.223	.257
	FUT	.583	-.277
	PRES	.029	.090
	PAST	-.283	.256
	TEST	.764	-.119
	FRAM	.773	-.132
	ADAPT	1.000	-.138
	REACT	-.138	1.000
Sig. (1-tailed)	DSIA	.000	.000
	FUT	.000	.000
	PRES	.314	.067
	PAST	.000	.000
	TEST	.000	.023
	FRAM	.000	.014
	ADAPT	.	.011
	REACT	.011	.

N	DSIA	280	280
	FUT	280	280
	PRES	280	280
	PAST	280	280
	TEST	280	280
	FRAM	280	280
	ADAPT	280	280
	REACT	280	280

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: DSIA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.399[a]	.159	.137	.66789650

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIA

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	22.911	7	3.273	7.337	.000[a]
Residual	121.335	272	.446		
Total	144.246	279			

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIA

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.876	.346		2.529	.012
FUT	-.149	.051	-.223	-2.931	.004
PRES	-.068	.038	-.104	-1.800	.073
PAST	.042	.032	.081	1.302	.194
TEST	.051	.063	.076	.818	.414
FRAM	-.105	.062	-.163	-1.684	.093
ADAPT	.019	.075	.026	.252	.801
REACT	.142	.049	.175	2.895	.004

a. Dependent Variable: DSIA

Coefficients[a]

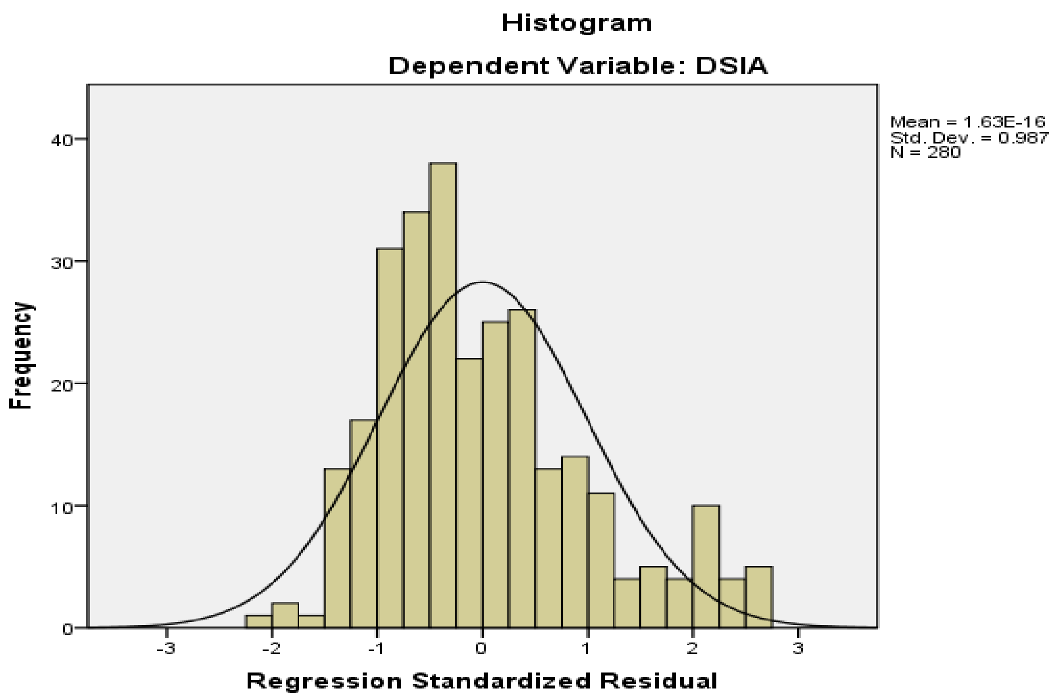
Model	95.0% Confidence Interval for B	
	Lower Bound	Upper Bound
1 (Constant)	.194	1.557
FUT	-.250	-.049
PRES	-.142	.006
PAST	-.021	.105
TEST	-.072	.175
FRAM	-.227	.018
ADAPT	-.129	.167
REACT	.046	.239

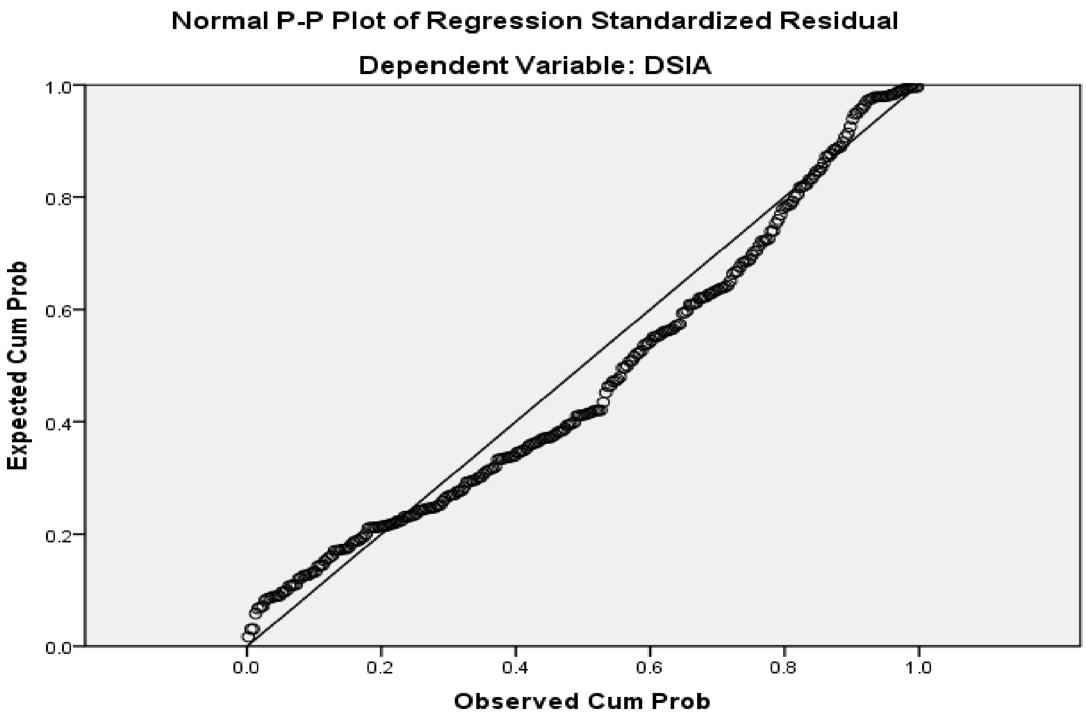
a. Dependent Variable: DSIA

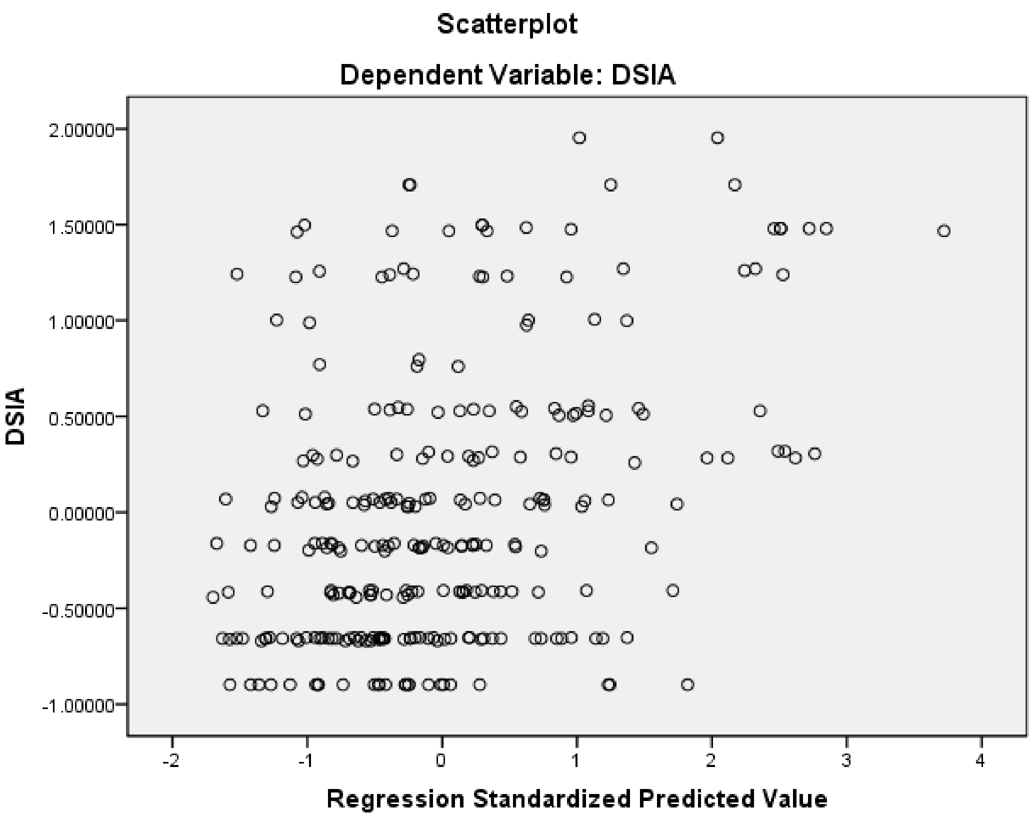
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.4869562	1.0663096	.0000000	.28656006	280
Residual	-1.41951120	1.78997135	.00000000	.65946465	280
Std. Predicted Value	-1.699	3.721	.000	1.000	280
Std. Residual	-2.125	2.680	.000	.987	280

a. Dependent Variable: DSIA




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: DSIA
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: DSIA
DSIA
Regression Standardized Predicted Value
2.00000
1.50000
1.00000
0.50000
0.00000
-0.50000
-1.00000
-2
-1
0
1
2
3
4

TSI, FSA – DSI Analytic

Descriptive Statistics

	Mean	Std. Deviation	N
DSIB	.0000000	.67567206	280
FUT	5.5973	1.07412	280
PRES	5.4677	1.09777	280
PAST	3.6893	1.39311	280
TEST	3.8714	1.05621	280
FRAM	4.5134	1.11966	280
ADAPT	4.5411	.97464	280
REACT	2.5600	.88084	280

Correlations

		DSIB	FUT	PRES	PAST	TEST	FRAM
Pearson Correlation	DSIB	1.000	.155	.214	-.020	.200	.222
	FUT	.155	1.000	.044	-.071	.552	.607
	PRES	.214	.044	1.000	.212	.085	-.009
	PAST	-.020	-.071	.212	1.000	-.191	-.245
	TEST	.200	.552	.085	-.191	1.000	.724
	FRAM	.222	.607	-.009	-.245	.724	1.000
	ADAPT	.223	.583	.029	-.283	.764	.773
	REACT	-.125	-.277	.090	.256	-.119	-.132
Sig. (1-tailed)	DSIB	.	.005	.000	.373	.000	.000
	FUT	.005	.	.233	.118	.000	.000
	PRES	.000	.233	.	.000	.077	.443
	PAST	.373	.118	.000	.	.001	.000
	TEST	.000	.000	.077	.001	.	.000

	FRAM	.000	.000	.443	.000	.000	.
	ADAPT	.000	.000	.314	.000	.000	.000
	REACT	.018	.000	.067	.000	.023	.014
N	DSIB	280	280	280	280	280	280
	FUT	280	280	280	280	280	280
	PRES	280	280	280	280	280	280
	PAST	280	280	280	280	280	280
	TEST	280	280	280	280	280	280
	FRAM	280	280	280	280	280	280
	ADAPT	280	280	280	280	280	280
	REACT	280	280	280	280	280	280

Correlations

		ADAPT	REACT
Pearson Correlation	DSIB	.223	-.125
	FUT	.583	-.277
	PRES	.029	.090
	PAST	-.283	.256
	TEST	.764	-.119
	FRAM	.773	-.132
	ADAPT	1.000	-.138
	REACT	-.138	1.000
Sig. (1-tailed)	DSIB	.000	.018
	FUT	.000	.000
	PRES	.314	.067
	PAST	.000	.000
	TEST	.000	.023
	FRAM	.000	.014
	ADAPT	.	.011

	REACT	.011	.
N	DSIB	280	280
	FUT	280	280
	PRES	280	280
	PAST	280	280
	TEST	280	280
	FRAM	280	280
	ADAPT	280	280
	REACT	280	280

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: DSIB

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.340[a]	.115	.093	.64359917

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIB

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.705	7	2.101	5.071	.000[a]
	Residual	112.668	272	.414		
	Total	127.373	279			

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIB

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.156	.334		-3.466	.001
	FUT	-.033	.049	-.052	-.669	.504
	PRES	.135	.036	.219	3.701	.000
	PAST	.017	.031	.036	.564	.574
	TEST	-.003	.061	-.005	-.048	.961
	FRAM	.095	.060	.157	1.581	.115
	ADAPT	.084	.073	.121	1.160	.247
	REACT	-.101	.047	-.131	-2.126	.034

a. Dependent Variable: DSIB

Coefficients[a]

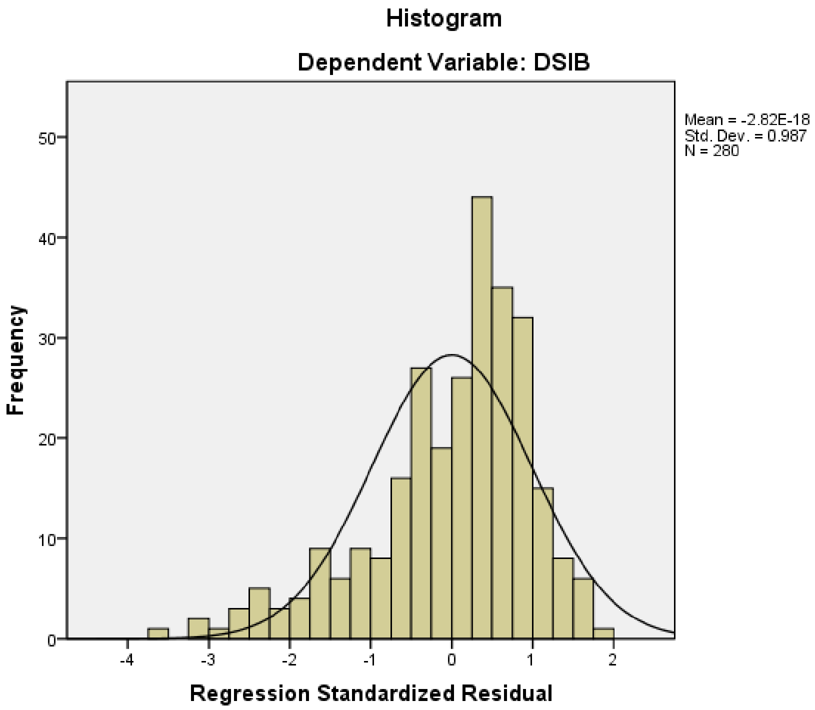
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-1.813	-.500
	FUT	-.130	.064
	PRES	.063	.206
	PAST	-.043	.078
	TEST	-.122	.116
	FRAM	-.023	.213
	ADAPT	-.059	.227
	REACT	-.194	-.007

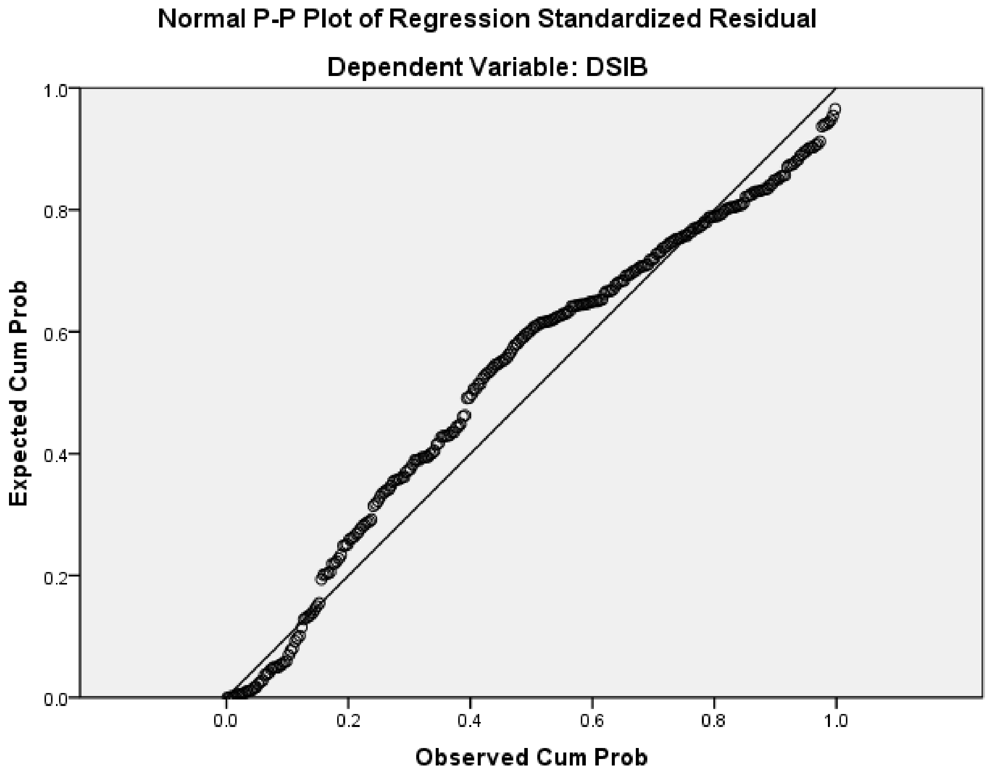
a. Dependent Variable: DSIB

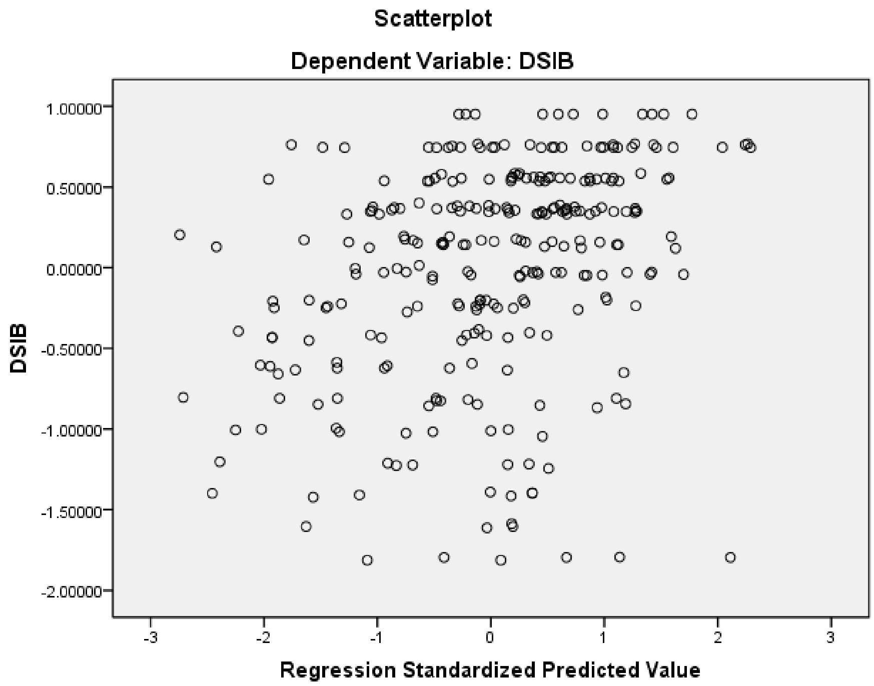
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.6298035	.5256402	.0000000	.22957669	280
Residual	-2.28021049	1.16621733	.00000000	.63547406	280
Std. Predicted Value	-2.743	2.290	.000	1.000	280
Std. Residual	-3.543	1.812	.000	.987	280

a. Dependent Variable: DSIB




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: DSIB
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: DSIB
DSIB
Regression Standardized Predicted Value
1.00000
0.50000
0.00000
-0.50000
-1.00000
-1.50000
-2.00000
-3
-2
-1
0
1
2
3

TSI, FSA – DSI Conceptual

Descriptive Statistics

	Mean	Std. Deviation	N
DSIC	.0000000	.76923252	280
FUT	5.5973	1.07412	280
PRES	5.4677	1.09777	280
PAST	3.6893	1.39311	280
TEST	3.8714	1.05621	280
FRAM	4.5134	1.11966	280
ADAPT	4.5411	.97464	280
REACT	2.5600	.88084	280

Correlations

		DSIC	FUT	PRES	PAST	TEST	FRAM
Pearson Correlation	DSIC	1.000	.506	-.065	-.191	.313	.472
	FUT	.506	1.000	.044	-.071	.552	.607
	PRES	-.065	.044	1.000	.212	.085	-.009
	PAST	-.191	-.071	.212	1.000	-.191	-.245
	TEST	.313	.552	.085	-.191	1.000	.724
	FRAM	.472	.607	-.009	-.245	.724	1.000
	ADAPT	.372	.583	.029	-.283	.764	.773
	REACT	-.211	-.277	.090	.256	-.119	-.132
Sig. (1-tailed)	DSIC	.	.000	.139	.001	.000	.000

	FUT	.000	.	.233	.118	.000	.000
	PRES	.139	.233	.	.000	.077	.443
	PAST	.001	.118	.000	.	.001	.000
	TEST	.000	.000	.077	.001	.	.000
	FRAM	.000	.000	.443	.000	.000	.
	ADAPT	.000	.000	.314	.000	.000	.000
	REACT	.000	.000	.067	.000	.023	.014
N	DSIC	280	280	280	280	280	280
	FUT	280	280	280	280	280	280
	PRES	280	280	280	280	280	280
	PAST	280	280	280	280	280	280
	TEST	280	280	280	280	280	280
	FRAM	280	280	280	280	280	280
	ADAPT	280	280	280	280	280	280
	REACT	280	280	280	280	280	280

Correlations

		ADAPT	REACT
Pearson Correlation	DSIC	.372	-.211
	FUT	.583	-.277
	PRES	.029	.090
	PAST	-.283	.256
	TEST	.764	-.119
	FRAM	.773	-.132
	ADAPT	1.000	-.138
	REACT	-.138	1.000
Sig. (1-tailed)	DSIC	.000	.000
	FUT	.000	.000
	PRES	.314	.067

	PAST	.000	.000
	TEST	.000	.023
	FRAM	.000	.014
	ADAPT	.	.011
	REACT	.011	.
N	DSIC	280	280
	FUT	280	280
	PRES	280	280
	PAST	280	280
	TEST	280	280
	FRAM	280	280
	ADAPT	280	280
	REACT	280	280

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: DSIC

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.572[a]	.327	.310	.63905824

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIC

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	54.006	7	7.715	18.891	.000[a]
Residual	111.084	272	.408		
Total	165.090	279			

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSIC

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	-1.564	.331		-4.721	.000
FUT	.270	.049	.377	5.535	.000
PRES	-.029	.036	-.041	-.796	.427
PAST	-.053	.031	-.096	-1.716	.087
TEST	-.093	.060	-.128	-1.546	.123
FRAM	.235	.059	.342	3.954	.000
ADAPT	-.038	.072	-.048	-.528	.598
REACT	-.048	.047	-.055	-1.026	.306

a. Dependent Variable: DSIC

Coefficients[a]

Model	95.0% Confidence Interval for B	
	Lower Bound	Upper Bound
1(Constant)	-2.216	-.912
FUT	.174	.366
PRES	-.100	.042

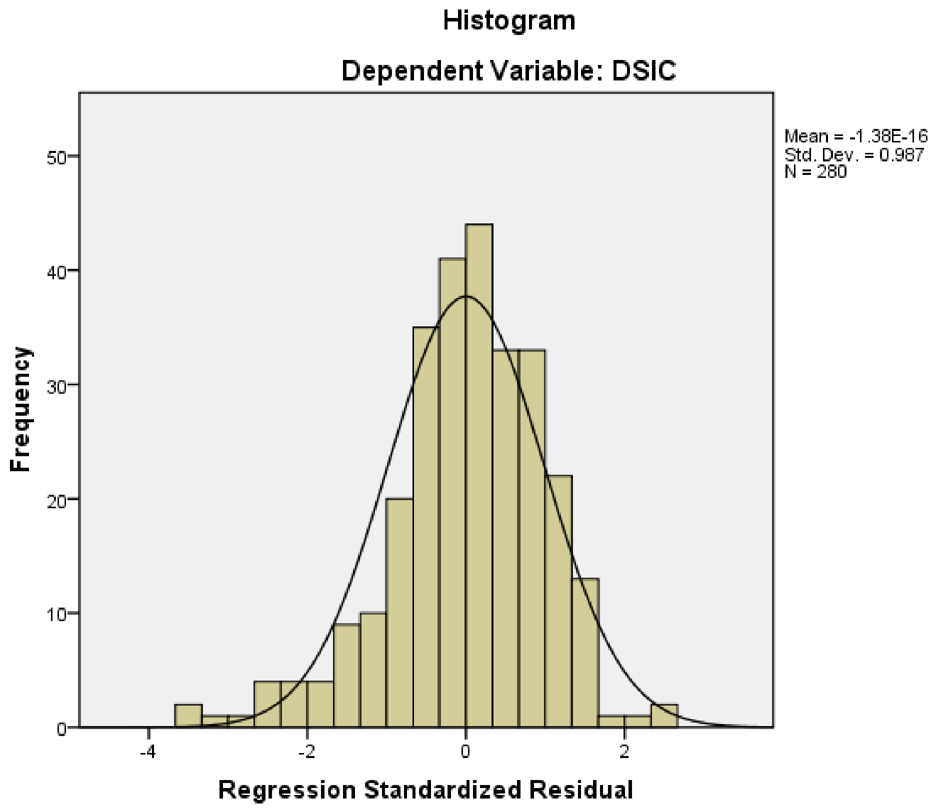
PAST	-.113	.008
TEST	-.212	.025
FRAM	.118	.352
ADAPT	-.180	.104
REACT	-.141	.044

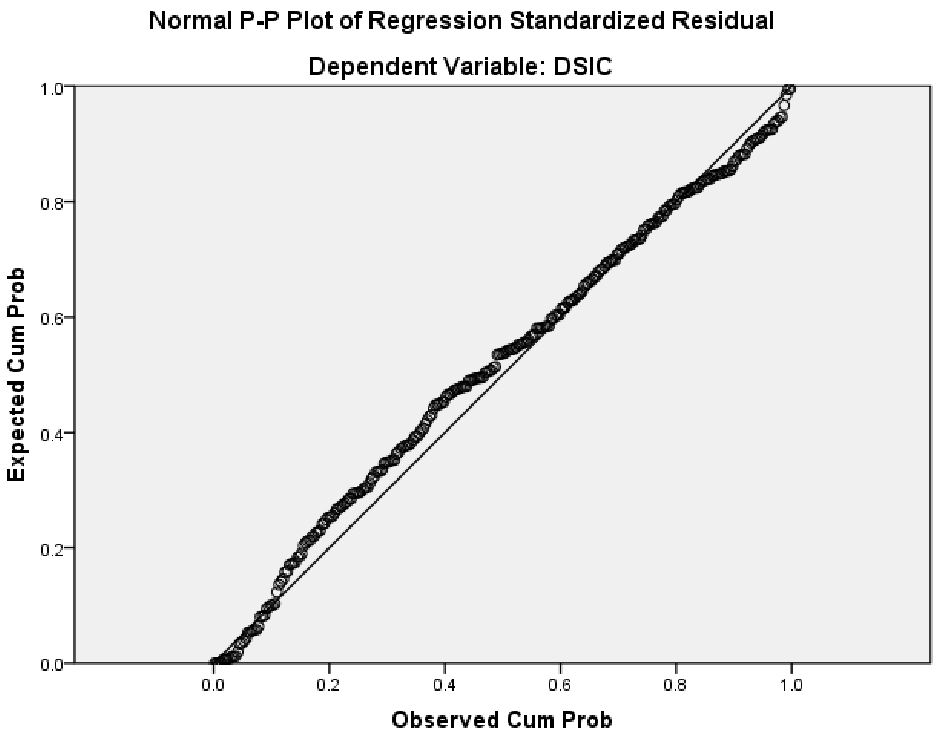
a. Dependent Variable: DSIC

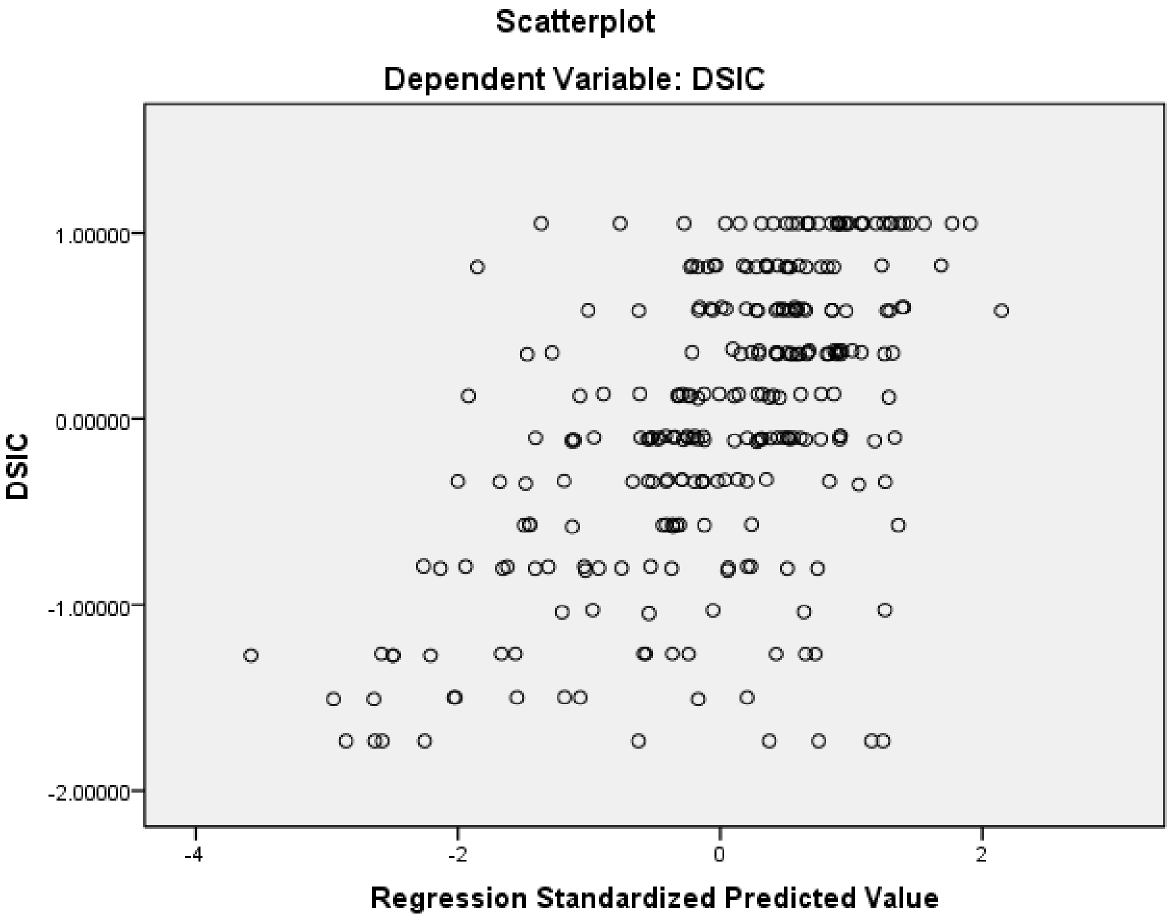
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-1.5746468	.9444277	.0000000	.43996558	280
Residual	-2.27854681	1.65085983	.00000000	.63099045	280
Std. Predicted Value	-3.579	2.147	.000	1.000	280
Std. Residual	-3.565	2.583	.000	.987	280

a. Dependent Variable: DSIC


Histogram
Dependent Variable: DSIC
Mean = -1.38E-16
Std. Dev. = 0.987
N = 280
Frequency
0
10
20
30
40
50
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: DSIC
Expected Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob


Scatterplot
Dependent Variable: DSIC
1.00000
0.00000
-1.00000
-2.00000
DSIC
-4
-2
0
2
Regression Standardized Predicted Value

TSI, FSA – DSI behavioural

Descriptive Statistics

	Mean	Std. Deviation	N
DSID	.0000000	.74143174	280
FUT	5.5973	1.07412	280
PRES	5.4677	1.09777	280
PAST	3.6893	1.39311	280
TEST	3.8714	1.05621	280
FRAM	4.5134	1.11966	280
ADAPT	4.5411	.97464	280
REACT	2.5600	.88084	280

Correlations

		DSID	FUT	PRES	PAST	TEST	FRAM
Pearson Correlation	DSID	1.000	-.227	-.138	.133	-.200	-.281
	FUT	-.227	1.000	.044	-.071	.552	.607
	PRES	-.138	.044	1.000	.212	.085	-.009
	PAST	.133	-.071	.212	1.000	-.191	-.245
	TEST	-.200	.552	.085	-.191	1.000	.724
	FRAM	-.281	.607	-.009	-.245	.724	1.000
	ADAPT	-.196	.583	.029	-.283	.764	.773
	REACT	.125	-.277	.090	.256	-.119	-.132
Sig. (1-tailed)	DSID	.	.000	.011	.013	.000	.000
	FUT	.000	.	.233	.118	.000	.000
	PRES	.011	.233	.	.000	.077	.443
	PAST	.013	.118	.000	.	.001	.000
	TEST	.000	.000	.077	.001	.	.000
	FRAM	.000	.000	.443	.000	.000	.
	ADAPT	.000	.000	.314	.000	.000	.000

	REACT	.018	.000	.067	.000	.023	.014
N	DSID	280	280	280	280	280	280
	FUT	280	280	280	280	280	280
	PRES	280	280	280	280	280	280
	PAST	280	280	280	280	280	280
	TEST	280	280	280	280	280	280
	FRAM	280	280	280	280	280	280
	ADAPT	280	280	280	280	280	280
	REACT	280	280	280	280	280	280

Correlations

		ADAPT	REACT
Pearson Correlation	DSID	-.196	.125
	FUT	.583	-.277
	PRES	.029	.090
	PAST	-.283	.256
	TEST	.764	-.119
	FRAM	.773	-.132
	ADAPT	1.000	-.138
	REACT	-.138	1.000
Sig. (1-tailed)	DSID	.000	.018
	FUT	.000	.000
	PRES	.314	.067
	PAST	.000	.000
	TEST	.000	.023
	FRAM	.000	.014
	ADAPT	.	.011
	REACT	.011	.
N	DSID	280	280

	FUT	280	280
	PRES	280	280
	PAST	280	280
	TEST	280	280
	FRAM	280	280
	ADAPT	280	280
	REACT	280	280

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: DSID

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.352[a]	.124	.101	.70291519

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSID

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	18.980	7	2.711	5.488	.000[a]
Residual	134.392	272	.494		
Total	153.372	279			

a. Predictors: (Constant), REACT, PRES, FRAM, PAST, FUT, TEST, ADAPT

b. Dependent Variable: DSID

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.058	.364		2.904	.004
FUT	-.065	.054	-.095	-1.216	.225
PRES	-.115	.040	-.170	-2.898	.004
PAST	.059	.034	.111	1.740	.083
TEST	.013	.066	.018	.192	.848
FRAM	-.194	.065	-.294	-2.974	.003
ADAPT	.090	.079	.118	1.132	.259
REACT	.055	.052	.065	1.063	.289

a. Dependent Variable: DSID

Coefficients[a]

Model	95.0% Confidence Interval for B	
	Lower Bound	Upper Bound
1 (Constant)	.341	1.776
FUT	-.171	.040
PRES	-.193	-.037
PAST	-.008	.125
TEST	-.118	.143
FRAM	-.323	-.066
ADAPT	-.066	.246
REACT	-.047	.157

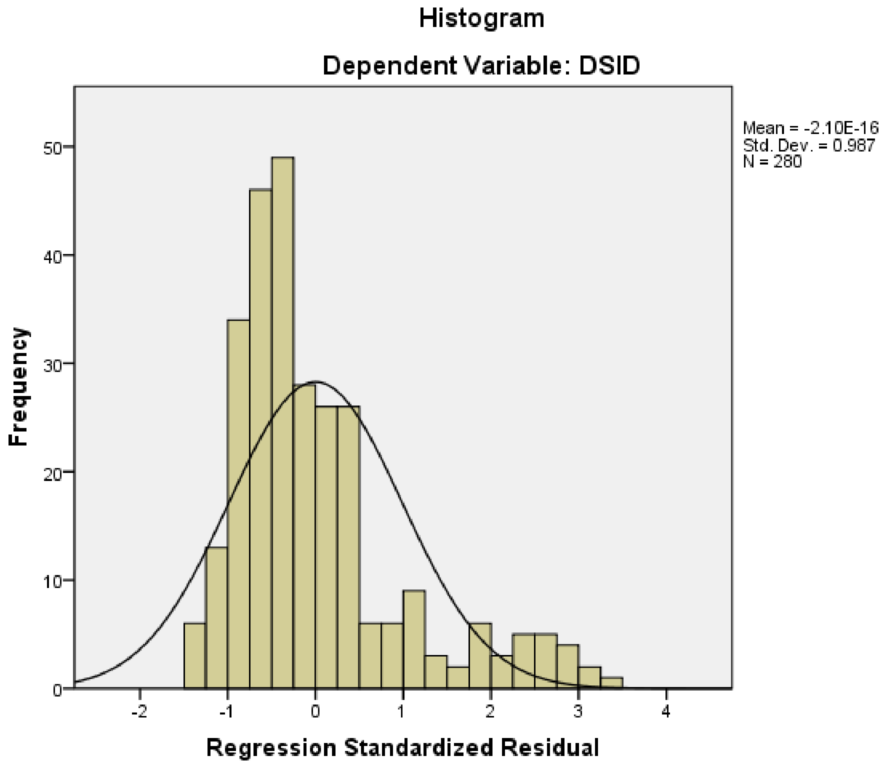
a. Dependent Variable: DSID

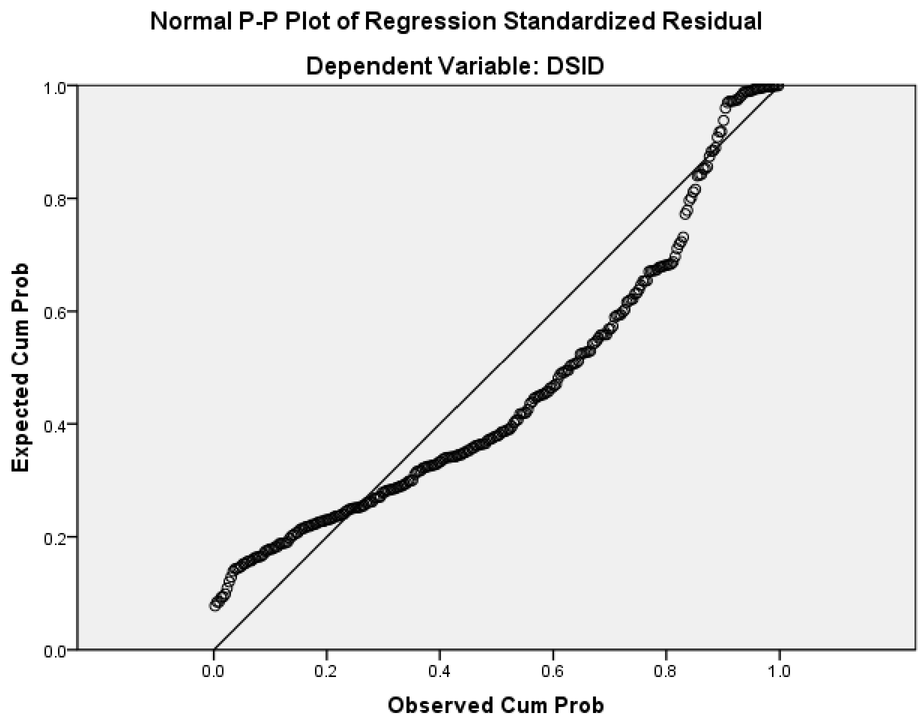
Residuals Statistics[a]

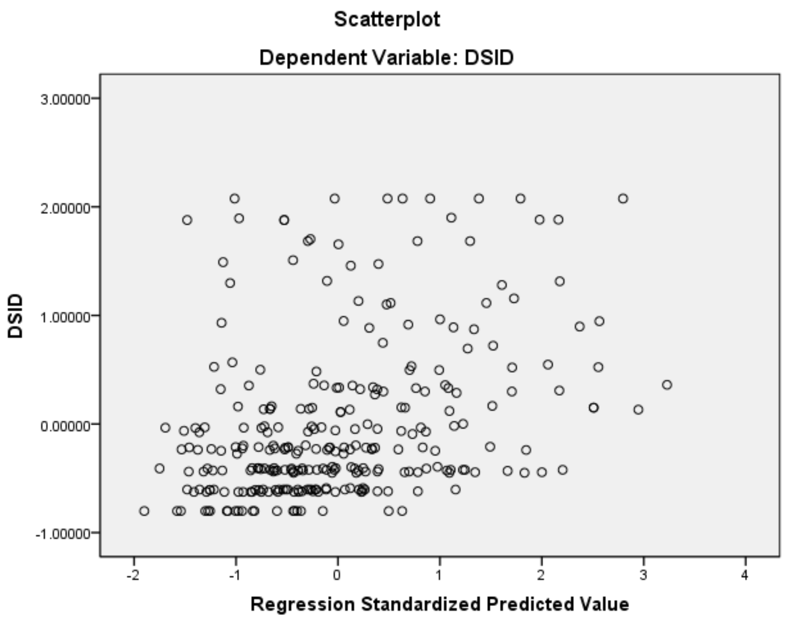
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.4956336	.8420612	.0000000	.26082135	280

Residual	-.99728060	2.34045410	.00000000	.69404124	280
Std. Predicted Value	-1.900	3.228	.000	1.000	280
Std. Residual	-1.419	3.330	.000	.987	280

a. Dependent Variable: DSID




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: DSID
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: DSID
DSID
Regression Standardized Predicted Value
3.00000
2.00000
1.00000
0.00000
-1.00000
-2
-1
0
1
2
3
4

Appendix K

AMOS Output Main SEM Model

Notes for Model (Default model)
Computation of degrees of freedom (Default model)

Number of distinct sample moments:	15
Number of distinct parameters to be estimated:	13
Degrees of freedom (15 - 13):	2

Result (Default model)
Minimum was achieved
Chi-square = 5.077
Degrees of freedom = 2
Probability level = .079

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
ANA	<---	TSI	.203	.054	3.788	***	
CONC	<---	FSA	.374	.072	5.181	***	
CONC	<---	ANA	.507	.081	6.297	***	
CONC	<---	TSI	-.068	.054	-1.247	.212	
SMP	<---	ANA	.375	.110	3.408	***	
SMP	<---	CONC	-.280	.110	-2.539	.011	
SMP	<---	FSA	.381	.091	4.191	***	
TSIlattot	<---	TSI	.470				
FSAlattot	<---	FSA	.650				
DSICtotcong	<---	CONC	.660				
SMPlatenttot	<---	SMP	.640				
DSIBtotcong	<---	ANA	.570				

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
ANA	<---	TSI	.288
CONC	<---	FSA	.363
CONC	<---	ANA	.488
CONC	<---	TSI	-.092
SMP	<---	ANA	.328
SMP	<---	CONC	-.255
SMP	<---	FSA	.337
TSIlattot	<---	TSI	.914
FSAlattot	<---	FSA	.905
DSICtotcong	<---	CONC	.896
SMPlatenttot	<---	SMP	.903
DSIBtotcong	<---	ANA	.837

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
TSI	<-->	FSA	.425	.105	4.063	***	

Correlations: (Group number 1 - Default model)

			Estimate
TSI	<-->	FSA	.303

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
TSI	1.978	.201	9.858	***	
FSA	1.000	.103	9.678	***	
e7	.900	.113	7.977	***	

	Estimate	S.E.	C.R.	P	Label
e8	.675	.091	7.422	***	
e9	1.075	.124	8.642	***	
e3	.136				
e4	.113				
e5	.119				
e1	.087				
e2	.093				

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
ANA	.083
CONC	.363
SMP	.158
DSIBtotcong	.701
SMPlatenttot	.815
DSICtotcong	.803
FSAlattot	.819
TSIlattot	.835

Matrices (Group number 1 - Default model)

Implied (for all variables) Covariances (Group number 1 - Default model)

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
FSA	1.000									
TSI	.425	1.978								

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
ANA	.086	.401	.981							
CONC	.389	.229	.503	1.060						
SMP	.304	.248	.260	.039	1.277					
DSIBtotcong	.049	.229	.559	.287	.148	.455				
SMPlatenttot	.195	.159	.166	.025	.817	.095	.642			
DSICtotcong	.256	.151	.332	.700	.026	.189	.017	.575		
FSAlattot	.650	.277	.056	.253	.198	.032	.127	.167	.515	
TSIlattot	.200	.930	.189	.108	.117	.107	.075	.071	.130	.524

Implied (for all variables) Correlations (Group number 1 - Default model)

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
FSA	1.000									
TSI	.303	1.000								
ANA	.087	.288	1.000							
CONC	.377	.158	.493	1.000						
SMP	.26	.15	.23	.03	1.0					

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
	9	6	2	4	00					
DSIBtotcong	.073	.241	.837	.413	.194	1.000				
SMPlatenttot	.243	.141	.209	.031	.903	.175	1.000			
DSICtotcong	.338	.142	.442	.896	.030	.370	.027	1.000		
FSAlattot	.905	.274	.079	.342	.244	.066	.220	.306	1.000	
TSIlattot	.276	.914	.263	.144	.143	.220	.129	.129	.250	1.000

Implied Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	.455				
SMPlatenttot	.095	.642			
DSICtotcong	.189	.017	.575		
FSAlattot	.032	.127	.167	.515	
TSIlattot	.107	.075	.071	.130	.524

Implied Correlations (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	1.000				
SMPlatenttot	.175	1.000			
DSICtotcong	.370	.027	1.000		
FSAlattot	.066	.220	.306	1.000	
TSIlattot	.220	.129	.129	.250	1.000

Residual Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	.000				
SMPlatenttot	.012	.005			
DSICtotcong	.018	.009	.014		
FSAlattot	.059	.010	.024	.000	
TSIlattot	-.004	.007	-.002	-.003	.000

Standardized Residual Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	.005				
SMPlatenttot	.367	.085			
DSICtotcong	.551	.237	.298		
FSAlattot	2.039	.284	.694	.001	
TSIlattot	-.133	.186	-.053	-.107	.007

Modification Indices (Group number 1 - Default model)

Covariances: (Group number 1 - Default model)

			M.I.	Par Change
e7	<-->	FSA	4.648	.155
e3	<-->	FSA	4.151	.078
e2	<-->	e7	4.130	.089

Variances: (Group number 1 - Default model)

	M.I.	Par Change

Regression Weights: (Group number 1 - Default model)

	M.I.	Par Change

			M.I.	Par Change
ANA	<---	FSA	4.082	.150
FSAlattot	<---	DSIBtotcong	4.018	.115

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	13	5.077	2	.079	2.538
Saturated model	15	.000	0		
Independence model	5	138.544	10	.000	13.854

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.018	.993	.946	.132
Saturated model	.000	1.000		
Independence model	.102	.820	.729	.546

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.963	.817	.977	.880	.976
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.200	.193	.195
Saturated model	.000	.000	.000

Model	PRATIO	PNFI	PCFI
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	3.077	.000	13.863
Saturated model	.000	.000	.000
Independence model	128.544	94.180	170.354

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.018	.011	.000	.050
Saturated model	.000	.000	.000	.000
Independence model	.497	.461	.338	.611

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.074	.000	.158	.227
Independence model	.215	.184	.247	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	31.077	31.648	78.329	91.329
Saturated model	30.000	30.659	84.522	99.522
Independence model	148.544	148.763	166.718	171.718

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.111	.100	.150	.113
Saturated model	.108	.108	.108	.110

Model	ECVI	LO 90	HI 90	MECVI
Independence model	.532	.409	.682	.533

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	330	507
Independence model	37	47

Appendix L

AMOS Output Modified SEM Model

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments:	15
Number of distinct parameters to be estimated:	12
Degrees of freedom (15 - 12):	3

Result (Default model)

Minimum was achieved

Chi-square = 6.678

Degrees of freedom = 3

Probability level = .083

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
ANA	<---	TSI	.193	.053	3.634	***	
CONC	<---	FSA	.347	.068	5.090	***	
CONC	<---	ANA	.477	.076	6.310	***	
SMP	<---	ANA	.370	.109	3.385	***	
SMP	<---	CONC	-.273	.109	-2.494	.013	
SMP	<---	FSA	.379	.091	4.174	***	
TSIlattot	<---	TSI	.470				
FSAlattot	<---	FSA	.650				
DSICtotcong	<---	CONC	.660				
SMPlatenttot	<---	SMP	.640				
DSIBtotcong	<---	ANA	.570				

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate

			Estimate
ANA	<---	TSI	.274
CONC	<---	FSA	.336
CONC	<---	ANA	.459
SMP	<---	ANA	.325
SMP	<---	CONC	-.249
SMP	<---	FSA	.335
TSIlattot	<---	TSI	.914
FSAlattot	<---	FSA	.905
DSICtotcong	<---	CONC	.896
SMPlatenttot	<---	SMP	.903
DSIBtotcong	<---	ANA	.838

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
TSI	<-->	FSA	.418	.105	4.003	***	

Correlations: (Group number 1 - Default model)

			Estimate
TSI	<-->	FSA	.297

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
TSI	1.979	.201	9.858	***	
FSA	1.000	.103	9.679	***	
e7	.910	.113	8.031	***	
e8	.692	.091	7.647	***	
e9	1.075	.124	8.641	***	

	Estimate	S.E.	C.R.	P	Label
e3	.136				
e4	.113				
e5	.119				
e1	.087				
e2	.093				

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
ANA	.075
CONC	.349
SMP	.157
DSIBtotcong	.702
SMPlatenttot	.815
DSICtotcong	.803
FSAlattot	.819
TSIlattot	.835

Matrices (Group number 1 - Default model)

Implied (for all variables) Covariances (Group number 1 - Default model)

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
FSA	1.000									
TSI	.418	1.979								
ANA	.081	.383	.984							

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
CONC	.385	.328	.497	1.063						
SMP	.303	.211	.259	.040	1.275					
DSIBtotcong	.046	.218	.561	.283	.148	.456				
SMPlatenttot	.194	.135	.166	.026	.816	.095	.641			
DSICtotcong	.254	.216	.328	.702	.026	.187	.017	.576		
FSAlattot	.650	.272	.053	.250	.197	.030	.126	.165	.516	
TSIlattot	.197	.930	.180	.154	.099	.102	.063	.102	.128	.524

Implied (for all variables) Correlations (Group number 1 - Default model)

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
FSA	1.000									
TSI	.297	1.000								
ANA	.082	.274	1.000							
CONC	.374	.226	.486	1.000						
SMP	.269	.133	.231	.034	1.000					
DSIBto	.06	.23	.83	.40	.19	1.000				

	FSA	TSI	ANA	CONC	SMP	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
tcong	8	0	8	7	4					
SMPlatenttot	.243	.120	.209	.031	.903	.175	1.000			
DSICtotcong	.335	.202	.436	.896	.031	.365	.028	1.000		
FSAlattot	.905	.269	.074	.338	.243	.062	.220	.303	1.000	
TSIlattot	.272	.914	.251	.206	.121	.210	.109	.185	.246	1.000

Implied Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	.456				
SMPlatenttot	.095	.641			
DSICtotcong	.187	.017	.576		
FSAlattot	.030	.126	.165	.516	
TSIlattot	.102	.063	.102	.128	.524

Implied Correlations (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	1.000				
SMPlatenttot	.175	1.000			
DSICtotcong	.365	.028	1.000		
FSAlattot	.062	.220	.303	1.000	
TSIlattot	.210	.109	.185	.246	1.000

Residual Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	-.001				
SMPlatenttot	.012	.005			
DSICtotcong	.020	.008	.013		
FSAlattot	.061	.010	.025	.000	
TSIlattot	.001	.018	-.032	-.001	.000

Standardized Residual Covariances (Group number 1 - Default model)

	DSIBtotcong	SMPlatenttot	DSICtotcong	FSAlattot	TSIlattot
DSIBtotcong	-.019				
SMPlatenttot	.372	.094			
DSICtotcong	.616	.233	.271		
FSAlattot	2.105	.292	.734	-.004	
TSIlattot	.034	.510	-.966	-.039	.007

Total Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC
ANA	.000	.193	.000	.000
CONC	.347	.092	.477	.000
SMP	.284	.046	.240	-.273
DSIBtotcong	.000	.110	.570	.000
SMPlatenttot	.182	.030	.154	-.175
DSICtotcong	.229	.061	.315	.660
FSAlattot	.650	.000	.000	.000
TSIlattot	.000	.470	.000	.000

Standardized Total Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC

	FSA	TSI	ANA	CONC
ANA	.000	.274	.000	.000
CONC	.336	.126	.459	.000
SMP	.251	.058	.211	-.249
DSIBtotcong	.000	.230	.838	.000
SMPlatenttot	.227	.052	.190	-.225
DSICtotcong	.301	.113	.411	.896
FSAlattot	.905	.000	.000	.000
TSIlattot	.000	.914	.000	.000

Direct Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC
ANA	.000	.193	.000	.000
CONC	.347	.000	.477	.000
SMP	.379	.000	.370	-.273
DSIBtotcong	.000	.000	.570	.000
SMPlatenttot	.000	.000	.000	.000
DSICtotcong	.000	.000	.000	.660
FSAlattot	.650	.000	.000	.000
TSIlattot	.000	.470	.000	.000

Standardized Direct Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC
ANA	.000	.274	.000	.000
CONC	.336	.000	.459	.000
SMP	.335	.000	.325	-.249
DSIBtotcong	.000	.000	.838	.000

	FSA	TSI	ANA	CONC
SMPlatenttot	.000	.000	.000	.000
DSICtotcong	.000	.000	.000	.896
FSAlattot	.905	.000	.000	.000
TSIlattot	.000	.914	.000	.000

Indirect Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC
ANA	.000	.000	.000	.000
CONC	.000	.092	.000	.000
SMP	-.095	.046	-.130	.000
DSIBtotcong	.000	.110	.000	.000
SMPlatenttot	.182	.030	.154	-.175
DSICtotcong	.229	.061	.315	.000
FSAlattot	.000	.000	.000	.000
TSIlattot	.000	.000	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	FSA	TSI	ANA	CONC
ANA	.000	.000	.000	.000
CONC	.000	.126	.000	.000
SMP	-.084	.058	-.114	.000
DSIBtotcong	.000	.230	.000	.000
SMPlatenttot	.227	.052	.190	-.225
DSICtotcong	.301	.113	.411	.000
FSAlattot	.000	.000	.000	.000
TSIlattot	.000	.000	.000	.000

Modification Indices (Group number 1 - Default model)

Covariances: (Group number 1 - Default model)

			M.I.	Par Change
e7	<-->	FSA	5.017	.163
e2	<-->	e7	4.065	.089

Variances: (Group number 1 - Default model)

	M.I.	Par Change

Regression Weights: (Group number 1 - Default model)

			M.I.	Par Change
ANA	<---	FSA	4.424	.157
FSAlattot	<---	DSIBtotcong	4.023	.116

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	12	6.678	3	.083	2.226
Saturated model	15	.000	0		
Independence model	5	138.544	10	.000	13.854

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.021	.991	.953	.198
Saturated model	.000	1.000		
Independence model	.102	.820	.729	.546

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.952	.839	.973	.905	.971

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.300	.286	.291
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	3.678	.000	15.294
Saturated model	.000	.000	.000
Independence model	128.544	94.180	170.354

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.024	.013	.000	.055
Saturated model	.000	.000	.000	.000
Independence model	.497	.461	.338	.611

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.066	.000	.135	.272
Independence model	.215	.184	.247	.000

AIC

Model	AIC	BCC	BIC	CAIC

Model	AIC	BCC	BIC	CAIC
Default model	30.678	31.205	74.295	86.295
Saturated model	30.000	30.659	84.522	99.522
Independence model	148.544	148.763	166.718	171.718

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.110	.097	.152	.112
Saturated model	.108	.108	.108	.110
Independence model	.532	.409	.682	.533

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	327	474
Independence model	37	47

Appendix M

Regression Analysis: Interaction Terms

EDUCATION LEVEL – DSI Conceptual

Correlations

		DSICtotcong	TSIlattot	EDULEV_c	TSIEDULEV
Pearson Correlation	DSICtotcong	1.000	.125	.124	.011
	TSIlattot	.125	1.000	.114	-.037
	EDULEV_c	.124	.114	1.000	-.078
	TSIEDULEV	.011	-.037	-.078	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.019	.429
	TSIlattot	.019	.	.028	.266
	EDULEV_c	.019	.028	.	.097
	TSIEDULEV	.429	.266	.097	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	EDULEV_c	280	280	280	280
	TSIEDULEV	280	280	280	280

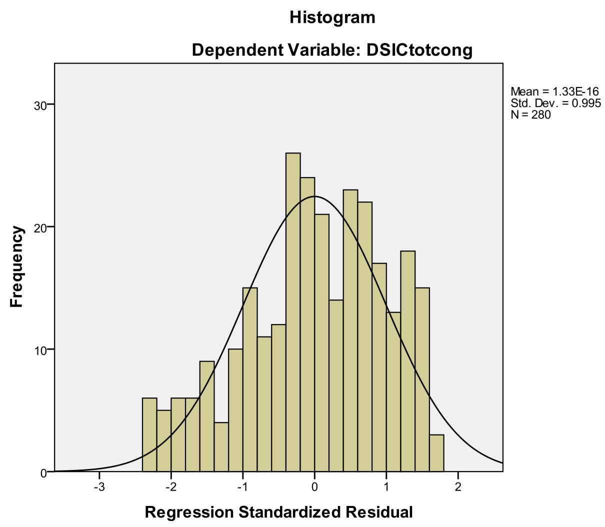
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.167[a]	.028	.021	.76121	.028	3.956	2	277	.020
2	.168[b]	.028	.018	.76237	.001	.160	1	276	.689

a. Predictors: (Constant), EDULEV_c, TSIlattot

b. Predictors: (Constant), EDULEV_c, TSIlattot, TSIEDULEV

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	FSAlattot	EDULEV_c	FSAEDULEV
Pearson Correlation	DSICtotcong	1.000	.345	.124	-.068
	FSAlattot	.345	1.000	.039	-.227
	EDULEV_c	.124	.039	1.000	.005
	FSAEDULEV	-.068	-.227	.005	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.019	.128
	FSAlattot	.000	.	.258	.000
	EDULEV_c	.019	.258	.	.467
	FSAEDULEV	.128	.000	.467	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	EDULEV_c	280	280	280	280
	FSAEDULEV	280	280	280	280

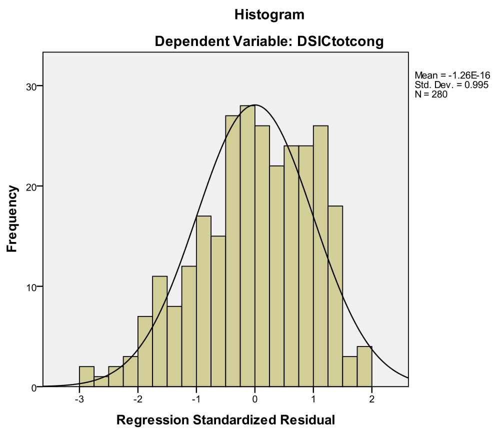
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.363[a]	.131	.125	.71947	.131	20.965	2	277	.000
2	.363[b]	.132	.122	.72074	.000	.025	1	276	.875

a. Predictors: (Constant), EDULEV_c, FSAlattot

b. Predictors: (Constant), EDULEV_c, FSAlattot, FSAEDULEV

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	FSAlattot	EDULEV_c	FSAEDULEV
Pearson Correlation	DSIBtotcong	1.000	.188	-.016	.014
	FSAlattot	.188	1.000	.039	-.227
	EDULEV_c	-.016	.039	1.000	.005
	FSAEDULEV	.014	-.227	.005	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.395	.407
	FSAlattot	.001	.	.258	.000
	EDULEV_c	.395	.258	.	.467
	FSAEDULEV	.407	.000	.467	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	EDULEV_c	280	280	280	280
	FSAEDULEV	280	280	280	280

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.190[a]	.036	.029	.66579	.036	5.174	2	277	.006
2	.199[b]	.039	.029	.66580	.003	.991	1	276	.320

a. Predictors: (Constant), EDULEV_c, FSAlattot

b. Predictors: (Constant), EDULEV_c, FSAlattot, FSAEDULEV

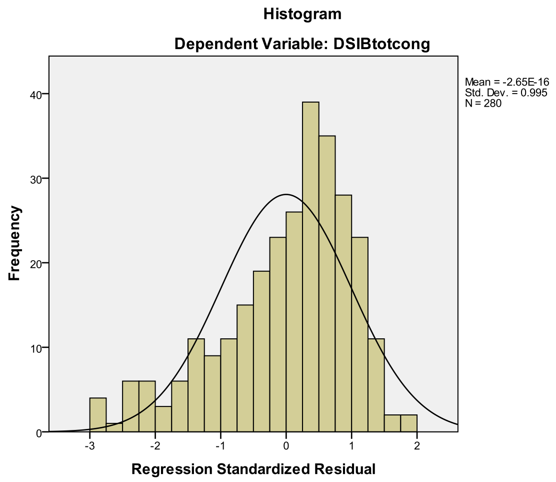
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.190[a]	.036	.029	.66579	.036	5.174	2	277	.006
2	.199[b]	.039	.029	.66580	.003	.991	1	276	.320

a. Predictors: (Constant), EDULEV_c, FSAlattot

b. Predictors: (Constant), EDULEV_c, FSAlattot, FSAEDULEV

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	TSIlattot	EDULEV_c	TSIEDULEV
Pearson Correlation	DSIBtotcong	1.000	.212	-.016	.064
	TSIlattot	.212	1.000	.114	-.037
	EDULEV_c	-.016	.114	1.000	-.078
	TSIEDULEV	.064	-.037	-.078	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.395	.142
	TSIlattot	.000	.	.028	.266
	EDULEV_c	.395	.028	.	.097
	TSIEDULEV	.142	.266	.097	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	EDULEV_c	280	280	280	280
	TSIEDULEV	280	280	280	280

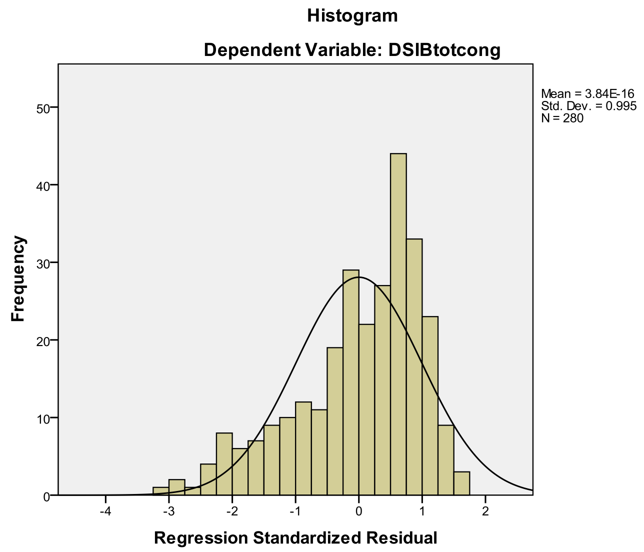
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.216[a]	.047	.040	.66212	.047	6.769	2	277	.001
2	.227[b]	.051	.041	.66164	.005	1.405	1	276	.237

a. Predictors: (Constant), EDULEV_c, TSIlattot

b. Predictors: (Constant), EDULEV_c, TSIlattot, TSIEDULEV

c. Dependent Variable: DSIBtotcong



FUTURES / FORESIGHT EDUCATION – DSI Conceptual

Correlations

		DSICtotcong	FSAlattot	EDUFUT_c	FSAEDUFUT
Pearson Correlation	DSICtotcong	1.000	.345	-.398	.257
	FSAlattot	.345	1.000	-.287	.352
	EDUFUT_c	-.398	-.287	1.000	-.215
	FSAEDUFUT	.257	.352	-.215	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.000	.000
	FSAlattot	.000	.	.000	.000
	EDUFUT_c	.000	.000	.	.000
	FSAEDUFUT	.000	.000	.000	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	EDUFUT_c	280	280	280	280
	FSAEDUFUT	280	280	280	280

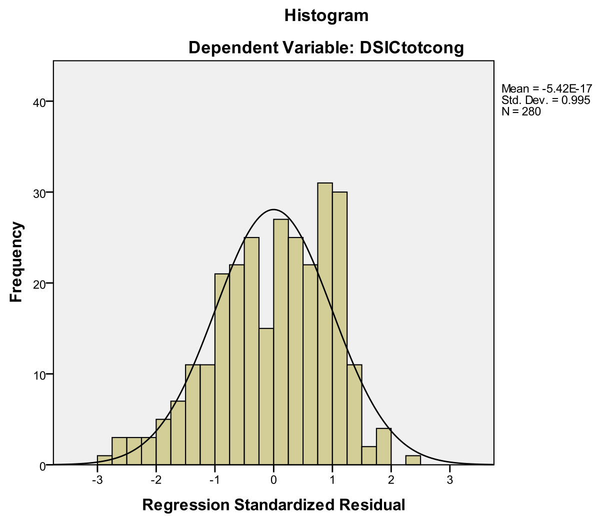
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.466[a]	.217	.211	.68319	.217	38.348	2	277	.000
2	.478[b]	.228	.220	.67946	.011	4.053	1	276	.045

a. Predictors: (Constant), EDUFUT_c, FSAlattot

b. Predictors: (Constant), EDUFUT_c, FSAlattot, FSAEDUFUT

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	TSIlattot	EDUFUT_c	TSIEDUFUT
Pearson Correlation	DSICtotcong	1.000	.125	-.398	.092
	TSIlattot	.125	1.000	-.103	-.199
	EDUFUT_c	-.398	-.103	1.000	-.094
	TSIEDUFUT	.092	-.199	-.094	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.000	.062
	TSIlattot	.019	.	.043	.000
	EDUFUT_c	.000	.043	.	.058
	TSIEDUFUT	.062	.000	.058	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	EDUFUT_c	280	280	280	280
	TSIEDUFUT	280	280	280	280

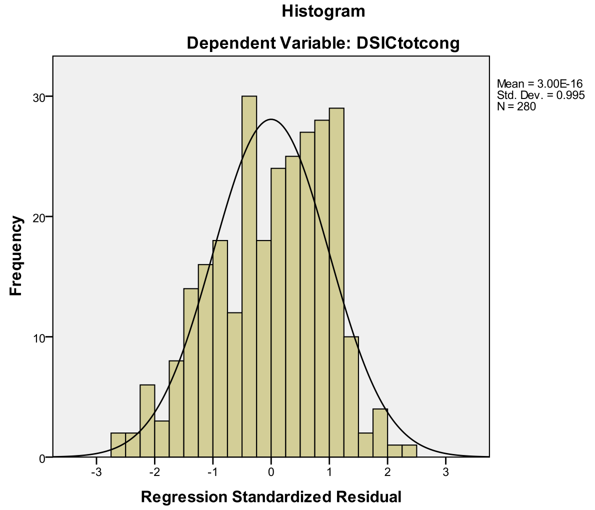
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.407[a]	.166	.160	.70512	.166	27.519	2	277	.000
2	.414[b]	.171	.162	.70406	.006	1.839	1	276	.176

a. Predictors: (Constant), EDUFUT_c, TSIlattot

b. Predictors: (Constant), EDUFUT_c, TSIlattot, TSIEDUFUT

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	TSIlattot	EDUFUT_c	TSIEDUFUT
Pearson Correlation	DSIBtotcong	1.000	.212	-.160	-.104
	TSIlattot	.212	1.000	-.103	-.199
	EDUFUT_c	-.160	-.103	1.000	-.094
	TSIEDUFUT	-.104	-.199	-.094	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.004	.041
	TSIlattot	.000	.	.043	.000
	EDUFUT_c	.004	.043	.	.058
	TSIEDUFUT	.041	.000	.058	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	EDUFUT_c	280	280	280	280
	TSIEDUFUT	280	280	280	280

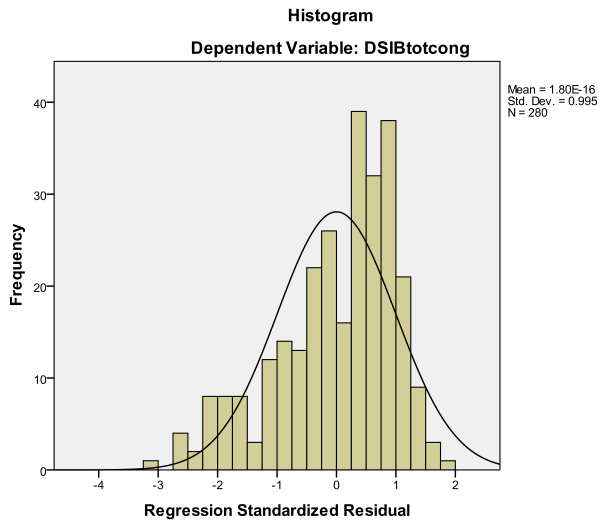
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.254[a]	.064	.058	.65595	.064	9.513	2	277	.000
2	.266[b]	.071	.061	.65489	.006	1.898	1	276	.169

a. Predictors: (Constant), EDUFUT_c, TSIlattot

b. Predictors: (Constant), EDUFUT_c, TSIlattot, TSIEDUFUT

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	FSAlattot	EDUFUT_c	FSAEDUFUT
Pearson Correlation	DSIBtotcong	1.000	.188	-.160	.047
	FSAlattot	.188	1.000	-.287	.352
	EDUFUT_c	-.160	-.287	1.000	-.215
	FSAEDUFUT	.047	.352	-.215	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.004	.218
	FSAlattot	.001	.	.000	.000
	EDUFUT_c	.004	.000	.	.000
	FSAEDUFUT	.218	.000	.000	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	EDUFUT_c	280	280	280	280
	FSAEDUFUT	280	280	280	280

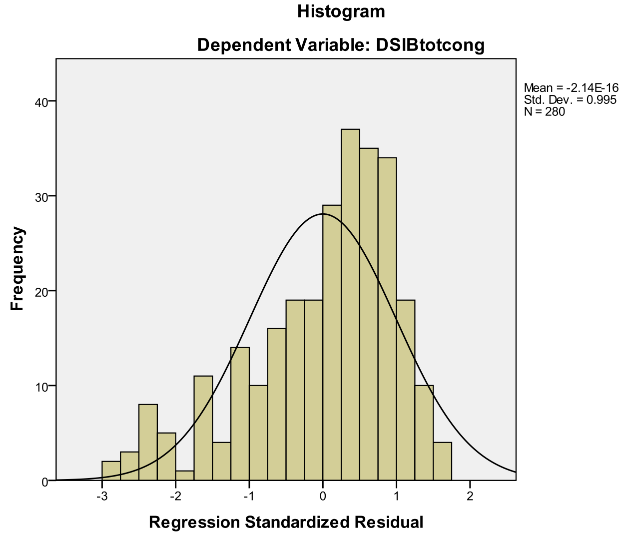
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.218[a]	.048	.041	.66173	.048	6.940	2	277	.001
2	.221[b]	.049	.039	.66250	.001	.357	1	276	.551

a. Predictors: (Constant), EDUFUT_c, FSAlattot

b. Predictors: (Constant), EDUFUT_c, FSAlattot, FSAEDUFUT

c. Dependent Variable: DSIBtotcong



INDUSTRY EXPERIENCE - DSI Conceptual / Analytic

Correlations

		DSICtotcong	TSIlattot	INDEXP_c	TSIINDEXP
Pearson Correlation	DSICtotcong	1.000	.125	-.120	.102
	TSIlattot	.125	1.000	-.019	-.014
	INDEXP_c	-.120	-.019	1.000	.022
	TSIINDEXP	.102	-.014	.022	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.022	.045
	TSIlattot	.019	.	.373	.408
	INDEXP_c	.022	.373	.	.360
	TSIINDEXP	.045	.408	.360	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	INDEXP_c	280	280	280	280

Correlations

		DSICtotcong	TSIlattot	INDEXP_c	TSIINDEXP
Pearson Correlation	DSICtotcong	1.000	.125	-.120	.102
	TSIlattot	.125	1.000	-.019	-.014
	INDEXP_c	-.120	-.019	1.000	.022
	TSIINDEXP	.102	-.014	.022	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.022	.045
	TSIlattot	.019	.	.373	.408
	INDEXP_c	.022	.373	.	.360
	TSIINDEXP	.045	.408	.360	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	INDEXP_c	280	280	280	280
	TSIINDEXP	280	280	280	280

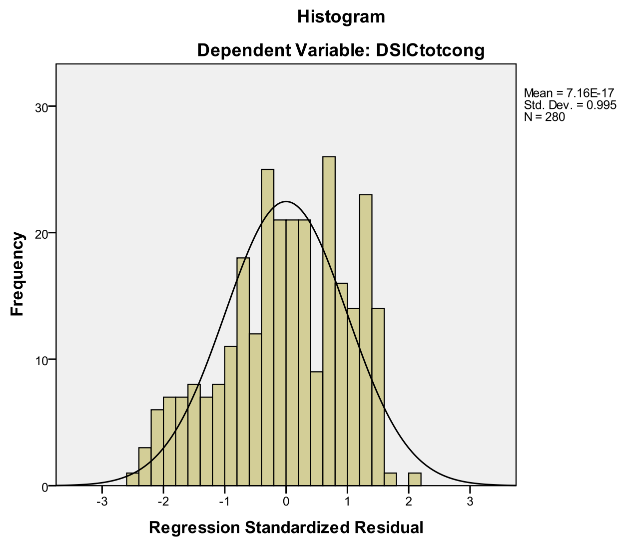
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.171[a]	.029	.022	.76059	.029	4.189	2	277	.016
2	.201[b]	.041	.030	.75754	.011	3.230	1	276	.073

a. Predictors: (Constant), INDEXP_c, TSIlattot

b. Predictors: (Constant), INDEXP_c, TSIlattot, TSIINDEXP

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	FSAlattot	INDEXP_c	FSAINDEXP
Pearson Correlation	DSICtotcong	1.000	.345	-.120	.158
	FSAlattot	.345	1.000	.018	.130
	INDEXP_c	-.120	.018	1.000	.040
	FSAINDEXP	.158	.130	.040	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.022	.004
	FSAlattot	.000	.	.381	.015
	INDEXP_c	.022	.381	.	.253
	FSAINDEXP	.004	.015	.253	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	INDEXP_c	280	280	280	280
	FSAINDEXP	280	280	280	280

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.368[a]	.135	.129	.71794	.135	21.647	2	277	.000
2	.387[b]	.149	.140	.71330	.014	4.613	1	276	.033

a. Predictors: (Constant), INDEXP_c, FSAlattot

b. Predictors: (Constant), INDEXP_c, FSAlattot, FSAINDEXP

c. Dependent Variable: DSICtotcong

Correlations

		DSIBtotcong	FSAlattot	INDEXP_c	FSAINDEXP
Pearson Correlation	DSIBtotcong	1.000	.188	-.001	.145
	FSAlattot	.188	1.000	.018	.130
	INDEXP_c	-.001	.018	1.000	.040
	FSAINDEXP	.145	.130	.040	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.492	.008
	FSAlattot	.001	.	.381	.015
	INDEXP_c	.492	.381	.	.253
	FSAINDEXP	.008	.015	.253	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	INDEXP_c	280	280	280	280
	FSAINDEXP	280	280	280	280

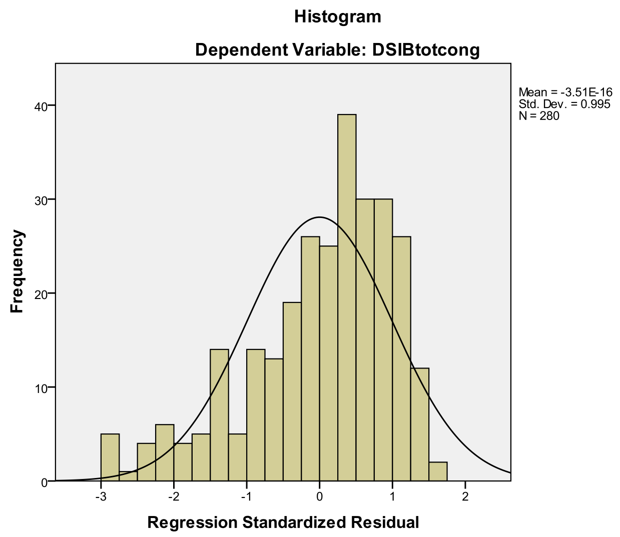
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.188[a]	.035	.029	.66597	.035	5.095	2	277	.007
2	.224[b]	.050	.040	.66206	.015	4.281	1	276	.039

a. Predictors: (Constant), INDEXP_c, FSAlattot

b. Predictors: (Constant), INDEXP_c, FSAlattot, FSAINDEXP

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	TSIlattot	INDEXP_c	FSAINDEXP
Pearson Correlation	DSIBtotcong	1.000	.212	-.001	.145
	TSIlattot	.212	1.000	-.019	.116
	INDEXP_c	-.001	-.019	1.000	.040
	FSAINDEXP	.145	.116	.040	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.492	.008
	TSIlattot	.000	.	.373	.026
	INDEXP_c	.492	.373	.	.253
	FSAINDEXP	.008	.026	.253	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	INDEXP_c	280	280	280	280
	FSAINDEXP	280	280	280	280

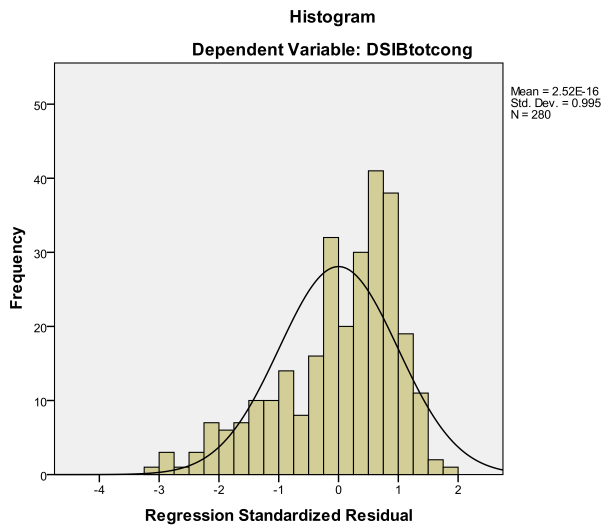
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.212[a]	.045	.038	.66269	.045	6.521	2	277	.002
2	.244[b]	.060	.049	.65880	.015	4.276	1	276	.040

a. Predictors: (Constant), INDEXP_c, TSIlattot

b. Predictors: (Constant), INDEXP_c, TSIlattot, FSAINDEXP

c. Dependent Variable: DSIBtotcong



POSITION EXPERIENCE – DSI Conceptual / Analytic

Correlations

		DSICtotcong	FSAlattot	POSEXP_c	FSAPOSEXP
Pearson Correlation	DSICtotcong	1.000	.344	-.106	.064
	FSAlattot	.344	1.000	-.041	.113
	POSEXP_c	-.106	-.041	1.000	.035
	FSAPOSEXP	.064	.113	.035	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.039	.143
	FSAlattot	.000	.	.250	.030
	POSEXP_c	.039	.250	.	.279
	FSAPOSEXP	.143	.030	.279	.
N	DSICtotcong	279	279	279	279
	FSAlattot	279	279	279	279
	POSEXP_c	279	279	279	279
	FSAPOSEXP	279	279	279	279

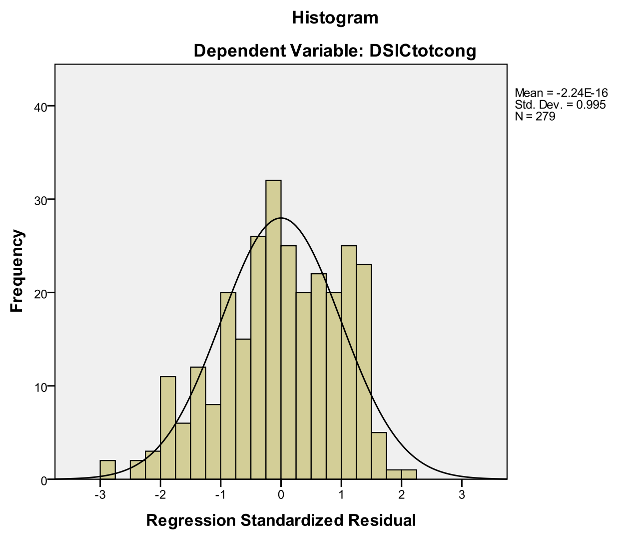
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.356[a]	.127	.121	.72191	.127	20.063	2	276	.000
2	.357[b]	.128	.118	.72287	.001	.270	1	275	.604

a. Predictors: (Constant), POSEXP_c, FSAlattot

b. Predictors: (Constant), POSEXP_c, FSAlattot, FSAPOSEXP

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	TSIlattot	POSEXP_c	TSIPOSEXP
Pearson Correlation	DSICtotcong	1.000	.135	-.106	.000
	TSIlattot	.135	1.000	-.007	-.110
	POSEXP_c	-.106	-.007	1.000	-.008
	TSIPOSEXP	.000	-.110	-.008	1.000
Sig. (1-tailed)	DSICtotcong	.	.012	.039	.497
	TSIlattot	.012	.	.452	.034
	POSEXP_c	.039	.452	.	.447
	TSIPOSEXP	.497	.034	.447	.
N	DSICtotcong	279	279	279	279
	TSIlattot	279	279	279	279
	POSEXP_c	279	279	279	279
	TSIPOSEXP	279	279	279	279

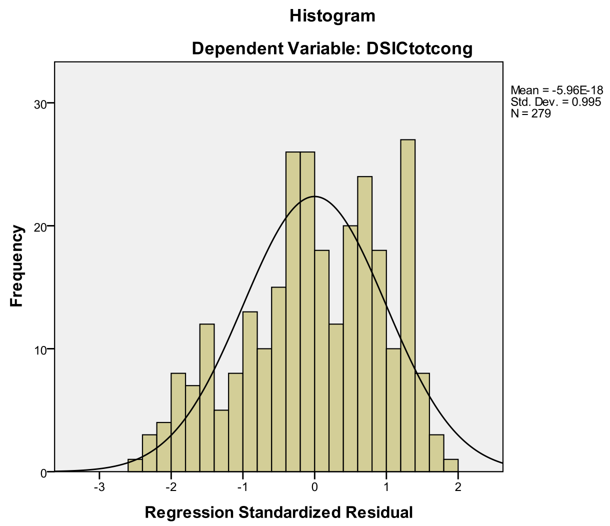
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.171[a]	.029	.022	.76119	.029	4.170	2	276	.016
2	.172[b]	.030	.019	.76249	.000	.059	1	275	.807

a. Predictors: (Constant), POSEXP_c, TSIlattot

b. Predictors: (Constant), POSEXP_c, TSIlattot, TSIPOSEXP

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	TSIlattot	POSEXP_c	TSIPOSEXP
Pearson Correlation	DSIBtotcong	1.000	.229	-.009	-.068
	TSIlattot	.229	1.000	-.007	-.110
	POSEXP_c	-.009	-.007	1.000	-.008
	TSIPOSEXP	-.068	-.110	-.008	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.442	.129
	TSIlattot	.000	.	.452	.034
	POSEXP_c	.442	.452	.	.447
	TSIPOSEXP	.129	.034	.447	.
N	DSIBtotcong	279	279	279	279
	TSIlattot	279	279	279	279
	POSEXP_c	279	279	279	279
	TSIPOSEXP	279	279	279	279

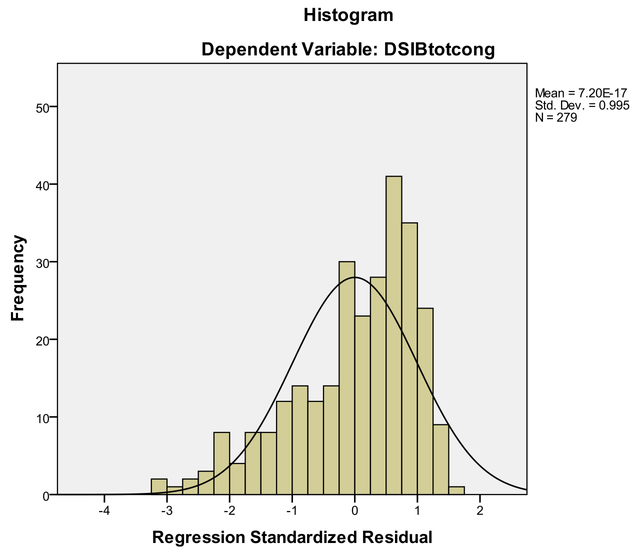
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.229[a]	.052	.045	.65988	.052	7.618	2	276	.001
2	.233[b]	.054	.044	.66042	.002	.543	1	275	.462

a. Predictors: (Constant), POSEXP_c, TSIlattot

b. Predictors: (Constant), POSEXP_c, TSIlattot, TSIPOSEXP

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	FSAlattot	POSEXP_c	FSAPOSEXP
Pearson Correlation	DSIBtotcong	1.000	.186	-.009	.037
	FSAlattot	.186	1.000	-.041	.113
	POSEXP_c	-.009	-.041	1.000	.035
	FSAPOSEXP	.037	.113	.035	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.442	.268
	FSAlattot	.001	.	.250	.030
	POSEXP_c	.442	.250	.	.279
	FSAPOSEXP	.268	.030	.279	.
N	DSIBtotcong	279	279	279	279
	FSAlattot	279	279	279	279
	POSEXP_c	279	279	279	279
	FSAPOSEXP	279	279	279	279

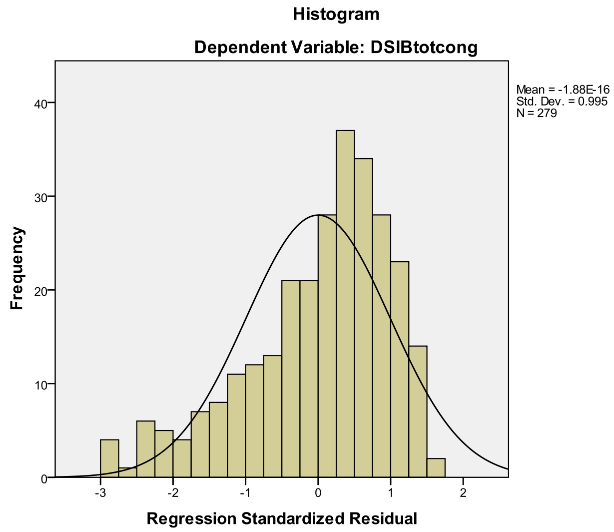
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.186[a]	.035	.028	.66596	.035	4.970	2	276	.008
2	.187[b]	.035	.025	.66708	.000	.076	1	275	.783

a. Predictors: (Constant), POSEXP_c, FSAlattot

b. Predictors: (Constant), POSEXP_c, FSAlattot, FSAPOSEXP

c. Dependent Variable: DSIBtotcong



POSITION – DSI Conceptual / Analytic

Correlations

		DSICtotcong	TSIlattot	POS_c	TSIPOS
Pearson Correlation	DSICtotcong	1.000	.125	.063	-.071
	TSIlattot	.125	1.000	.047	.123
	POS_c	.063	.047	1.000	.171
	TSIPOS	-.071	.123	.171	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.146	.118
	TSIlattot	.019	.	.219	.020
	POS_c	.146	.219	.	.002
	TSIPOS	.118	.020	.002	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	POS_c	280	280	280	280
	TSIPOS	280	280	280	280

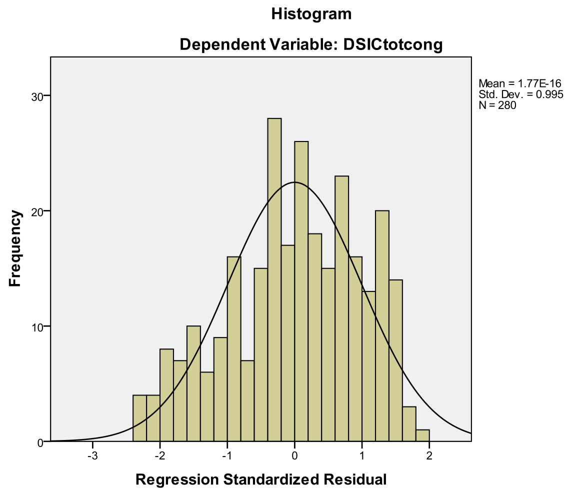
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.137[a]	.019	.012	.76470	.019	2.658	2	277	.072
2	.169[b]	.028	.018	.76234	.010	2.721	1	276	.100

a. Predictors: (Constant), POS_c, TSIlattot

b. Predictors: (Constant), POS_c, TSIlattot, TSIPOS

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	FSAlattot	POS_c	FSAPOS
Pearson Correlation	DSICtotcong	1.000	.345	.063	-.103
	FSAlattot	.345	1.000	-.014	-.153
	POS_c	.063	-.014	1.000	-.113
	FSAPOS	-.103	-.153	-.113	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.146	.042
	FSAlattot	.000	.	.405	.005
	POS_c	.146	.405	.	.030
	FSAPOS	.042	.005	.030	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	POS_c	280	280	280	280
	FSAPOS	280	280	280	280

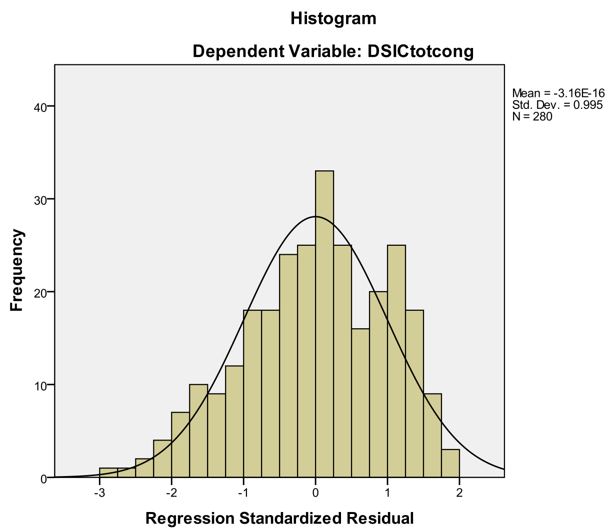
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.352[a]	.124	.118	.72262	.124	19.579	2	277	.000
2	.355[b]	.126	.116	.72313	.002	.605	1	276	.437

a. Predictors: (Constant), POS_c, FSAlattot

b. Predictors: (Constant), POS_c, FSAlattot, FSAPOS

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	FSAlattot	POS_c	FSAPOS
Pearson Correlation	DSIBtotcong	1.000	.188	.170	-.037
	FSAlattot	.188	1.000	-.014	-.153
	POS_c	.170	-.014	1.000	-.113
	FSAPOS	-.037	-.153	-.113	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.002	.271
	FSAlattot	.001	.	.405	.005
	POS_c	.002	.405	.	.030
	FSAPOS	.271	.005	.030	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	POS_c	280	280	280	280
	FSAPOS	280	280	280	280

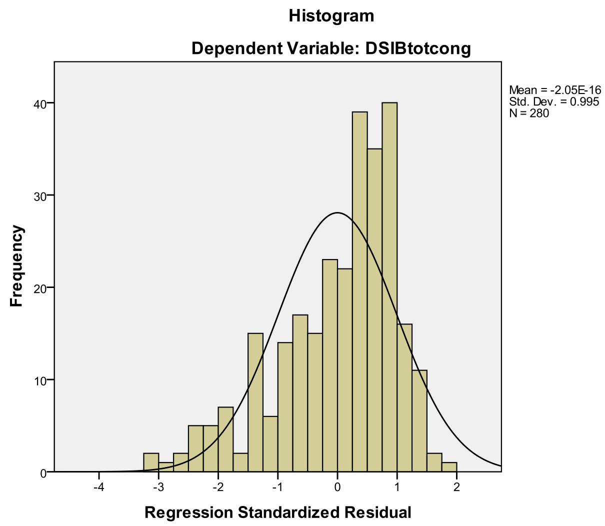
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.255[a]	.065	.058	.65563	.065	9.660	2	277	.000
2	.256[b]	.065	.055	.65676	.000	.044	1	276	.835

a. Predictors: (Constant), POS_c, FSAlattot

b. Predictors: (Constant), POS_c, FSAlattot, FSAPOS

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	TSIlattot	POS_c	TSIPOS
Pearson Correlation	DSIBtotcong	1.000	.212	.170	-.054
	TSIlattot	.212	1.000	.047	.123
	POS_c	.170	.047	1.000	.171
	TSIPOS	-.054	.123	.171	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.002	.186
	TSIlattot	.000	.	.219	.020
	POS_c	.002	.219	.	.002
	TSIPOS	.186	.020	.002	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	POS_c	280	280	280	280
	TSIPOS	280	280	280	280

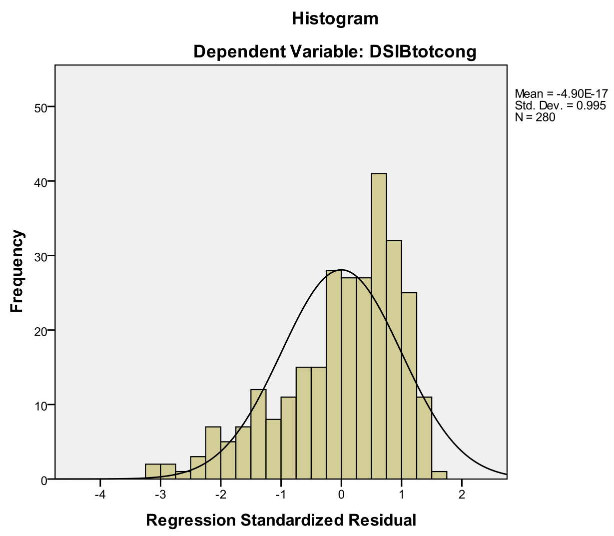
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.266[a]	.071	.064	.65375	.071	10.514	2	277	.000
2	.287[b]	.082	.072	.65077	.012	3.542	1	276	.061

a. Predictors: (Constant), POS_c, TSIlattot

b. Predictors: (Constant), POS_c, TSIlattot, TSIPOS

c. Dependent Variable: DSIBtotcong



AGE – DSI Conceptual / Analytic

Correlations

		DSICtotcong	FSAlattot	AGE_c	FSAAGE
Pearson Correlation	DSICtotcong	1.000	.345	-.087	.079
	FSAlattot	.345	1.000	.021	.000
	AGE_c	-.087	.021	1.000	.001
	FSAAGE	.079	.000	.001	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.074	.095
	FSAlattot	.000	.	.364	.499
	AGE_c	.074	.364	.	.496
	FSAAGE	.095	.499	.496	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	AGE_c	280	280	280	280
	FSAAGE	280	280	280	280

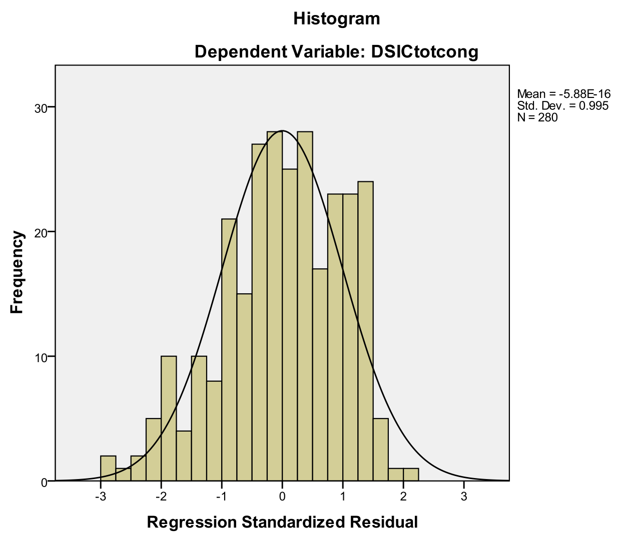
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.358[a]	.128	.122	.72090	.128	20.332	2	277	.000
2	.366[b]	.134	.125	.71963	.006	1.982	1	276	.160

a. Predictors: (Constant), AGE_c, FSAlattot

b. Predictors: (Constant), AGE_c, FSAlattot, FSAAGE

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	TSIlattot	AGE_c	TSIAGE
Pearson Correlation	DSICtotcong	1.000	.125	-.087	.055
	TSIlattot	.125	1.000	.043	-.103
	AGE_c	-.087	.043	1.000	.085
	TSIAGE	.055	-.103	.085	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.074	.178
	TSIlattot	.019	.	.235	.043
	AGE_c	.074	.235	.	.079
	TSIAGE	.178	.043	.079	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	AGE_c	280	280	280	280
	TSIAGE	280	280	280	280

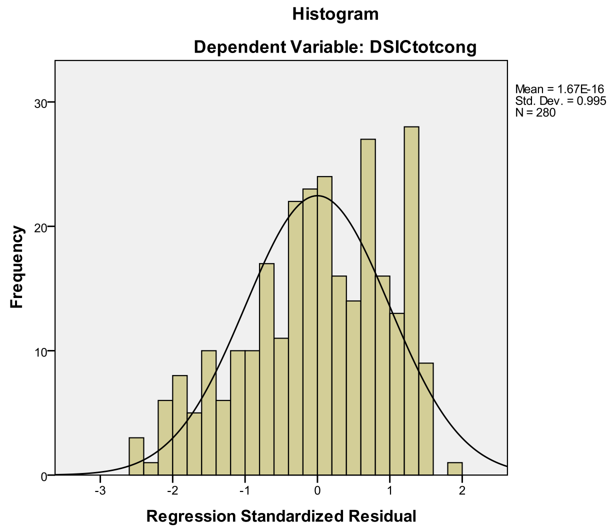
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.155[a]	.024	.017	.76268	.024	3.406	2	277	.035
2	.173[b]	.030	.019	.76173	.006	1.696	1	276	.194

a. Predictors: (Constant), AGE_c, TSIlattot

b. Predictors: (Constant), AGE_c, TSIlattot, TSIAGE

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	TSIlattot	AGE_c	TSIAGE
Pearson Correlation	DSIBtotcong	1.000	.212	.091	.060
	TSIlattot	.212	1.000	.043	-.103
	AGE_c	.091	.043	1.000	.085
	TSIAGE	.060	-.103	.085	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.065	.157
	TSIlattot	.000	.	.235	.043
	AGE_c	.065	.235	.	.079
	TSIAGE	.157	.043	.079	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	AGE_c	280	280	280	280
	TSIAGE	280	280	280	280

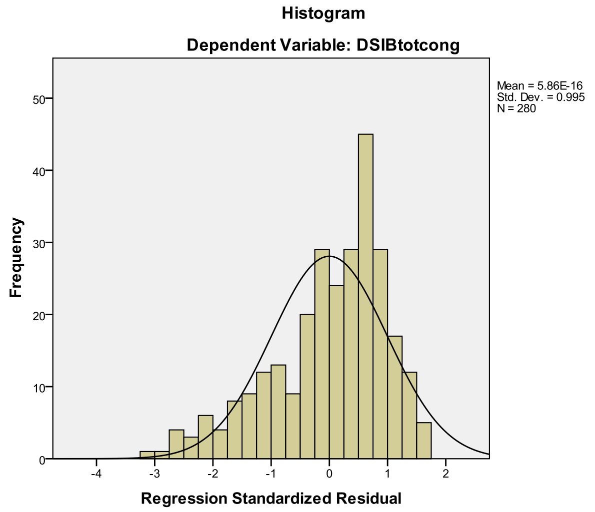
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.227[a]	.052	.045	.66036	.052	7.543	2	277	.001
2	.239[b]	.057	.047	.65957	.006	1.669	1	276	.197

a. Predictors: (Constant), AGE_c, TSIlattot

b. Predictors: (Constant), AGE_c, TSIlattot, TSIAGE

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	FSAlattot	AGE_c	FSAAGE
Pearson Correlation	DSIBtotcong	1.000	.188	.091	.089
	FSAlattot	.188	1.000	.021	.000
	AGE_c	.091	.021	1.000	.001
	FSAAGE	.089	.000	.001	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.065	.068
	FSAlattot	.001	.	.364	.499
	AGE_c	.065	.364	.	.496
	FSAAGE	.068	.499	.496	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	AGE_c	280	280	280	280
	FSAAGE	280	280	280	280

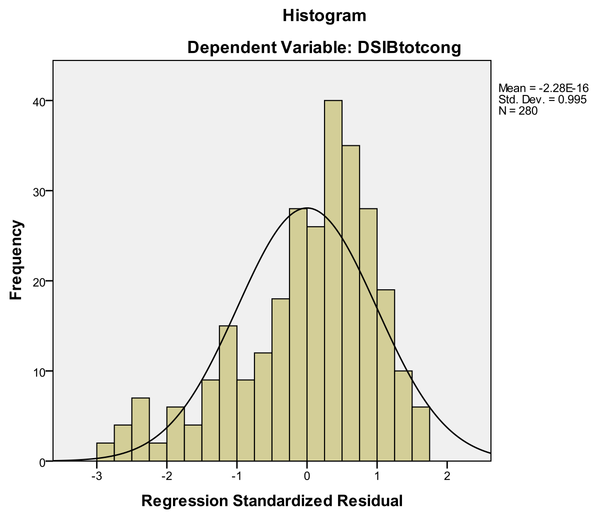
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.207[a]	.043	.036	.66336	.043	6.228	2	277	.002
2	.226[b]	.051	.041	.66179	.008	2.315	1	276	.129

a. Predictors: (Constant), AGE_c, FSAlattot

b. Predictors: (Constant), AGE_c, FSAlattot, FSAAGE

c. Dependent Variable: DSIBtotcong



NATIONALITY – DSI Conceptual

Correlations

		DSICtotcong	TSIlattot	NAT_c	TSINAT
Pearson Correlation	DSICtotcong	1.000	.125	.233	.002
	TSIlattot	.125	1.000	.205	.142
	NAT_c	.233	.205	1.000	.018
	TSINAT	.002	.142	.018	1.000
Sig. (1-tailed)	DSICtotcong	.	.019	.000	.486
	TSIlattot	.019	.	.000	.009
	NAT_c	.000	.000	.	.383
	TSINAT	.486	.009	.383	.
N	DSICtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	NAT_c	280	280	280	280
	TSINAT	280	280	280	280

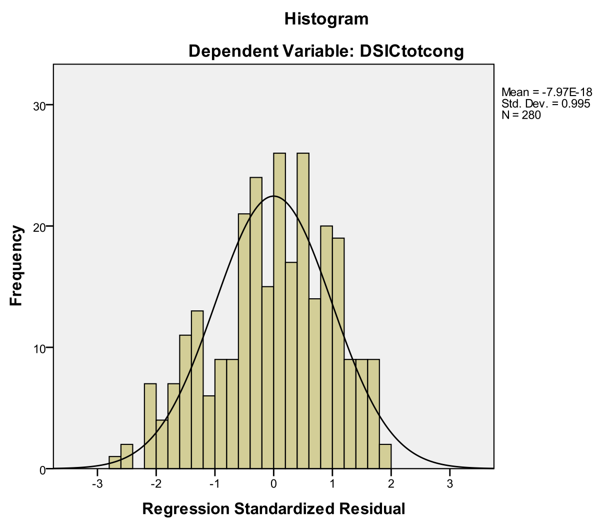
Model Summary[c]

Model					Change Statistics				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.246[a]	.060	.054	.74830	.060	8.912	2	277	.000
2	.246[b]	.061	.050	.74959	.000	.052	1	276	.821

a. Predictors: (Constant), NAT_c, TSIlattot

b. Predictors: (Constant), NAT_c, TSIlattot, TSINAT

c. Dependent Variable: DSICtotcong



Correlations

		DSICtotcong	FSAlattot	NAT_c	FSANAT
Pearson Correlation	DSICtotcong	1.000	.345	.233	-.238
	FSAlattot	.345	1.000	.236	-.388
	NAT_c	.233	.236	1.000	.021
	FSANAT	-.238	-.388	.021	1.000
Sig. (1-tailed)	DSICtotcong	.	.000	.000	.000
	FSAlattot	.000	.	.000	.000
	NAT_c	.000	.000	.	.362
	FSANAT	.000	.000	.362	.
N	DSICtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	NAT_c	280	280	280	280
	FSANAT	280	280	280	280

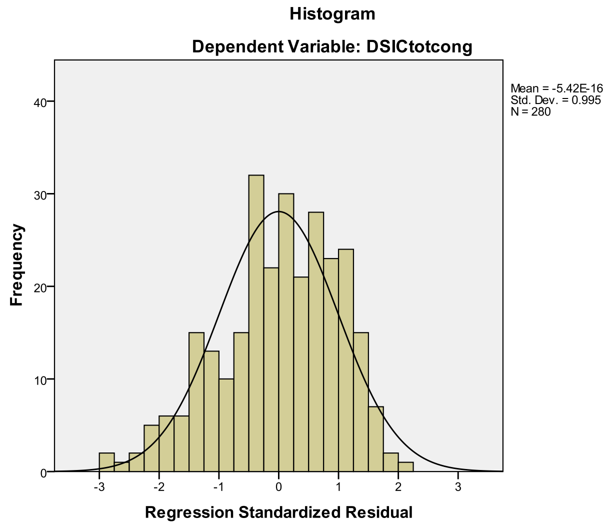
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.379[a]	.143	.137	.71447	.143	23.203	2	277	.000
2	.402[b]	.161	.152	.70828	.018	5.866	1	276	.016

a. Predictors: (Constant), NAT_c, FSAlattot

b. Predictors: (Constant), NAT_c, FSAlattot, FSANAT

c. Dependent Variable: DSICtotcong



Correlations

		DSIBtotcong	FSAlattot	NAT_c	FSANAT
Pearson Correlation	DSIBtotcong	1.000	.188	.236	-.130
	FSAlattot	.188	1.000	.236	-.388
	NAT_c	.236	.236	1.000	.021
	FSANAT	-.130	-.388	.021	1.000
Sig. (1-tailed)	DSIBtotcong	.	.001	.000	.015
	FSAlattot	.001	.	.000	.000
	NAT_c	.000	.000	.	.362
	FSANAT	.015	.000	.362	.
N	DSIBtotcong	280	280	280	280
	FSAlattot	280	280	280	280
	NAT_c	280	280	280	280
	FSANAT	280	280	280	280

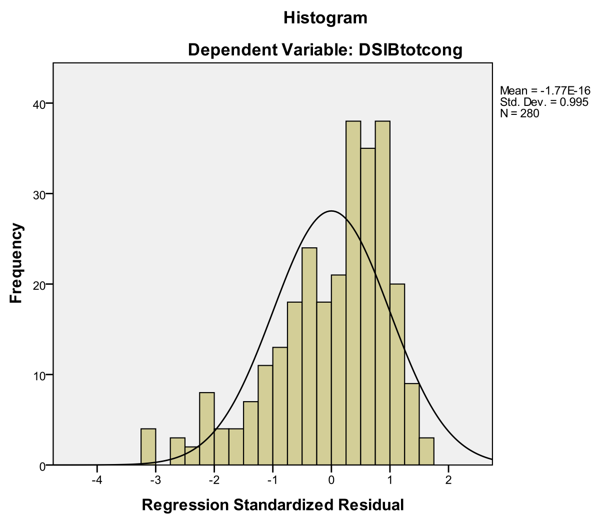
Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.273[a]	.074	.068	.65238	.074	11.140	2	277	.000
2	.286[b]	.082	.072	.65086	.008	2.290	1	276	.131

a. Predictors: (Constant), NAT_c, FSAlattot

b. Predictors: (Constant), NAT_c, FSAlattot, FSANAT

c. Dependent Variable: DSIBtotcong



Correlations

		DSIBtotcong	TSIlattot	NAT_c	TSINAT
Pearson Correlation	DSIBtotcong	1.000	.212	.236	.004
	TSIlattot	.212	1.000	.205	.142
	NAT_c	.236	.205	1.000	.018
	TSINAT	.004	.142	.018	1.000
Sig. (1-tailed)	DSIBtotcong	.	.000	.000	.475
	TSIlattot	.000	.	.000	.009
	NAT_c	.000	.000	.	.383
	TSINAT	.475	.009	.383	.
N	DSIBtotcong	280	280	280	280
	TSIlattot	280	280	280	280
	NAT_c	280	280	280	280
	TSINAT	280	280	280	280

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.289[a]	.084	.077	.64908	.084	12.665	2	277	.000
2	.290[b]	.084	.074	.65004	.001	.178	1	276	.674

a. Predictors: (Constant), NAT_c, TSIlattot

b. Predictors: (Constant), NAT_c, TSIlattot, TSINAT

c. Dependent Variable: DSIBtotcong